



# INTERNATIONAL CONGRESS ON NATURAL, HEALTH SCIENCES AND TECHNOLOGY

## BOOK OF ABSTRACTS



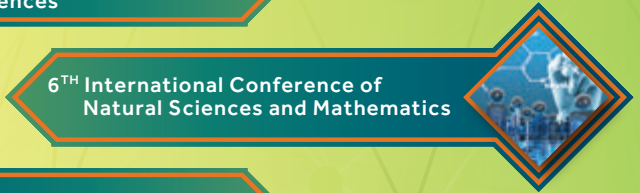
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8<sup>TH</sup> International Scientific  
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7<sup>TH</sup> International Scientific  
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6<sup>TH</sup> International Conference of  
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4<sup>TH</sup> International Conference of  
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2<sup>ND</sup> International Conference on  
Sustainable Agriculture Farming  
Systems

15 – 17 May, 2024  
Tetova, North Macedonia





**International Congress on Natural, Health Sciences  
and Technology**

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## Contents

### 9<sup>th</sup> International Balkan Conference in Sport Sciences

#### **DIFFERENCES BETWEEN SOME ANTHROPOMETRIC PARAMETERS AND MOTOR SKILLS BETWEEN JUNIOR AND CADET VOLLEYBALL PLAYERS**

Laureta ABAZI, Granit BAJRAMI, Vjosa ZHUBAJ 63

#### **METHODS FOR MONITORING TRAINING LOAD AND ASSESSING NEUROMUSCULAR PERFORMANCE**

Mark DODAJ, Agron KASA 65

#### **STUDENT ENGAGEMENT IN RECREATIONAL AND OVERWEIGHT PHYSICAL ACTIVITIES**

Vjosa ZHUBAJ, Laureta ABAZI 67

#### **EVALUATING THE ROLE OF CYP1A2 rs762551 GENE POLYMORPHISM ON ARROWHEAD AGILITY DRILL TEST PERFORMANCE IN ACTIVE YOUNG MEN**

Esra YILDIZ, Mesut CERIT, Murat ANILIR 69

#### **EVALUATING THE INFLUENCE OF THE CYP1A2 rs762551 GENE POLYMORPHISM ON THE PERFORMANCE OF PHYSICALLY ACTIVE ADULT MALES IN THE YO-YO INTERMITTENT RECOVERY 2 TEST**

Didem ÇATALO, Mesut CERIT, Selin YILDIRIM TUNCER 71

#### **SELECTION OF KARATE PLAYERS AT A YOUNG AGE BASED ON SOME MOTOR SKILLS**

Elhami SHABANI 73

**EVALUATION OF THE EFFECTS OF ACE GENE  
POLYMORPHISM ON YO-YO INTERMITTENT  
RECOVERY 2 TEST PERFORMANCE IN ACTIVE YOUNG  
MEN**

Hakan DAKILIR, Mesut CERIT, Metin DALIP, Lejla AJRUSH,  
Jon ISMAILI 74

**PERCEIVED BENEFITS AND BARRIERS OF EXERCISE  
AMONG ACTIVE AND INACTIVE KOSOVAR STUDENTS  
AT THE UNIVERSITIES OF NORTH MACEDONIA**

Arben MALIQI, Blerim SYLEJMANI, Nazim MYRTAJ, Rabbit  
VESELI 76

**SPORT, HEALTH AND THE PEOPLE (SHAPE). A WEST  
BALKAN UNIVERSITY NETWORK ON SPORT AND PLAY  
IN COMMUNITY LIFE AND WELLBAING (WORK IN  
PROGRESS)**

Fadil MAMUTI, Shpresa MEMISHI, Kastriot SHAQIRI, Agim  
REXHEPI, Blerim SULEJMANI 78

**CHALLENGES AND OPPORTUNITIES FOR THE  
DEVELOPMENT OF PHYSICAL ACTIVITY IN THE  
YOUNGEST COUNTRY IN THE WORLD**

Mimoza SHKODRA, Juliana MEJÍA GRUESO, Andrea  
RAMÍREZ VARELA 80

**SOCIO-ECONOMIC AND SOCIO-CULTURAL ASPECT OF  
INFLUENCE ON ANTHROPOMETRIC AND MOTOR  
CHARACTERISTICS: EMPIRICAL ANALYSIS OF THE  
EXPERIENCES OF THE TEACHING-EDUCATIONAL  
STAFF AMONG HIGH SCHOOL STUDENTS**

Milazim KAMBERI, Laureta ABAZI, Hyjnor KICA, Adriatik  
KAMBERI 82



**THE STATUS OF PHYSICAL GROWTH AND MOVEMENT DEVELOPMENT OF LOWER SECONDARY SCHOOL CHILDREN IN THE SEVEN REGIONS OF KOSOVO**

Illir GLLAREVA, Hasim RUSHITI, Alim HAJREDINI, Besim HALILAJ 84

**RELATIONSHIP BETWEEN ANTHROPOMETRIC CHARACTERISTICS AND MOTOR SKILLS OF 16-YEAR-OLD BASKETBALL PLAYERS**

Xheneta JASHARI, Fatmir PIREVA, Shemsedin VEHAJI, Gentijana PAÇARIZI, Ardita PIREVA 86

**COMPARATIVE ANALYSIS BETWEEN THE 2014, 2018 AND 2022 WINTER OLYMPIC GAMES IN TEAM SKI JUMPING**

Qendresa SHALA, Zenel METAJ, Shkelzen SHALA, Fatlind GASHI, Nazim MYRTAJ 88

**THE IMPACT AND BENEFITS OF PHYSICAL ACTIVITY DURING AND AFTER PREGNANCY**

Elga DAMO 90

**NATIONAL UNIVERSITY CHAMPIONSHIP 2023 - NATIONAL UNIVERSITY GAMES 2023**

Aida SHEHU, Marlind PELUSHI 92

**SOME PARAMETERS OF BODY AND MOVEMENT DEVELOPMENT IN STUDENTS AGED 12-13 YEARS OF “ELENA GJIKA” PRIMARY SCHOOL FROM PRISHTINA**

Diellza RUSHITI, Besim HALILAJ, Hasim RUSHITI 93

**RELATION OF MATURATION WITH SOME AGILITY TESTS IN YOUNG FOOTBALL PLAYERS FROM REPUBLIC OF NORTH MACEDONIA**

Lejla AJRUSH, Jon ISMAILI, Haki ISMAILI, Metin DALIP 95

**MAXIMIZING PHYSICAL PERFORMANCE IN LOWER LIMB AMPUTEES: A SYSTEMATIC REVIEW**

Aldo MUÇALLIU 97

**BULLYING IN SPORTS: ANALYSIS AND MANAGEMENT STRATEGIES IN SCHOOL SPORTING ENVIRONMENTS**

Francesco VITOBELLO, Jona HOXHA 99

**MOTIVATION AND KNOWLEDGE OF SWIMMING AMONG STUDENTS AGED 11 AND 14 IN THE MUNICIPALITY OF FERIZAJ**

Lirie MALIQI, Hasim RUSHITI, Alim HAJREDINI, Besim HALILAJ, Ilir GLLAREVA 100

**ANALYZING THE EXECUTION STYLE OF THE JUMP TYPES AS A KEY FACTOR OF PERFORMANCE**

Era DEVA, Milaim BERISHA 102

**BENEFITS OF OUTDOOR ACTIVITIES ON CHILD DEVELOPMENT: LITERATURE REVIEW**

Adri KASMI, Juel JARANI 104

**THE INFLUENCE OF FATIGUE ON SOME KINEMATIC PARAMETERS DURING THREE-POINT SHOOTING IN BASKETBALL**

Fadil REXHEPI, Betim HYSENI, Fatmir PIREVA, Besim GASHI 106

**12 WEEKS EFFECT OF PLYOMETRIC TRAINING ON ANTHROPOMETRIC MEASURES AND PHYSICAL FITNESS PERFORMANCE IN 14-YEAR-OLD BOYS**

Astrit ISENI, Muamer ABDULLAI 108

**RELATIONSHIPS AND INFLUENCE OF ANTHROPOMETRIC CHARACTERISTICS AND PHYSICAL FITNESS PARAMETERS IN 100 M SPRINT RUNNING IN ADOLESCENTS**

Zarife JASHARI, Astrit ISENI 110

**THE EFFECTS OF SPORTS PARTICIPATION ON ACADEMIC ACHIEVEMENT, QUALITY OF LIFE AND SELF-ESTEEM AMONG YOUNG PEOPLE IN KOSOVO**

Fitore AZEMI, Naim FANAJ, Bardhyl KABASHI 112

**LOW BACK PAIN IN THE HEALTHCARE PROFESSIONALS**

Petri O., Abazaj E., Daka.A, Marku. A, Angjeli. E 114

**8<sup>th</sup> International Scientific Conference on Applied Sciences**

**DYNAMIC EVOLUTION: MUSEUM SPATIAL COMPOSITION AND ARCHITECTURAL INTEGRATION**

Arbresha IBRAHIMI, Marija MILOSHEVSKA JANAKIESKA, Vjosa SARAÇINI 117

**POLYPROPYLENE STRIP REINFORCEMENT FOR SEISMIC STRENGTHENING OF MASONRY WALLS: A PROMISING SOLUTION**

Festim ADEMI, Enis JAKUPI 118

**WHICH ARCHITECTURE STUDY MODULE DOES OUR COUNTRY AND EUROPE NEED AS EUROPEAN UNION COMUNUNITY**

Enis JAKUPI 120

**ANALYSIS OF THE FIRE BEHAVIOR OF COMPOSITE BEAMS OF STEEL AND CONCRETE IN MULTI-STORY BUILDINGS**

Shinasi ZEJNELI, Berat ZEJNELI 121

**DIMENSION OF THE CONSTRUCTIVE ELEMENTS OF A STEEL FRAME WITH TWO AREAS OF A HALL ACCORDING TO EURO COD 3 UNDER THE INFLUENCE OF SNOW, WIND AND SEISMIC**

Shinasi ZEJNELI, Berat ZEJNELI 124

**CONSERVATION AND RESTORATION OF MONUMENTS OF CULTURAL WORKS**

Pajazit HAJZERI, Qazim NAMANI, Faik SAHITI, Emin SALLAHU 127

**UNDERGROUND NEW LIVING CONCEPT IN KOSOVO**

Zana PRELVUKAJ, Lulzim BEQIRI 128

**THE DEVELOPMENT AND APPLICATION OF INTELLIGENT TRANSPORT SYSTEMS AND THEIR IMPACT ON TRAFFIC SAFETY**

Sedat ARUCI, Feta SINANI, Pero STEFANOVSKI, Adina OSMANI, Emir ALIJA 129

**MULTIPLEXING AND SCALABILITY OF DATA IN THE INDUSTRIAL PROCESS AND IMPLEMENTATION**

Nderim ZEQRIRI, Ferit IDRIZI, Asan IDRIZI, Eip RUFATI 131

**SNAIL TRACK EFFECT ON INSTALLED PHOTOVOLTAIC  
MODULE**

Irfan SHAQIRI 133

**TRENDS AND COHERENCE AS VALUES OF  
URBAN/ARCHITECTURAL BUILT HERITAGE**

Binak BEQAJ, Kujtim ELEZI 134

**LANDSLIDE RISK ASSESSMENT IN A NEIGHBORHOOD IN  
THE VILLAGE OF PIROK NEAR TETOVE**

Idaver HUSEINI, Nexhmi KRASNIQI, Asan IDRIZI, Semijale  
HSANI-ZIBERI 136

**MAINTENANCE MANAGEMENT ACTIVITIES OF  
COLLECTIVE HOUSING BUILDINGS**

Idaver HUSEINI, Nexhmi KRASNIQI, Anjeza ALAJ 137

**FORM-FINDING OF ARCHES**

Teodora MIHAJLOVSKA, Dobre NIKOLOVSKI, Ana  
TROMBEVA-GAVRILOSKA, Liljana D. SOFRONIEVSKA 138

**CONSTRUCTION OF FLOATING PHOTOVOLTAIC  
POWER PLANTS IN THE AREA OF JSC ESM RESERVOIRS**

Imer ZENKU, Merita DEMA, Nexhbedin ISMAILI 139

**EXPLORING SHOCK ABSORBER VIBRATION DYNAMICS  
THROUGH ARDUINO BASED MEASUREMENTS**

Lundrim DALIPI, Ferit IDRIZI 141

**A COMPARATIVE METHOD FOR ANALYSES OF  
EFFECTIVENESS OF CONVENTIONAL MACHINE**

**LEARNING METHODS VS DEEP NEURAL NETWORKS IN PREDICTIVE MODEL APPLICATIONS**

Ferit IDRIZI, Nderim ZEQIRI, Besim AQIFI 143

**DETECTION AND PREDICTION OF STEPPER MOTOR FRICTION BY USING ACCELEROMETERS AND LONG SHORT TERM MEMORY NEURAL NETWORKS**

Besim AQIFI, Ferit IDRIZI 145

**THE APPLICATION OF MACHINE LEARNING FOR THE MODEL DESIGN FOR THE DETECTION OF SMALL DEFECTS IN MECHANICAL PROCESSING**

Drilon SEJDIJA, Ferit IDRIZI 146

**VERNACULAR ARCHITECTURE AND NATIONAL IDENTITY: BOSNIA AND MACEDONIA REVISITED**

Kujtim ELEZI, Nuran SALIU 148

**ANALYSIS TO STRATEGIES TO REDUCE THE NUMBER OF TRAFFIC ACCIDENTS ON ROADS**

Feta SINANI, Emir ALIJA, Xhemile SEJDINI, Adina OSMANI 150

**EVOLUTION OF ELECTRIC VEHICLE REGISTRATIONS AND CHARGING INFRASTRUCTURE IN NORTH MACEDONIA**

Xhemile SEJDINI, Resmi EJUPI, Feta SINANI 151

**LOCAL COMMUNITY AWARENESS AND PERCEPTIONS TOWARDS INDUSTRIAL HERITAGE VALUES AND TRANSFORMATION**

Fjolla IBRAIMI, Enis JAKUPI, Aleksandar RADEVSKI 152

**AIR QUALITY IN THE REPUBLIC OF NORTH  
MACEDONIA AND ITS EFFECTS ON HEALTH**

Asan IDRIZI, Arbenita IDRIZI, Idaver HUSEINI, Nexhbedin  
ISMAILI, Blerta IDRIZI 154

**VERNACULAR DWELLING; A COMPARISON BETWEEN  
PRIZREN AND OHRID**

Bekim CEKO, Kujtim ELEZI, Lulzim BEQIRI 156

**PERFORMING INVESTIGATIONS IN ORDER TO FIND A  
REASONS FOR STEEL WIRE ROPE BREAKING**

Nazif JASHARI, Sveto CVETKOVSKI 157

**EXPLORING THE HIDDEN PSYCHOLOGICAL EFFECTS  
OF URBAN NOISE POLLUTION IN KOSOVO**

Shqiprim AHMETI, Egzon BAJRAKTARI 159

**ENHANCING THE POTENTIAL OF SPORTS FACILITIES  
AT SCHOOLS**

Hazra MERXHANI, Fjolla IBRAIMI 160

**IMPACT OF APPROPRIATE ORIENTATION OF  
RESIDENTIAL BUILDINGS ON ENERGY EFFICIENCY: A  
CASE STUDY IN TETOVO, NORTH MACEDONIA**

Lindihana GOXHA, Erda BESIMI, Fjolla IBRAIMI 161

**DETERMINING THE DANGER THRESHOLD OF  
INTERSECTION TRAFFIC ACCIDENTS**

Zoran JOŠEVSKI, Pero STEFANOVSKI, Feta SINANI, Mile  
STOJMENOV 163

**THE IMPACT OF SOCIO-CULTURAL DEVELOPMENTS ON  
THE URBAN STRUCTURE OF TETOVO DURING THE  
PERIOD OF YUGOSLAVIA**

Aurora SAIDI, Erda BISLIMI, Ajla LIMANI 164

**INVESTMENTS OF INTERNATIONAL FINANCIAL  
INSTITUTIONS IN THE INFRASTRUCTURE PROJECTS IN  
NORTH MACEDONIA**

Getoar ABDURAMANI, Strahinja TRPEVSKI, Enis JAKUPI  
165

**A COMPREHENSIVE EXPLORATION OF THE NEXUS OF  
ARTIFICIAL INTELLIGENCE AND ARCHITECTURE**

Nuran SALIU, Kujtim ELEZI, Egzona ZENDELI VEJSELI 167

**THE INFLUENCE OF GEOMETRIC ELEMENTS ON THE  
SERVICE LEVEL AT ROUNDABOUTS**

Adina OSMANI, Feta SINANI 169

**COMPARATIVE ANALYSIS OF NANOMATERIALS TO  
IMPROVE THE ENERGY EFFICIENCY OF HISTORIC  
BUILDINGS**

Liljana D. SOFRONIEVSKA, Bojan KARANAKOV, Ognen  
MARINA, Teodora MIHAJLOVSKA 170

**THE GREEN IMAGE OF MIXED-USE PROJECTS IN  
TIRANA: GREENBUILDING OR GREENWASHING?**

Artea ZERA, Katjana BORIÇI, Odeta MANAHASA, Desantila  
HYSA 172



**SOLAR ANALYSIS: THE IMPACT OF NEW TALL BUILDINGS IN THE CENTER OF TIRANA**

Adriana LIPO, Denisa METANI, Manjola LOGLI, Odeta MANAHASA 174

**7<sup>th</sup> International Scientific Conference of the Faculty of Medical Sciences**

**MEDICAL SCIENCES**

**THE DOCTRINE OF THE NEURON**

Alajdin ASANI, Ema BEXHETI, Sadi BEXHETI 178

**THE IMPORTANCE OF TREATING FRACTURES OF THE SPONGIOTIC AREAS OF THE SKELETON IN PATIENTS WHO SUFFER FROM OSTEOPOROSIS**

Elona HASALLA, Ilda TAKA, Blerta HASALLA, Sulejman BAHHA, Irena XHAFERRI, Elda RUÇI, Brandi FAHRIU 179

**FEATURES OF ANAPHYLACTIC SHOCK AS THE MOST SEVERE FORM OF ANAPHYLAXIS**

Pirro PRIFTI 181

**IMPACT OF DYSLIPIDEMIA ON CORONARY HEART DISEASE IN WOMEN**

Klara HYSENAJ, Rezarta STENA, Shpetim QYRA, Blerina BANI 183

**THE IMPACT OF MATERNAL SMOKING ON PREGNANCY AND FETUS DEVELOPMENT**

Saemira DURMISHI, Shkëlqim HIDRI, Mitilda GUGU 185

**ACCESS AND USE OF THE AUTOMATIC EXTERNAL  
DEFIBRILLATOR IN THE MANAGEMENT OF CARDIAC  
ARREST IN PREHOSPITAL AND HOSPITAL SETTINGS**

Basri LENJANI, Besim MEHMEDI, Ilirian LENJANI, Entela  
LENJANI 187

**APNEA**

Amar FERATI, Ermal PASHAJ, Prunela POLIÇI 189

**EPIGLOTTITIS, ACUTE LARYNGITIS AND CROUP IN  
CHILDREN ETIOLOGY, EPIDEMIOLOGY,  
PATHOGENESIS, CLINICAL PICTURE AND TREATMENT**

Ferihan BAJRAMI 190

**PERSONAL EXPOSURE TO CHEMICAL CONTAMINANTS  
IN HOUSEHOLDS COOKING WITH WOOD AND COAL IN  
KOSOVO**

Antigona UKËHAXHAJ, Besa SUTAJ 191

**PNEUMONIA IN CHILDHOOD-CAUSES, EPIDEMIOLOGY,  
PATHOGENESIS, CLINICAL PRESENTATION AND  
TREATMENT**

Ferihan BAJRAMI 193

**ASSOCIATION OF POLYMORPHISMS OF THE GENES  
INVOLVED IN CYCLOPHOSPHAMIDE AND  
DOXORUBICIN METABOLISM WITH THEIR TOXICITY IN  
BREAST CANCER PATIENTS**

Ilir ISMAILI 194

**ULCERATIVE DERMATITIS IN TRAUMATOLOGY**

Ilber BESIMI, Florim SELIMI, Ekrem ISMANI, Fatima BESIMI  
196

## **NURSING CARE AFTER HIATAL HERNIA SURGERY**

Muhamed TAIRI, Loreta SELIMI 198

## **DIABETES, ITS COMPLICATIONS IN PATIENTS AT THE REGIONAL HOSPITAL “XHAFERR KONGOLI” ELBASAN FOR THE PERIOD 2020-2023 - THE ROLE OF NURSES IN ITS PREVENTION AND MANAGEMENT**

Shqipe LUTA, Albana SULA, Rajmonda HIDA, Elona DYBELI,  
Elona HASALLA, Armelda TETA, Juxhin LUTA, Esmeralda  
VRETO 200

## **A SYSTEMATIC ANALYSIS FOR THE GLOBAL, REGIONAL AND LOCAL TREND OF BREAST CANCER, 1990-2019**

Sabina TOSUNI, Elona GAXHJA, Entela DRIZAJ, Rezarta  
STENA 202

## **THE CAUSES THAT AFFECT THE QUALITY OF NURSE’S WORK**

Majlinda RAKIPAJ, Neda ÇAKËRRI, Erlini KOKALLA,  
Emirjona KIÇAJ, Rudina CERÇIZAJ, Deona TARAJ 204

## **CUMULATIVE REPORT FROM THE BEGINNING OF THE YEAR ON THE “WHOOPING COUGH” EPIDEMIC IN THE REPUBLIC OF NORTH MACEDONIA UNTIL 18.04.2024**

Nevzat ELEZI, Rrezearta ELEZI, Rron ELEZI, Magbule  
BRAIMI – ELEZI 207

## **THE EVALUATION OF THE FACTORS AFFECTING THE PROFESSIONAL RELATIONSHIP IN HEALTH CARE**

Neda ÇAKËRRI, Majlinda RAKIPAJ, Deona TARAJ 208

**ASSESSMENT OF KNOWLEDGE OF NURSING PERSONNEL ON HOSPITAL INFECTIONS**

Albana SULA, Petrit BIBERAJ, Zamira ÇABIRI, Rustem  
CELAMI, Elona GAXHJA, Elona DYBELI, Blerina BANI, Ilda  
TAKA , Shqipe LUTA, Rajmonda HIDA, Elona HASALLA,  
Luljeta LESI, Arjeta XHEMALI 211

**CARDIAC SIDE EFFECTS OF ANTIARRHYTHMIC DRUGS**

Nadir AJRULI, Nexhbedin ABAZI, Ardi AJRULI 213

**ASSESSING VENTRICULAR TACHYCARDIA IN A YOUNG PATIENT: THE ROLE OF MRI IN DETERMINING ICD PROTECTION AFTER FIRST EPISODE – A CASE REPORT**

Vegim ZHAKU, Pranvera RAMADANI, Lidija POPOSKA 215

**A LITERATURE REVIEW ON THE IMPACT OF ARTIFICIAL INTELLIGENCE IN PHYSIOTHERAPY**

Behije GOLLOBËRDA, Elona DYBELI, Brikena DUKA,  
Venemin GEGA, Raimonda HIDA, Ilma TOÇI 217

**AORTIC ANEURYSM, CASE WITH ABDOMINAL AORTIC ANEURYSM, CARDIOMYOPATHY, RENAL FAILURE AND SECONDARY ANEMIA**

Neset UZAIRI, Valon ASANI, Vlora AMETI, Ema BEXHETI  
218

**CORRELATION BETWEEN ESTROGEN AND HISTAMINE PRODUCTION IN HORMONAL REPLACEMENT THERAPY IN POSTMENOPAUSAL WOMEN, ASTHMA AND HISTAMINE INTOLERANCE**

Rrezearta ELEZI, Nevzat ELEZI, Bekim ISMAILI, Driton  
SELMANI, Rron ELEZI 221

**THE CLINICAL BENEFIT FROM DETERMINATION OF SCORE2 AND HMOD IN PATIENTS WITH ARTERIAL HYPERTENSION**

Nexhbedin ABAZI, Nadir AJRULI, Teuta ABAZI, Ekrem ISMANI, Mentor KAREMANI 223

**THE IMPORTANCE OF SPEECH THERAPY IN THE AUTONOMY OF PATIENTS WITH DEMENTIA**

Ilma TOÇI, Laurena BRAKO-JUSUFI, Gjergji DOKA, Rajmonda HIDA, Arkida SKENDERI, Behije GOLLOBËRDA 225

**HIATAL HERNIAS AND GASTROESOPHAGEAL REFLUX DISEASE – CURRENT PROBLEMS**

Kastriot HAXHIREXHA, Erblira RESHITI, Gresa AJVAZI 227

**CORRELATION BETWEEN BMI AND GONADOTROPIN HORMONES IN THE FEMALE GENDER**

Adelina ELEZI, Sheqibe BEADINI, Irena KOSTOVSKA, Egzona ZIBERI 229

**BENEFITS AND PROFILE OF PROBIOTICS AT SPECIFIC STAGES OF EMBRYONIC DEVELOPMENT IN CHICKEN EGGS**

Sheqibe BEADINI, Nexhbedin BEADINI, Altin BEGOLLI, Aleina ARSLLANI 231

**THE EFFECT OF THE ANTIBIOTIC GENTAMICIN ON THE STAGES OF ONTOGENESIS IN CHICKEN EGGS**

Albulena BEADINI, Nexhbedin BEADINI, Blandi LOKAJ, Festina DOBRA, Greta KASTRATI 233

**CORRELATION BETWEEN THE DISORDER OF THE THYROID GLAND, OBESITY AND OVERWEIGHT IN THE FEMALE GENDER**

Albulena BEADINI, Irfan AMETI, Adelina ELEZI, Albin BEADINI, Avdi NAZIFI, Egzona ZIBERI 235

**AIR TRAFFIC MANAGMENT DURING COVID-19 IN WESTERN EUROPE AND THE CONSEQUENCES OF THE PANDEMIC IN COMPARISON TO NORTH MACEDONIA**

Ilir MEHMEDI, Suzana MEHMEDI 238

**URINARY TRACT INFECTIONS AND PROSTATE SPECIFIC ANTIGEN TPSA**

Albin BEADINI, Adelina ELEZI, Koço ÇAKARALOSKI, Learta HASANI 240

**LIPID DISORDERS IN UREMIC ENVIRONMENT**

Lutfi ZYLBEARI, Ema BEXHETI, Elita ZYLBEARI-MASHA, Art ZYLBEARI, Gazmend ZYLBEARI, Zamira BEXHETI 243

**PULMONARY MANIFESTATIONS IN PATIENTS WITH SYSTEMIC LUPUS ERYTHEMATOSIS (SLE)**

Elita ZYLBEARI-MASHA, Art ZYLBEARI, Gazmend ZYLBEARI, Bistra ANGELOVSKA 245

**CARDIOVASCULAR COMPLICATIONS OF PATIENTS WITH CHRONIC KIDNEY DISEASE(CKD)**

Art ZYLBEARI, Koço ÇAKALAROVSKI, Milka ZDRAVKOVSKA 248

**CARDIAC TROPONINS (cTn-I) IN PATIENTS WITH UREMIA**

Gazmend ZYLBEARI, Zamira BEXHETI, Ema BEXHETI, Elita ZYLBEARI-MASHA, Art ZYLBEARI, Koço ÇAKALAROVSKI, Milka ZDRAVKOVSKA 251

**LIPID DISORDERS AND HOMOCYSTEINE (Hcy) IN PATIENTS WITH CHRONIC KIDNEY DISEASE (CKD)**

Art ZYLBEARI, Koço ÇAKALAROVSKI, Lutfi ZYLBEARI, Milka ZDRAVKOVSKA 253

**OUR EXPERIENCE ON CARDIAC RESEARCH: EXERCISE VS CARDIOVASCULAR DISEASE**

Drilon MIFTARI, Montserrat BATLLE, Eduard GUASCH 256

**OBESITY, THE BURDEN OF 21ST CENTURY**

Dilek RAMADANI, Drilon MIFTARI 258

**NURSING CARE AWARENESS AND COMPLICATIONS OF IMMOBILIZATION WITH CASTS**

Ilda TAKA, Elona HASALLA, Albana SULA (KRECI), Elona ZHIVA (PRIFTI), Entela DRIZAJ, Rajmonda HIDA 260

**EFFICIENT ANESTHESIA: NAVIGATING LOW-FLOW TECHNIQUES**

Diturim XHELADINI, Minire ISENI, Shpenza ARIFI 262

**PREVALENCE OF PEPTIC ULCER IN THE DISTRICT OF ELBASAN IN THE PERIOD JANUARY 2023- DECEMBER 2023**

Brikena DUKA, Elona DYBELI, Behije GOLLOBËRDA, Entela DRIZAJ, Sabina TOSUNI, Klodiana GJERGJI 264

## **ANTENATAL CARE**

Besa NUREDINI DEMIRI, Kefser LUSJANI, Luljeta BEQIRI,  
Esma IBRAIMI, Elinda JONUZI 266

## **THE CONSERVATIVE THERAPY AND ASSISTED REPRODUCTION TECHNOLOGY IN THE TREATMENT OF MALE INFERTILITY**

Riana BËRDYNAJ, Adriatik KRASNIQI, Xhevrije ARIFI, Nita  
REXHEPI, Vegim ZHAKU 270

## **UNDERSTANDING AND MANAGING STRESS AMONG MEDICAL SCIENCE STUDENTS**

Leart IBRAIMI, Arsim ALIU, Driton SELMANI 272

## **THE RELATIONSHIP BETWEEN COGNITIVE DEFICITS AND CLINICAL CHARACTERISTICS IN PATIENTS WITH SCHIZOPHRENIA**

Imran MEMEDI, Gordana STANKOVSKA 273

## **PEDIATRIC CASE PRESENTATION: PANHYPOPITUITARISM CO-OCCURRENCE IN EARLY CHILDHOOD - A CASE OF MULTISYSTEMIC SYNDROMES MANIFESTATION**

Lundrim SELA, Diellza RAMADANI, Vildane ADEMI, Agron  
PAJAZITI, Ferizat HAXHIREXHA 275

## **RECTUM METASTASIS - SECONDARY DEPOSIT FROM PULMONARY CARCINOMA**

Florim SELIMI, Ilber BESIMI 277

## **THE LEVEL OF KNOWLEDGE OF THE STUDENTS OF "ALEKSANDËR XHUVANI" ELBASAN UNIVERSITY, ON THE RISK FACTORS AND THE PRACTICE OF SELF-**



**EXAMINATION FOR THE EARLY DETECTION OF BREAST CANCER**

Rajmonda OBONI, Ilma TOCI, Arkida SKENDERI, Venemin GEGA, Albana SULA, Elona DYBELI, Gjergji DOKO, Shqipe LUTA, Elona HASALLA, Ilda TAKA , Behije GOLLOBËRDA

278

**THE PREVALENCE OF INFLAMMATORY BOWEL DISEASES IN THE REGION OF GOSTIVAR DURING THE PERIOD OF 2018-2022**

Driton SELMANI, Art ZYLBEARI, Avdi NAZIFI, Idaver FETAI, Shenazi BILALI, Besjan BILALI

280

**RATIONAL AND IRRATIONAL USE OF ANTIDEPRESSANTS IN THE REGION OF TETOVO**

Driton SELMANI, Ismail SAIDI, Nexhibe NUHII, Agnesa EMURLI, Elona EMURLI, Afrim ALIU

282

**ROCURONIUM BROMIDE – ESMERON**

Minire ISENI, Edita TAIRI, Diturim XHELADINI

284

**THE EFFECTS OF COVID-19 ON MEDICAL EDUCATION: A SURVEY OF THE STUDENTS' PERSPECTIVE**

Vlera ASANI, Hafjete SHABANI, Driton SELMANI

286

**AESTHETIC SURGERY OF THE ABDOMINAL WALL - CASE REPORT**

Vigan TAHIRI, Gresa THAQI, Roland ALILI

287

**PLACENTA ACCRETA: A CASE REPORT AND REVIEW**

Nagip RUFATI, Meral REXHEPI, Majlinda AZEMI, Aferdita ISMAILI, Learta VELIU ASANI

288

**BIOCHEMICAL MARKERS IN THE FIRST TRIMESTER  
SCREENING FOR FETAL CHROMOSOME  
ABNORMALITIES**

Ruhide AZEMI NEZIRI, Slagjana SIMEONOVA KRSTEVSKA  
290

**EXSANGUINOTRANSFUSION - CASE REPORT**

Luljeta BEQIRI, Jadranka GULEVA, Besa DEMIRI, Iskra  
MARTINOVSKA, Dobrila KAPUSHEVSKA, Shpresa  
MUAREMOVSKA, Kefser LUSJANI 292

**MORTALITY AND MORBIDITY IN LATE PREMATURE  
COMPARED TO TIMELY NEWBORNS**

Luljeta BEQIRI, Besa POCESTA, Iskra MARTINOVSKA, Besa  
DEMIRI, Dobrila KAPUSHEVSKA, Kefser LUSJANI, Shpresa  
MUAREMOVSKA 294

**MINIMAL INVASIVE STRABISMUS SURGERY**

Bekim TATESHI, Ermira TATESHI 296

**DECIPHERING THE MICROBIAL WORLD FOR FORENSIC  
INVESTIGATION- A SYSTEMATIC REVIEW AND META  
ANALYSIS**

Vlera MUHAREMI, Anida NESIMI, Anida BAJRAMI, Nevzat  
ELEZI 297

**LABOUR INDUCTION**

Besa NUREDINI DEMIRI, Luljeta BEQIRI, Kefser LUSJANI,  
Esma IBRAIMI, Nurxhan AJETI, Neriman ADEMOSKA 299

**APPROACH TO THE PATIENT WITH CLINICALLY AND  
BIOCHEMICALLY ACTIVE PRIMARY**

**HYPERPARATHYROIDISM DESPITE NEGATIVE  
SESTAMIBI 99MTC**

Irfan AHMETI, Avdi NAZIFI, Sebajet AHMETI JAKUPI,  
Aleksandra MICKOSKA, Ivana MLADENOSKA STOJKOSKA  
302

**CATHETER ASSOCIATED URINARY TRACT INFECTION**

Aferdita ADEMI 304

**OUR EXPERIENCE IN THE MANAGEMENT OF BLUNT  
ABDOMINAL TRAUMA**

Kastriot HAXHIREXHA, Agron DOGJANI, Labeat  
HAXHIREXHA, Blerim FEJZULI 306

**COVID-19 INFECTIONS AFTER THE COVID-19 PANDEMIC**

Ferizat DIKA – HAXHIREXHA, Blinera BALLANCA, Sevdije  
KOXHA, Shqiponja TURKESHI, Aferdita ADEMI 308

**A CASE OF CRITICAL STENOSIS OF A CEREBRAL  
ARTERY FOLLOWED BY A SHORT-TERM ONSET OF  
DECEREBRATION MOVEMENTS**

Bajram KAMBERI 310

**RISK FACTORS OF PRESSURE ULCERS AND THEIR  
TREATMENT**

Blerim FEJZULI, Aferdita ADEMI 312

**ROAD SAFETY AMONG ELDERLY DRIVERS, AN ISSUE OF  
PUBLIC HEALTH**

Erlini KOKALLA, Brunilda SUBASHI, Lejdi FETAHU, Stiliana  
BROKAJ, Majlinda RAKIPAJ 314

**ARTERIAL HYPERTENSION IN THE YOUNG AGE GROUP,  
LONGITUDINAL RESEARCH FOR THE PERIOD JANUARY  
2023 - JANUARY 2024**

Qahil IBRAIMI, Diturim XHELADINI, Gjylaj ALIJA, Art  
ZYLBEARI 316

**NEW-ONSET EPILEPSY IN ELDERLY PEOPLE – A CASE  
REPORT**

Bajram KAMBERI, Lejla ADEMI, Enisa IDRIZI, Emira ADEMI  
318

**ECTOPIC PREGNANCY**

Besa NUREDINI DEMIRI, Elinda JONUZI, Zamira BEXHETI  
ZYLBEARI, Kefser LUSJANI 320

**ISCHEMIA AND PURULENT PERITONITIS OF THE  
SMALL INTESTINE AFTER SPONTANEOUS DELIVERY**

Besa NUREDINI DEMIRI, Bashkim ISMAILI, Esmâ IBRAIMI,  
Kefser LUSJANI, Elinda JONUZI 322

**OSTEOMALACIA IN PUERPERIUM WOMEN**

Besa DEMIRI 324

**DIAGNOSTIC IMAGING OF BILIARY TRACT CANCERS  
USING AI**

Elona DYBELI, Armela KAPAJ, Merve AYDIN, Albana SULA  
326

**PUBLIC HEALTH PRESENTATION: PUBLIC HEALTH AS  
THE CHALLENGE OF FUTURE**

Bleart UKA, Jamin JAKUPI, Arbëresha BEXHETI- FERATI 327

## **PREVENTION OF FETAL GROWTH RETARDATION**

Besa NUREDINI-DEMIRI, Kefser LUSJANI, Luljeta BEQIRI,  
Esmā IBRAIMI, Zamira BEXHETI ZYLBEARI 329

## **DENTAL MEDICINE**

### **PROSTHETIC PROBLEMS IN PATIENTS WITH PERMANENT DENTITION**

Sherif SHAQIRI, Edita ETEMI, Kaltrina BEQIRI 332

### **REHABILITATION & IMPLANTATION IN AESTHETIC AREA**

Kenan FERATI, Arbëresha BEXHETI FERATI 334

### **THE ROLE OF ANTIBIOTICS IN THE TREATMENT OF OROFACIAL INFECTIONS**

Arbëresha BEXHETI FERATI, Kenan FERATI, Jeta BEXHETI,  
Ardian BEXHETI, Armend REXHEPI, Arta KURIU 335

### **DENTAL TRAUMA INVOLVING PERIODONTAL TISSUES: CLINICAL ASPECTS**

Elizabeta GJORGIEVSKA 336

### **EFFECT OF THIRD MANDIBULAR MOLAR ANGULATION AND LEVEL OF ERUPTION ON INCISAL MANDIBULAR CROWDING IN PATIENTS WITHOUT PREVIOUS ORTHODONTIC TREATMENT**

Fjolla AJETI, Natasa TOSESKA SPASOVA 337

### **COMPLICATIONS DURING ROUTINE EXTRACTION OF MAXILLARY TEETH**

Hava SINANI ARSLANI 339

**INCIDENCE OF IMPLANT LOSS DUE TO PERI-  
IMPLANTITIS**

Aldin BAKIU, Berina ASANI, Kenan FERATI 340

**GENOTYPIC DETECTION OF ANTIBIOTIC RESISTANT  
MICROBES**

Dinora NEZIRI, Erza REXHEPI, Arbëresha BEXHETI FERATI  
342

**PREOPERATIVE PATHOSES OF IMPACTED  
MANDIBULAR THIRD MOLAR RELATED TO  
DEMOGRAPHIC CHARACTERISTICS OF THE PATIENTS**

Albina AJETI ABDURAMANI, Boris VELICKOVSKI, Marija  
PEEVA PETRESKA, Qanije SABRIU AJETI 343

**PATHOLOGY AND DATA OF INFLUENZA VIRUS  
INFECTIONS IN REPUBLIC OF NORTH MACEDONIA**

Jehona ALIJI, Qëndresa ZULBEARI, Arbëresha BEXHETI  
FERATI 345

**ANTIBIOTIC PRESCRIPTION ON EVERYDAY DENTISTRY  
(USE AND MISUSE)**

Florentina SADIKU, Kenan FERATI, Abdullah MAXHUNI 347

**PRESERVATION OF DISTAL BONE DEFECT AFTER  
SURGICAL EXTRACTION OF IMPACTED THIRD MOLAR**

Bunjamin XHAFERI, Jeton NEZIRI, Marija MITEVA,  
Aleksandar GAVRILOV, Sahmedin SALI 349

**COMPLICATIONS IN IMPLANT DENTISTRY**

Amar NESIMI, Kenan FERATI 351

## **PHARMACY**

### **KNOWLEDGE OF HEALTH PROFESSIONALS ON THE INTERACTION OF DRUGS WITH FOOD IN THE REGION OF KICHEVO AND THE SURROUNDINGS**

Ariana ISMAILI, Lulzime BALLAZHI, Edita ALILI-IDRIZI,  
Merita DAUTI, Sihana AMETI - LIKA, Leontina ALIU 353

### **THE EFFECT OF CANNABIDIOL OIL TREATMENT ON CARBOHYDRATE METABOLISM IN STZ-INDUCED DIABETIC RATS**

Elona XHEMAILI, Elena RAFAILOVSKA, Biljana MIOVA,  
Zorica NAUMOVSKA, Gjose STEFKOV 355

### **PATIENT INFORMATION LEAFLETS - ESSENTIAL TOOLS ON SAFE AND EFFECTIVE USE OF MEDICINES**

Arlinda HAXHIU ZAJMI, Drita YZEIRI HAVZIU, Merita  
DAUTI, Dorentina BEXHETI, Gjylai ALIJA, Arijeta SHABANI,  
Nexhibe NUHII 357

### **NEW TRENDS IN GREEN COSMETIC FORMULATIONS AND FUTURE CHALLENGES FOR QUALITY CONTROL**

Merita DAUTI, Sihana AHMETI- LIKA, Drita HAVZIU, Edita  
ALILI-IDRIZI, Lulzime BALLAZHI, Arlinda HAXHIU-ZAJMI,  
Gjylai ALIJA 359

### **THE ROLE OF NUTRITION IN HUMAN HEALTH**

Gjylai ALIJA, Dorentina BEXHETI, Merita DAUTI, Drita  
HAVZIU, Arlinda HAXHIU-ZAJMI, Nexhibe NUHII, Sihana  
AHEMTI-LIKA, Lulzime BALLAZHI, Edita ALILI-IDRIZI,  
Arijeta SHABANI, Driton SELMANI, Qail IBRAIMI 361

**THE IMPACT OF THE TRIPLE COMBINATION TRIKAFTA® ON THE QUALITY OF LIFE IN PATIENTS WITH CYSTIC FIBROSIS**

Arta BAKIU, Edita ALILI-IDRIZI, Lulzime BALLAZHI, Sihana AHMETI-LIKA, Merita DAUTI, Anesa BAKIU 363

**PROFESSIONAL POISONING**

Senem IBRAHIMI, Drita YZEIRI- HAVZIU, Arlinda HAXHIU-ZAJMI, Arijeta SHABANI, Dorentina BEXHETI, Edita ALILI-IDRIZI, Merita DAUTI, Nexhibe NUHII, Gjylai ALIJA, Lulzime BALLAZHI, Sihana AHMETI-LIKA, Melisa HAVZIU IDRIZI 365

**ADOLESCENTS' KNOWLEDGE AND AWARENESS ON THE USE OF COSMETIC AND DERMATOLOGICAL PREPARATIONS IN THE TREATMENT OF ACNE VULGARIS**

Nexhibe NUHII, Drita UZEIRI HAVZIU, Gjylaj OSMANI ALIJA, Sefedin BILALLI, Jehona XHELADINI, Elmedina ALIJA MAZLLAMI, Arben EMURLLAI, Nadire LUMA FERATI, Erda ALIU 366

**PREPARATION OF ORGANIC PLANT EXTRACTS AND THE REGULATIONS THAT APPLY DURING THIS PROCESS**

Erlinda IMERI, Sihana AHMETI LIKA, Hanife RUSTEMI AHMETI, Edita ALILI IDRIZI, Lulzime BALLAZHI, Merita DAUTI 368

**THE SCIENTIFIC RESEARCH ON THE RATIONAL AND IRRATIONAL USE OF PARACETAMOL**

Nakshije VESELI, Fjolla BYTYQI, Nexhibe NUHI, Nevzat ELEZI 370



**COMPARATIVE STUDY OF THE CONTENT OF POTENTIALLY TOXIC ELEMENTS BETWEEN LEAVES AND FLOWERS OF SAMBUCUS NIGRA: ICP-AES AND ICP-MS PROFILE**

Bujar QAZIMI, Valon EJUPI, Trajçe STAFILOV, Katerina BAČEVA ANDONOVSKA, Krsto TAŠEV, Hyrije KORAQI, Vesel QAZIMI, Shpend DRAGUSHA 371

**ANTIBIOTIC RESISTANCE BASED ON ANTIBIOGRAMS TAKEN FROM PATIENTS OF TETOVO**

Jehona ÇANGA, Nexhibe NUHII 373

**SURVEY ABOUT MEDICATION ADHERENCE IN KOSOVO**

Lindita ALIAGA, Armend ALIAGA, Darinka GJORGIEVA ACKOVA 375

**6<sup>th</sup> International Conference of Natural Sciences and Mathematics**

**BIOLOGY AND ECOLOGY**

**IDENTIFICATION OF DIFFERENT CANCERS THROUGH SPECIFIC TUMOR MARKERS**

Aulonë SYLA, Sheval F MEMISHI, Mije REÇI 379

**ELEMENTAL ANALYSIS AND ACCUMULATION MODELS OF HEAVY METALS IN MEDICINAL PLANTS: IMPLICATIONS FOR ENVIRONMENTAL HEALTH**

Albana MILAIMI, Liridon BUQAJ, Belma GJERGJIZI, Ibrahim ERTUGRUL YALCIN, Sheval MEMISHI, Yllka SHEHDADI, Urtina AVDIJA 380

**PREVALENCE OF HYPERTHYROIDISM IN THE TETOVA REGION, NORTH MACEDONIA**

Jehona IBRAHIMI, Mije REÇI, Sheval F MEMISHI 382

**MOLECULAR DIAGNOSTICS OF COVID-19 FROM SOME REGIONS IN NORTHERN MACEDONIA**

Nadica RISTOVSKA, Mije REÇI, Sheval F MEMISHI, Ismail FERATI, Hristina AMPOVA 384

**NEW LOCALITY OF CIRSIUM CANDELABRUM GRISEB, (ASTERACEAE) IN REPUBLIC OF NORTH MACEDONIA**

Agim HAZIRI 386

**STRICTLY PROTECTED, PROTECTED AND INVASIVE ALIEN WILD INSECTS SPECIES OF INSECTS IN NORTH MACEDONIA**

Vladimir KRPACH 387

**IDENTIFICATION OF CASES WITH HPV AS THE CAUSE OF UTERUS CANCER IN THE TETOVA REGION**

Mërgime ABDULI, Sheval F. MEMISHI, Mije REÇI 388

**MICROMORPHOLOGICAL AND HISTOCHEMICAL EVALUATION OF THE GLANDULAR TRICHOMES OF SALVIA FRUTICOSA MILL IN DHERMI AREA, IN SOUTH ALBANIA**

Matilda SHEHU, Zhaneta ZEKAJ 389

**CORRELATION BETWEEN OXIDATIVE STRESS AND DIABETES**

Egzona ZIBERI, Sheval F. MEMISHI, Mije REÇI 391

**ASSESSMENT OF FIN DAMAGE EXTENT IN  
AQUACULTURE TROUT IN THE LIKOVA REGION**

Gazmend ISENI, Ajten RUSHITI-DAUTI, Besa ISENI 393

**IDENTIFICATION OF THE MOST FREQUENT TYPES OF  
CANCER IN THE POLLOG REGION DURING THE TIME  
PERIOD 2019-2021**

Arta SALLAI, Sheval F. MEMISHI, Mije REÇI 395

**MONITORING OF THE LIVING ENVIRONMENT  
THROUGH AIR POLLUTANTS IN THE POLOG FIELD PIT  
OF THE REPUBLIC OF NORTH MACEDONIA**

Nexhbedin BEADINI, Sheqibe BEADINI, Altin BEGOLLI,  
Aleina ARSLLANI 397

**NEW LOCALITY OF PLANT SPECIES „VIOLA ALBA” L. IN  
SAR MOUNTAIN (THE PART OF NORTH MACEDONIAN)**

Nasuf ABDII 400

**MICROBIOLOGICAL AND PHYSIC-CHEMICAL  
ASSESSMENT OF THE SEA WATER IN ZVËRNECI COAST,  
VLORE, ALBANIA**

Hajdar KIÇAJ, Aurora BAKAJ, Mariola ISMAILAJ, Xhuljana  
ARAPAJ, Megi MALAJ, Juna TAFILI 401

**DIVERSITY OF BENTHIC MACROMOLLUSCAN  
COMMUNITIES ON THE ROCKY SHORES OF TRIPORTI,  
VLORE, ALBANIA**

Kerol SAÇAJ, Ina NASTO, Denada SOTA 403

**PHYSICO-CHEMICAL AND MICROBIOLOGICAL  
EVALUATION FOR THE DUKAT STREAM, VLORE,  
ALBANIA**

Brunilda RRAPAJ 405

**BIOCOENOSIS OF PHOTOPHILIC ALGAE IN THE ROCKY  
INTERTIDAL AREA OF TRIPORT, VLORE, ALBANIA**

Kristiana LUSHNJARI, Ina NASTO, Anxhela KAMBERAJ,  
Brunilda VESHAIJ 407

**WATER QUALITY ASSESSMENT OF THE SHUSHIC RIVER  
USING BENTHIC MACROINVERTEBRATES**

Geolind ÇOBAJ, Hajdar KIÇAJ, Bledar PEPA, Amra ALUSHAJ  
409

**COMPUTER SCIENCE**

**IMPLEMENTATION AND PERFORMANCE ANALYSIS OF  
A PRACTICAL SYSTEM FOR DIPLOMA VERIFICATION  
BASED ON BLOCKCHAIN AND AI TECHNOLOGIES**

Avni RUSTEMI, Vladimir ATANASOVSKI, Valentina  
ANGELKOSKA, Aleksandar RISTESKI 412

**METHOD OF ARTIFICIAL INTELLIGENCE IN  
IDENTIFICATION OF PLANT DISEASES**

Zani DALIPI, Fisnik AHMETI, Shpetim REXHEPI, Bilall I.  
SHAINI 414

**DESIGNING USE CASE DIAGRAMS AND SCENARIOS FOR  
CREATING THE BLOCKCHAIN SYSTEM FOR BIG DATA  
MANAGEMENT**

Hakan REXHEPI, Sazana ILJAZI, Avni RUSTEMI, Florim  
IDRIZI, Grela AJVAZI, Hirijete IDRIZI 415

**FOSTERING INCLUSIVE EDUCATION: EXPLORING THE INTERPLAY OF TEACHER SELF-EFFICACY AND ATTITUDES**

Blerta GURGUROVCI, Florinda IMERI, Shkurte LUMA-OSMANI 417

**PLAYFUL BEGINNINGS: THE IMPACT OF PLAY-BASED LEARNING ON EARLY CHILDHOOD DEVELOPMENT IN PRESCHOOLS**

Fatime ELMAZI, Florinda IMERI, Ermira MEMETI 419

**THE NEED FOR DIGITAL SERVICES IN THE SECTOR OF URBANISM AND LAND MANAGEMENT IN THE MUNICIPALITY OF TETOVO**

Suela RUSHITI, Dritan AQIFI, Florinda IMERI 421

**FACE RECOGNITION: A NEW WAY TO MANAGE YOUR PERSONAL DATA**

Puhiza ISENI, Diellza OSMANI, Semina NESIMI, Ermira REXHEPI, Lirije JAIJA-ALJIJI 423

**EXPLORING THE OPPORTUNITIES: BLOCKCHAIN INTEGRATION IN IoT AND ADDRESSING CHALLENGES IN NORTH MACEDONIA**

Puhiza ISENI, Suela RUSHITI, Nadije JAKUPI 424

**THE USE OF AI IN SOLVING PROBLEMS IN AGRICULTURE**

Meriton IBRAIMI, Florim IDRIZI 425

**A COMPARATIVE STUDY OF IDENTITY ASSURANCE: KANTARA, EIDAS, AND REFEDS PERSPECTIVES ON LOA**

Vjollca SHEMSHI, Boro JAKIMOVSKI 427

**WEB-BASED MANAGEMENT SYSTEM IN TEXTUAL  
FORMAT FOR OFFERS, CONTRACT AND PAYMENT FOR  
CONSTRUCTION COMPANY**

Jetmir QAZIMI, Festim HALILI, Eip RUFATI, Gazmend  
XHAFERI 429

**A COMPARATIVE ANALYSIS OF OFFLINE WALLETS AND  
THEIR INTEGRATION WITH NFC FOR PRACTICAL  
OFFLINE PAYMENTS**

Nexhibe SEJFULI-RAMADANI, Florim IDRIZI, Aleksandar  
RISTESKI 432

**NAVIGATING ETHICAL TERRAIN: ARTIFICIAL  
INTELLIGENCE AND HUMAN RIGHTS IN THE DIGITAL  
AGE**

Ermira MEMETI, Florinda IMERI, Shkurte LUMA-OSMANI  
434

**AN OPTIMIZATION MODEL FOR WASTE COLLECTION  
PATHS THAT AIMS TO CONNECT COST REDUCTION AND  
EMISSION MITIGATION IN ORDER TO ATTAIN  
SUSTAINABLE DEVELOPMENT OBJECTIVES**

Verda MISIMI JONUZI, Igor MISHKOVSKI 436

**THE LEVEL OF AWARENESS AND RECYCLING HABITS  
OF UT-COMPUTER SCIENCES STUDENTS ON E-WASTE  
MANAGEMENT**

Anila NUHIU, Shkurte LUMA-OSMANI, Florim IDRIZI, Eip  
RUFATI 438

**CHEMISTRY**

**INCREASING THE EXTRACTION COEFFICIENT FOR THE  
RAW MATERIAL CENTELA HERBA ASIATICA BY**

**OPTIMIZING THE SIZE OF THE GRANULES OF THE RAW MATERIAL**

Mahi LATIFI, Ejup LATIFI, Nazif JASHARI, Njomza LJATIFI 440

**GRANULOMETRIC OPTIMIZATION AND SOLVENT CONCENTRATION FOR THE EXTRACTION OF PHARMACEUTICAL RAW MATERIAL ECHINACEA PURPUREA**

Mahi LATIFI, Ejup LATIFI, Raman ALITI, Jeton KUCHI, Petrit LATIFI 442

**DESIGN AND SYNTHESIS OF SOME NOVEL COMPOUNDS DERIVED FROM HYBRID COUMARIN-THIAZOLE STRUCTURES**

Fatjonë KRASNIQI, Emil POPOVSKI, Ahmed JASHARI 444

**ANTICOAGULANT ACTIVITY OF SYNTHETIC COUMARIN DERIVATIVES: A COMPREHENSIVE STUDY**

Hamit ISMAILI, Arben HAZIRI, Ilirjana OSMANI 446

**REMOVAL OF Cr(VI) FROM AQUEOUS SOLUTIONS BY OPALIZED TUFF**

Hamdije MEMEDI, Kiril LISICHKOV, Katerina ATKOVSKA, Muhamed SHEHABI, Shefket DEHARI, Dije DEHARI, Arianit A. REKA 447

**INFLUENCE OF DEPOSITION CONDITIONS DURING PRECIPITATION OF NH<sub>4</sub>VO<sub>3</sub> WITH DIETHYL SULPHATE**

Aksu SAMET, Zulxhevat ABDIJA 449

**MONITORING THE WATER QUALITY OF THE VARDAR RIVER IN THE VELES REGION**

Miran ABDULI, Dije DEHARI, Muhamed SHEHABI,  
Shemsedin ABDULI, Ermira VEJSELI, Shefket DEHARI 451

**SEPARATION OF Cr(VI) FROM AQUEOUS SOLUTIONS BY DIATOMITE**

Hamdije MEMEDI, Kiril LISICHKOV, Katerina ATKOVSKA,  
Muhamed SHEHABI, Shefket DEHARI, Dije DEHARI, Arianit  
A. REKA 452

**GEOGRAPHY**

**THE EXTENT OF AGRICULTURE IN THE REGIONS OF NORTHERN MACEDONIA**

Merime MUSTAFI, Rukije IBRAIMI 455

**THE DEVELOPMENT OF TOURISM IN THE THERMAL-MINERAL BATHS OF THE MUNICIPALITY OF DEBAR**

Resul HAMITI, Arbesa ÇIKRI KAJA, Meribe MUSTAFI 457

**THE NATURAL MOVEMENT OF THE POPULATION IN REPUBLIC OF NORTH MACEDONIA 2014-2022**

Mireme RUSHITI, Sonila REXHEPI, Resul HAMITI, Meribe  
MUSTAFI 459

**MARRIAGES AND DIVORCES ACCORDING TO AGE IN NORTH MACEDONIA (2010, 2015, 2020, 2022)**

Arlinda IBISHI, Resul HAMITI, Meribe MUSTAFI, Mireme  
RUSHITI 461



**DYNAMICS AND CAPACITIES OF EDUCATIONAL FACILITIES IN POLLOG REGION**

Xhejda JONUZI, Meribe MUSTAFI, Rukije IBRAIMI, Fatmire AMITI 463

**DEVELOPMENT TRENDS OF SPA TOURISM IN THE REPUBLIC OF NORTH MACEDONIA**

Fatmire AMITI, Rukije IBRAIMI, Xhejda JONUZI 465

**THE ROLE OF ALTERNATIVE FORMS OF TOURISM IN THE PROMOTION OF THE TOURIST LICATIONS OF SHARR MOUNTAIN**

Rukije IBRAIMI, Merime MUSTAFI, Xhejda JONUZI, Fatmire AMITI 467

**MATHEMATICS**

**CONNECTEDNESS WITH F-OPEN SETS**

Emin DURMISHI, Zoran MISAJLESKI, Flamure SADIKI, Alit IBRAIMI 470

**ON DYNAMIC OF HENON MAP. HOW TO CONTROL IT!**

Ylldrita SALIHI, Krutan RASIMI 471

**THRIAD GEODESIC COMPOSITION IN FOUR DIMENSIONAL SPACE WITH AN AFFINE CONNECTEDNESS WITHOUT A TORSION**

Musa AJETI, Skender AVDIJI 472

**AFFINE AND PROJECTIVE PLANES CONSTRUCTED FROM RINGS**

Flamure SADIKI, Alit IBRAIMI, Miranda XHAFERI, Merita BAJRAMI, Mirlinda SHAQIRI 473

**DYNAMIC APPROACHES TO MATHEMATICAL  
PROBLEM MODELING: THE USE OF GEOGEBRA AND  
WOLFRAM MATHEMATICA FOR ENHANCED SOLUTION**

Flamure SADIKI, Anduena HAZIRI, Ylldrita SEFERI, Alit  
IBRAIMI, Florinda IMERI 474

**APPLICATION OF CONIC SECTIONS IN PHYSICS AND  
ASTRONOMY**

Rushadije HALILI, Endrita KELMENDI, Merita BAJRAMI 476

**EXPLORING CHARACTERISTICS AND APPLICATIONS  
OF FOUR IMPORTANT CONTINUOUS DISTRIBUTIONS**

Edona AJETI DEMIRI, Edin DEMIRI, Lazim KAMBERI,  
Rushadije RAMANI HALILI 477

**MATHEMATICS EDUCATION AND QUALITY  
EDUCATION PART OF THE SUSTAINABLE  
DEVELOPMENT AGENDA**

Teuta ILJAZI, Svetlana PANDILOSKA GRNCHAROVSKA 479

**NUMERICAL INTEGRATION OF 1-D WAVE EQUATION AS  
AN EXAMPLE OF A HYPERBOLIC PDE'S USING  
MATHEMATICA**

Skender AVDIJI, Musa AJETI 481

**PHYSICS**

**SPECTRA OF SECONDARY NEUTRONS, ALPHA, BETHA  
AND GAMMA PARTICLES EMERGING ACROSS  
RADIATION PROTECTION SHIELDING OF A PARTICLE  
THERAPY CENTER**

Mimoza FEJZULLAHI IZAIRI, Redona BEXHETI, Mimoza  
RISTOVA 484

**THE STUDY OF THE HOT-DIP GALVANIZING PROCESS OF STEEL**

Luan KOLA 486

**PHOTOACTIVITY OF TiO<sub>2</sub>**

Altin GJEVORI 487

**SEA - TEACHING METHODOLOGY IN NATURAL SCIENCES AND MATHEMATICS**

Naim SYLA 488

**THE INFLUENCE OF VIRTUAL EXPERIMENTS ON THE UNDERSTANDING OF GEOMETRIC OPTICS AT HIGH SCHOOL STUDENTS**

Fatbardha AVDIU HOXHA, Fadil AJREDINI, Neset IZAIRI 490

**DOSIMETRIC COMPARISON OF THREE DIFFERENT EXTERNAL BEAM PARTICLES USING TREATMENT PLANNING SYSTEM MATRAD**

Nermine MURADI, Gazmend NAFEZI, Fadil AJREDINI,  
Bashkim ZIBERI 492

**DISTRIBUTION OF SOME RADIOACTIVE ISOTOPES (AROUND THE OSLOMEJ POWER PLANT**

Emri MURATI, Naim MAHMUDI 494

**INVESTIGATING THE VISCOSITY-TEMPERATURE RELATION OF ENGINE OILS USING A ROTATIONAL VISCOSIMETER**

Nurijeta AMETI, Arta ILJAZI, Naim MAHMUDI, Kimet  
JUSUFI 496

**ANALYSIS OF MEAN GLANDULAR DOSE IN ONE  
DIGITAL MAMMOGRAPHY UNIT IN NORTH  
MACEDONIA**

Mirjeta MEDIJI ARIF, Mimoza RISTOVA, Vesna GERSHAN  
497

**CZTS/CdS PHOTOVOLTAIC CELLS BASED ON SPIN  
COATED SOL-GEL SYNTHESIZED  $\text{Cu}_2\text{ZnSnS}_4$  THIN FILM**

Ramadan ALITI, Yoganash PUTTHISIGAMANY, Mimoza  
RISTOVA 499

**4<sup>th</sup> International Conference of Food Technology and Nutrition**

**TRITICALE - UNDERESTIMATED RAW MATERIAL FOR  
FOOD PRODUCTION**

Agnieszka MAKOWSKA, Jakub KRÓLAK 501

**FORMATION OF ADVANCED GLYCATION END-  
PRODUCTS IN CEREAL-BASED MATRICES**

Sylwia MILDNER-SZKUDLARZ, Maria RÓŻAŃSKA, Karolina  
ŁUCZKO, Paweł RYCHLEWSKI 503

**USING THE FIVE-PARAMETER LOGISTIC FUNCTION  
AND RESPONSE SURFACE METHODOLOGY TO  
OPTIMIZE THE FERMENTATION PROCESS**

Artur SZWENGIEL, Aleksandra SOBAŃSKA, Anna  
SZCZEPAŃSKA-ÁLVAREZ 505

**SENSORY QUALITY AND COMPARISON OF SOME  
COMMERCIAL SET YOGHURT BRANDS FROM NORTH  
MACEDONIA AND KOSOVO**

Nisa SULEJMANI, Rejhana LUMA, Kaltrina SELMANI,  
Kaltrina SEJDIU, Fatbardha TËRSTENA, Leonora ALIU,  
Florentina BEHLULI, Ardi SULBIJE, Erhan SULEJMANI 507

**PHYSICO-CHEMICAL AND RHEOLOGICAL QUALITIES  
OF SOME WHEAT CULTIVARS FOR PASTA PRODUCTION**

Albulena XHURKAJ , Besiana HOXHA, Ibrahim HOXHA ,  
Viktorija STAMATOVSKA 509

**STATISTICAL RESEARCH ON THE CORRELATION  
BETWEEN BMI AND GLYCOSYRED HEMOGLOBIN IN  
PATIENTS WITH DIABETES**

Merije ELEZI, Vlatko TANEVSKI, Besnik ELEZI, Enesa  
NESIMI, Mirsade TAIRI, Enisa RAHMANI, Zuliha AVDIJA,  
Mustafa MUSTAFI 511

**EXAMINATION OF THE DYNAMICS OF ANALYZES  
PERFORMED FOR THE PRESENCE OF RADIONUCLEIDE  
RESIDUES IN FOOD IN THE PERIOD 2019-2023 IN THE  
REPUBLIC OF NORTH MACEDONIA**

Merije ELEZI, Vlatko TANEVSKI, Besnik ELEZI, Ismail  
FERATI, Enes NESIMI, Mirsade TAIRI, Zuliha AVDIJA, Enisa  
RAHMANI, Mustafa MUSTAFI 513

**RHEOLOGICAL, NUTRITIONAL, AND SENSORY  
QUALITIES OF BREAD ENRICHED WITH PUMPKIN  
FLOUR**

Besiana HOXHA, Albulena XHURKAJ, Ibrahim HOXHA,  
Gafur XHABIRI, Nexhdet SHALA 515

**PI&KI BISCUIT PREPARATION AND PRODUCTION  
PROCESS IN EGI GROUP ZAHAQ – PEJE**

Nexhdet SHALA, Ibrahim HOXHA, Fjona ALIJAJ, Besiana  
HOXHA 517

**EVALUATION OF PHYSICAL CHEMICAL AND SENSORY PROPERTIES OF A TRADITIONAL SOFT FRESH WHEY AND CREAM CHEESE**

Erhan SULEJMANI, Hava MIFTARI, Xhabir ABDULLAHI,  
Xhezair IDRIZI 518

**MICROWAVE HEATING EFFECT ON THE OXIDATION AND QUALITY OF COLD PRESS SUNFLOWER OIL**

Boshko PETROVSKI, Vezirka JANKULOSKA, Gorica  
PAVLOVSKA, Daniela NIKOLOVSKA NEDELKOSKA, Tanja  
STOJANOVSKA 520

**CREATING DIFFERENT FORMULATIONS FOR IMPROVING THE RHEOLOGICAL, NUTRITIONAL, QUALITATIVE, AND SENSORY QUALITIES OF GLUTEN-FREE BREAD**

Gafur XHABIRI, Namik DURMISHI, Durim ALIJA, Majlinda  
SANA, Iliana LAZOVA-BORISOVA, Eldina HAVZIU 522

**QUALITY AND SAFETY PARAMETERS BEFORE AND AFTER PASTEURIZATION OF APPLE JUICE**

Namik DURMISHI, Janina PELAJ 524

**THE BENEFITS OF INCORPORATING VEGETABLES AND FRUITS FLOURS INTO GRAIN-BASED FOODS**

Iliana LAZOVA-BORISOVA, Namik DURMISHI, Gafur  
XHABIRI 526

**SEASONAL VARIATIONS IN SOMATIC CELL COUNT AND THEIR IMPACT ON THE PHYSICOCHEMICAL COMPOSITION OF RAW COW MILK**

Lina DIMOVSKA, Biljana TRAJKOVSKA, Lidija VELJANOVSKA, Biljana GAGACHEVA, Nina DIMOVSKA

527

**ANALYSIS OF PH VALUE AND WATER ACTIVITY AS KEY SAFETY PARAMETERS FOR KULEN SAUSAGE**

Tanja STOJANOVSKA, Tatjana KALEVSKA, Nevena GRUEVSKA, Daniela N. NEDELKOSKA, Sanja SAZDOVSKA

529

**FRUIT CONSUMPTION AND ITS INFLUENCE ON THE DEGREE OF INSULIN RESISTANCE**

Eleonora DELINIKOLOVA, Vezirka JANKULOSKA, Tatjana BLAZHEVSKA, Viktorija STAMATOVSKA

530

**AN INNOVATIVE APPROACH TO THE APPLICATION OF OHMIC HEATING IN THE FOOD INDUSTRY AND HOW IT AFFECTS FOOD COMPONENTS**

Katerina TEMELKOVSKA RISTEVSKA, Anka TRAJKOVSKA PETKOSKA, Daniela NIKOLOVSKA NEDELKOSKA

532

**THE EFFECT OF ASCORBIC ACID IN THE RHEOLOGICAL PROPERTIES OF DOUGHS IN PASTA FROM AGIMI AND DAJTI WHEAT**

Majlinda SANA, Abdyl SINANI, Gafur XHABIRI

534

**BIOCONCENTRATION OF CU AND CO IN LEAFY AND FRUIT VEGETABLES FROM THE AREA OF KOSOVO'S MITROVICA**

Ganimete HETA, Vehbi ZENELI, Gorica PAVLOVSKA

536

**ACCUMULATION OF METALS IN APPLES AND PEARS  
FROM THE AREA OF THE KOSOVO'S MITROVICA**

Vehbi ZENELI, Ganimete HETA, Valentina PAVLOVA, Gorica  
PAVLOVSKA 538

**UNDERSTANDING THE RELATIONSHIP BETWEEN NUTS  
AND SEED INTAKE, LIFESTYLE HABITS, AND BMI: A  
CROSS-SECTIONAL ANALYSIS**

Valbona SALLAI MAZLLAMI, Vesna KNIGHTS 539

**PRODUCTION OF FRUIT AND VEGETABLE PRODUCTS  
AND THEIR CONTROL**

Rejhana LUMA, Nisa SULEJMANI, Hava MIFTARI, Durim  
ALIJA 540

**NUTRITIONAL VALUES, MICROBIOLOGICAL ANALYSIS,  
AND TECHNOLOGICAL PROCESS OF THE PRODUCTION  
OF PRIZREN SAUSAGE**

Armire HOTI, Fejzullah FEJZULLA, Xhezair IDRIZI, Durim  
ALIJA, Hava MIFTARI 542

**AWARENESS OF USAGE THE ARTIFICIAL SWEETENERS  
IN FOOD BY DIFFERENT POPULATION IN NORTH  
MACEDONIA**

Ljubica KARAKASHOVA, Frosina BABANOVSKA-  
MILENKOVSKA, Lenche VELKOSKA-MARKOVSKA,  
Namik DURMISHI 543

**THE POLLUTION OF THE FIFTH CANAL ON CRNA REKA  
IN THE REGION OF BITOLA**

Tatjana BLAZHEVSKA, Valentina PAVLOVA, Nevena  
GRUEVSKA, Eleonora DELINIKOLOVA, Katerina  
TEMELKOVSKA 545



**MONITORING OF THE MICROBIOLOGICAL QUALITY OF DRINKING WATER IN SOME SETTLEMENTS IN THE POLLOG REGION**

Ismail FERATI, Rejhana LUMA, Sahide SINANAI, Ilderina QERIMI, Yllza HASANI, Rakip EMRULI, Ilir RUSTEMI 547

**2<sup>nd</sup> International Conference on Sustainable Agriculture Farming System**

**THE STUDY OF SOME POTATO CULTIVARS (SOLANUM TUBEROSUM L.) IN NORTH MACEDONIA**

Valmir SALIJI, Alirami SALIJI, Nikollaq BARDHI, Hirijete IDRIZI, Zejnedije ADEMI, Bardha IBISHI 550

**TESTING OF WHEAT CULTIVARS (TRITICUM AESTIVUM L.) IN THE AREA OF POLLOG - NORTH MACEDONIA**

Valmir SALIJI, Alirami SALIJI, Nikollaq BARDHI, Bardhyl LIMANI, Denada DERVISHI, Zejnedije ADEMI 552

**THE PRE-EM USE OF SOME HERBICIDES IN THE CONTROL OF WEEDS IN POTATOES AND THEIR INFLUENCE ON THE YIELD**

Alirami SALIJI, Valmir SALIJI, Bardhyl LIMANI, Hirijete IDRIZI, Nikollaq BARDHI, Moltine PREBIBAJ 554

**RECORDING, PRESERVATION, IMPROVEMENT AND USE OF AUTOCHTHONOUS GENETIC RESOURCES OF PLANTS IN THE REGION OF KORÇA**

Adrian MAHO, Gjergji MERO, Besnik SKENDERASI, Gjergji PAPA, Nikollaq ROSHANJI 556

**LIVESTOCK AND BEEKEEPING SUSTAINABILITY IN THE BALKANS: CURRENT STATE AND FUTURE PROSPECTS**

Vesna KARAPETKOVSKA - HRISTOVA, Bardha IBISHI,  
Bardhyl LIMANI, Ivan PAVLOVIC 558

**A STUDY ON SEMEN PRODUCTION AND CRYOPRESERVATION OF SPERMATOOA IN BULGARIAN BLACK AND WHITE BULLS**

Stanimir DIMITROV, Zhelyazko SABEV, Georgi GARBEV 559

**OCCURRENCE OF LAMPROGLENA PULCHELLA (NORDMANN, 1832) (COPEPODA: LERNAEIDAE) IN SOME CYPRINID FISH FROM LAKE OHRID (MACEDONIA)**

Dijana BLAZHEKOVIKJ - DIMOVSKA, Stojmir  
STOJANOVSKI 561

**THE USE OF SELF-ORGANIZING MAPS FOR THE ASSESSMENT OF SOIL CHEMISTRY COMPONENTS QUALITY**

Hirijete IDRIZI 563

**QUANTITATIVE-PHYSICAL TRAITS OF SEMI-ORIENTAL TOBACCO VARIETIES AND LINES**

Karolina KOCHOSKA, Natasha ZDRAVESKA 565

**THE STUDY OF MAIZE HYBRIDS (ZEA MAYS SPECIES L.) IN DIMAL MUNICIPALITY, BERAT**

Denada DËRVISHI, Eligerta GOREZI, Moltine PREBIBAJ,  
Nikollaq BARDHI, Alirami SALIJI, Hirijete IDRIZI 567

**EVALUATION OF MORPHOBIOLOGICAL AND PRODUCTIVE INDICATORS OF POTATO CULTIVARS**

**(SOLANUM TUBEROSUM L.) IN THE AREA OF MYZEQE,  
LUSHNJE**

Moltine PREBIBAJ, Denada DËRVISHI, Nikollaq BARDHI,  
Valmir SALIJI, Alirami SALIJI, Xhuljo GJEKA 568

**EVALUATION OF MORPHOBIOLOGICAL INDICATORS  
AND PRODUCTION OF SWEET POTATO (IPOMEA  
BATATAS POIR) IN THE AREA OF MYZEQE, LUSHNJE**

Moltine PREBIBAJ, Muhamet METAJ, Denada DËRVISHI,  
Nikollaq BARDHI, Valmir SALIJI, Alirami SALIJI 570

**EVALUATION OF THE MORPHOBIOLOGICAL AND  
PRODUCTIVE INDICATORS OF CAYOTE (SECHUIM  
SCHEDULE L) IN THE AREA OF MYZEQE, LIBOFSHË,  
FIER**

Moltine PREBIBAJ, Xhulja SEMA, Agron RESHITI, Denada  
DËRVISHI, Valmir SALIJI, Nikollaq BARDHI 571

**THE STUDY OF THE IMPACT OF SOIL LIMING ON THE  
MORPHOLOGICAL AND PRODUCTIVE INDICATORS OF  
SAGE (SALVIA OFFICINALIS L) IN THE SECOND YEAR OF  
THE EXPERIMENT AND THE CORRELATIONS BETWEEN  
THEM**

Arion ZIBA, Valmir SALIJI, Moltine PREBIBAJ, Nikollaq  
BARDHI, Alirami SALIJI, Bardhyl LIMANI 573

**GENETIC DIVERSITY OF SOME LOCAL POTATO  
(SOLANUM TUBEROSUM L.) POPULATIONS FOR  
PHYSIOLOGICAL PARAMETERS**

Mimoza JAKUPI, Sali ALIU, Imer RUSINOVCI, Dukagjin  
ZEKA 575

## **DIGITAL PRACTICES IN SUSTAINABLE AGRICULTURE**

Daniela PELIVANOSKA DAMESKA, Blagojche NAJDOVSKI  
577

## **EVALUATION OF MORPHOBIOLOGICAL AND PRODUCTIVE INDICATORS OF MAIZE HYBRIDS (ZEA MAYS SP. L) IN TOSHKĚZ, LUSHNJE**

Valmir SALIJI, Denada DĚRVISHI, Amarildo CAULI, Moltine  
PREBIBAJ, Nikollaq BARDHI, Zejnedije ADEMI 579

## **CURRENT CONDITIONS WITH TOBACCO PRODUCTION IN MACEDONIA - ANALYSIS OF SUSTAINABILITY, THE POSSIBILITY OF DEVELOPMENT AND FUTURE PERSPECTIVES**

Silvana PASHOVSKA 581

## **THE ROLE OF THE ENTREPRENEUR IN MODERN AGRIBUSINESS AND CHOOSING THE MOST FAVORABLE ENTREPRENEURIAL STRATEGY**

Silvana PASHOVSKA, Marija SRBINOSKA, Gilnehar  
BAHTIJARI 583

## **IMPLEMENTATION OF DIGITAL TECHNOLOGIES FOR ELECTRONIC ORDERING IN MEAT INDUSTRY**

Blagojche NAJDOVSKI, Elena Joshevska, Gordana  
DIMITROVSKA, Borche MAKARIJOSKI, Darko  
VELJANOVSKI 585

## **THE EFFECTS OF FEED FORM ON BROILER CHICKEN GROWTH PERFORMANCE**

Dimitar NAKOV, Srekkjo GJORGJIEVSKI, Aco KUZELOV,  
Fidanka ILIEVA 586

**THE SIGNIFICANCE AND ROLE OF LIVESTOCK FARMING AS PART OF THE AGRICULTURAL SECTOR IN PELAGONIA REGION**

Borche MAKARIJOSKI, Mirjana VELJNAOVSKA, Gordana  
DIMITROVSKA, Vesna K. HRISTOVA, Goran  
MIHAJLOVSKI 588

**THE EFFECT OF GRAFTING ON THE PLANT GROWTH DYNAMICS IN TWO BELL PEPPER VARIETIES**

Albina KIKA, Skender KACIU, Rukie AGIC, Gordana  
POPSIMONOVA, Biljana DRVOSHANOVA 590

**ECONOMICALLY IMPORTANT INSECTS FROM FAM. GELECHIIDAE AND TORTRICIDAE (LEPIDOPTERA) ON STONE FRUIT IN NORTH MACEDONIA**

Miroľjub GOLUBOVSKI, Stanislava LAZAREVSKA, Sterja  
NACESKI, Vesna KRSTESKA 592

**A REVIEW OF WILD MUSHROOMS WITH ANTIBACTERIAL ACTIVITY IN THE REPUBLIC OF NORTHERN MACEDONIA**

Emri MURATI, Mitko KARADELEV, Adelina MURATI 594

**DETERMINATION OF PROTEINS PERCENTAGE BY THE KJELDAHL METHOD IN CEREALS OF THE MARKETS IN KORÇA CITY**

Basanja SHTYLLA, Katerina PIKULI, Kristi MORAVA,  
Nikolin KARAPANÇI, Nikoleta ZHIDRO 596

**GREEN PERSPECTIVE: UNDERSTANDING PALM OIL'S FUTURE**

Imrana SINANI 598

**EXAMINATION OF THE COMPOSITION OF WHEY FROM MIXED CHEESE**

Kristina TOMSKA, Jilijana TOMOVSKA, Milena  
MAGEROVSKA 600

**WAYS OF TREATING BED RETAINED PLACENTA COWS OF THE FRIESIAN BREED**

Nesim SEFERI 601

**THE INFLUENCE OF THE CONTENT OF TOTAL NITROGEN, POTASSIUM AND THE METHOD OF CULTIVATION ON SOME QUALITATIVE FEATURES OF STRAWBERRY FRUITS**

Elmi JUSUFI, Natasha GJORGOVSKA, Erhan SULEJMANI,  
Bedri GJURECI 602

**EFFECTIVENESS OF PREVENTIVE FUNGICIDE TREATMENTS IN CONTROLLING PLASMOPARA VITICOLA OUTBREAKS**

Gligor BOJKOV, Sasa MITREV, Emilija ARSOV 603

**CHEMOMETRIC EVIDENCE FOR SR AND RB ISOTOPES DUE TO THE SPECIFIC SOIL CHEMISTRY IN DIFFERENT GEOGRAPHICAL REGIONS**

Biljana BALABANOVA, Liping FAN 604

**CHEMICAL COMPOSITION OF MADŽUN (GRAPE MOLASSES) PRODUCED FROM DIFFERENT GRAPE VARIETIES**

Violeta DIMOVSKA, Fidanka ILIEVA, Emilija ARSOV, Biljana  
BALABANOVA, Biljana VITANOVSKA 606

**THE IMPACT OF RURAL TOURISM ON THE  
DEVELOPMENT OF RURAL ECONOMY WITH SPECIAL  
EMPHASIZES ON “STANET E SHIPKOVICËS”**

Arben HALILI

608

**9<sup>th</sup> International Balkan Conference in Sport  
Sciences**



# **DIFFERENCES BETWEEN SOME ANTHROPOMETRIC PARAMETERS AND MOTOR SKILLS BETWEEN JUNIOR AND CADET VOLLEYBALL PLAYERS**

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## **Abstract**

This study was carried out in order to find the main differences between some anthropometric parameters and motor skills. More precisely, it is intended to reach information and added values about the differences in the development of anthropometric and motor skills between junior and cadet volleyball players, where the sample of this study are the players of KV Drita in Gjilan. Within the selection of tests, are included those tests which are adapted to the type of sport, and which are suitable for the age of the players and also for the conditions for measurement.

From the anthropometric tests 13 (thirteen) variables and one test feature, which is BMI, while for the motor skills tests, we selected 7 (seven) variables.

The samples taken in this research will consist of two groups of volleyball players divided according to the competition category, from the cadet and junior players of KV Drita. The samples will be taken from the cadet category of 30 volleyball players and from the junior category of 30 volleyball players.

With the help of the tests and work methods used in this study, it was possible to prove that there are significant differences between anthropometric parameters and motor skills between junior and cadet volleyball players.

*Keywords:* Volleyball players, characteristics, anthropometric parameters, variables, motor skills.

# **METHODS FOR MONITORING TRAINING LOAD AND ASSESSING NEUROMUSCULAR PERFORMANCE**

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## **Abstract**

Football is arguably the most popular sport in the world and as such all teams aim to achieve the highest possible results, creating great difficulties for the coach and his staff in planning training loads so that all players are ready on the day of the match. There are different methods in different studies regarding the approach of periodization and load monitoring as well as the assessment of neuromuscular performance. The purpose of this literature review is to critically examine the existing set of studies related to the optimization of soccer performance through systematic monitoring of training load and assessment of neuromuscular performance, synthesizing and analyzing the relevant articles. The methodology used in this literature review includes periodization and monitoring of training loads including the GPS or RPE system. A systematic and comprehensive search of academic databases such as PubMed, Researchgate, Google scholar, will be conducted to identify relevant studies published in various journals. The scientific studies that had our focus were on elite soccer teams, which have addressed aspects of training loads, physiological responses and sports performance over a season. After selecting the scientific articles, we identified the most important information, including the methodology used, the training loads, the tests used and the main results. After initial reviews of abstracts and various full-length articles, 69 of them were selected for full-text review based on the predefined criteria we had

established. For the division of the days in the microcycle, the subtraction of the training days until the day of the match was used. The variety of studies made us understand the importance of monitoring training loads as well as evaluating neuromuscular skills. We also highlighted the lack of studies in the Albanian football championship in terms of load monitoring or intervention and neuromuscular evaluation during a season. Assessing physical performance through various tests and monitoring players' skills and performance can provide valuable insights for talent identification, performance improvement, and overall health and fitness monitoring. The management of these variables and indicators makes it possible to better understand the demands that players have at different levels of loads (Halson, 2014). A player's position resulted in noticeable changes in variables such as: RPE, total distance and average speed. Meanwhile, a study with professional football players did not result in significant changes in variables related to actions performed at high speed (Owen et al., 2017). However, the studied differences, based on the training session with different variables, where the closer we get to the match, the more the values are reduced. The reduced values placed on the athlete, otherwise known as "tapering", aim to promote recovery. Referring to the studies carried out, coaches and physical trainers should take into account that high loads increase the possibility of injury (Gabbett, 2016) but on the other hand it is also true that attention should be paid to the load changes from microcycle to microcycle (Cross et al.,2015). It is also necessary not only to normalize the load in absolute terms but also to measure the percentage of change, when there is sufficient information about what load the team is receiving from week to week a basis can be established to then estimate the percentage of change of team training.

*Keywords:* training load, load monitoring, 'GPS', 'RPE', neuromuscular assessments.

# STUDENT ENGAGEMENT IN RECREATIONAL AND OVERWEIGHT PHYSICAL ACTIVITIES

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## **Abstract**

Purpose of research: The study shows that the level of body mass index and physical activity among students of the University of Prizren “Ukshin Hoti” and the ratio of overweight to physical activity has been established.

The study was conducted in a sample of 215 (114 males and 101 females). Students were randomly selected by several faculties within the University of Prizren “Ukshin Hoti”. The subjects are treated in accordance with the Helsinki Declaration. The International Physical Activity Questionnaire (IPAQ) is used to evaluate physical activity. For the evaluation of the ideal weight, morphological parameters are applied: 1. Body height, 2. Body mass and 3. Body mass index. Nonparametric techniques, descriptive analysis, and regressive analysis are applied to the processing of results.

Results: Results show that the average male student height was Mean =177.57±7.69; body mass, Mean =71.04±14.00; body mass index, Mean =22.41±3.45. The male overweight was 23.69%. The mean body height of the students was Mean =163.82±4.54; body mass pasha, Mean =57.30±8.73; body mass index, Mean =21.30±2.74. The males’ overweight was 23.69% and in women 4.95%. The question of how much time you usually spend sitting during a workday over 3

hours, male students have the largest percentage of the number, over 50%. Regressive analysis indicates a link between non-physical activity and overweight with  $P < 0.05$  probability.

*Findings:* The results show a pronounced difference between male and female students in body mass index (BMI) indicating that women have a greater nutritional and physical activity during the day. The data indicate a trend towards increased overweight among the male student population. This study requires awareness and creates better conditions for the participation of students in recreational sports activities.

*Keywords:* Students, physical activity, morphological parameters, prevalence, IPAQ.

# **EVALUATING THE ROLE OF CYP1A2 rs762551 GENE POLYMORPHISM ON ARROWHEAD AGILITY DRILL TEST PERFORMANCE IN ACTIVE YOUNG MEN**

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## **Abstract**

Considerable disparities have been documented among individuals and research studies regarding the observed interactions in exercise performance subsequent to caffeine use. The CYP1A2 gene, believed to have a significant impact on the ergogenic effects of caffeine, encodes Cytochrome P450 1A2, an enzyme that is responsible for the entire process of caffeine metabolism. The presence of a single nucleotide polymorphism (SNP) rs762551 in this gene dictates the length of time that caffeine has an impact on metabolism. AA homozygotes exhibit a higher production of this enzyme. Individuals carrying the C allele generally have reduced caffeine elimination. The objective of this study was to investigate the various outcomes and genotype distributions associated with the impact of CYP1A2 rs762551 gene polymorphisms on the rates of improvement in arrowhead agility drill test performance among active adult males following a 6-week training period. The research population was established by voluntary participation of 54 male students, aged 19-24, who were in good health. The participants were specifically selected from the Faculty of Sports Sciences. The Arrowhead agility drill biomotor test was conducted at the commencement and conclusion of the study, spanning a duration of 6 weeks, with the purpose of assessing aerobic power, anaerobic performance, and recovery levels. The implementation has been executed. When

assessing the pre-test and post-test values of the subject group in the study, the researchers examined the arrowhead agility drill test right and left variables within the group. The results indicated that there was no statistically significant difference seen among the three genotypes. The frequencies of genotype distribution for CYP1A2 gene polymorphism are as follows: 23.78% for AA, 63.82% for AC, and 6.40% for CC. Despite the limited sample size in our investigation, the discovered interactions pertaining to the impact of CYP1A2 gene polymorphisms on athletic success align with the findings reported in previous studies. In this particular context, it is imperative to acknowledge that the impact of caffeine on athletes' performance may be contingent upon a multitude of genetic and factorial variations. Consequently, it is imperative to do thorough research in order to enhance the predictability of techniques pertaining to CYP1A2 gene variants.

*Keywords:* CYP1A2, genetic variation, exercise.



# **EVALUATING THE INFLUENCE OF THE CYP1A2 rs762551 GENE POLYMORPHISM ON THE PERFORMANCE OF PHYSICALLY ACTIVE ADULT MALES IN THE YO-YO INTERMITTENT RECOVERY 2 TEST**

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## **Abstract**

Variations due to heredity determine performance differences between individuals, responses to training practices, energy needs, recovery and rest periods, anaerobic and aerobic performance capacity, activity of enzymes and hormones, and the possible effects of ergogenic supplements such as caffeine. Interactions observed in exercise performance after caffeine intake have significant differences between both individuals and studies. The CYP1A2 gene, which is believed to have an effect on the ergogenicity of caffeine, encodes cytochrome P450 1A2, an enzyme responsible for the entire caffeine metabolism. A SNP (rs762551) in this gene determines the duration of acute effects caffeine produces on metabolism. AA homozygotes tend to produce more than this enzyme. C-allele carriers tend to have slower caffeine clearance. A limited number of studies in this context have found that the reactions to caffeine use are not influenced by the CYP1A2 (rs762551) gene variants, and a number of compatible studies have observed caffeine ergogenicity as an advantage or disadvantage in C-allele carriers. The study aims to identify different results and genotype distribution revealed by the effects of CYP1A2 rs762551 gene polymorphisms on Yo-Yo IR 2

test performance in response to a 6-week training program in active adult males. The study included healthy (n=62) adult male volunteers, 19-24 years of age, from students of the Faculty of Sports Sciences. Genomic DNA was isolated from mouth swab samples taken from participants using the Buccalyse DNA Extraction Kit from Isohelix via the protocol provided by the manufacturer. DNA concentration was determined by NanoDrop spectrophotometer (Thermo Fisher Scientific, USA). The statistical analysis of the data obtained from the research was carried out using Mac Excel and SPSS 27.0 software. When examining the Yo-Yo IR 2 test performance levels based on the genotype variable of the participants, it was found that the AA, AC and CC polymorphisms showed a statistically significant difference in  $p < 0.05$  levels. As a result, considering the fact that caffeine's performance-enhancing effects on individuals may depend on multi-gen and multi-factor variations, much more research is needed to make approaches to CYP1A2 gene variants more predictable.

*Keywords:* CYP1A2, Polimorfizm, Kafein, Exercise.

# SELECTION OF KARATE PLAYERS AT A YOUNG AGE BASED ON SOME MOTOR SKILLS

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## **Abstract**

The success of an athlete in the sport of karate primarily depends on anthropological characteristics and skills. Diagnosing the anthropological status in the childhood stage is decisive for a good athlete in the sport of karate. This paper aimed to prove the importance of cluster analysis in the selection of young people in karate. The sample included 50 young people from the municipality of Gjilan. A total of 8 motor variables were applied: Running 20m high start, Long jump with two legs, High jump with two legs, hand tapping, foot tapping, Lifting the body, Step to the side, Bending forward from a standing position. In order to determine the groups according to the results of motor skills, cluster analysis was applied, which grouped the young people and divided them into those who can be selected for the sport of karate. This quantitative method divided the young people according to their motor skills into two groups. In the first group, 20 young people were evaluated with the weakest results and 30 young people were evaluated with the best results. Between the groups, there is a statistically significant difference in all motor variables (except for the two speed variables).

*Keywords:* Cluster analysis, motor, karate, t-test, anthropology.

# **EVALUATION OF THE EFFECTS OF ACE GENE POLYMORPHISM ON YO-YO INTERMITTENT RECOVERY 2 TEST PERFORMANCE IN ACTIVE YOUNG MEN**

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## **Abstract**

The objective of the study is to assess the potential impact of ACE gene polymorphism on the performance of Yo-Yo Intermittent Recovery 2 Test in a cohort of physically active young boys, as well as to define the distribution of genotypes. This study was carried out on a group of 53 young male athletes (30 basketball players and 23 volleyball players) who were not part of the elite category. The participants were between the ages of 19 and 24 and volunteered to take part in the study. Research groups engaged in condition-enhancing anaerobic/aerobic threshold (long-term brisk runs) and muscular endurance (circuit training) training three times per week (one session lasting 90 minutes). The genotyping process involved the utilization of either the KASP genotyping method or microarray analysis. This was done utilizing genomic DNA extracted from either oral epithelial cells or leukocytes. In addition, the Yo-Yo Intermittent Recovery Test (Level 2) was administered both at the start and conclusion of the 6-week trial to assess levels of anaerobic/anaerobic power and recovery. The ACE genotype distributions of the entire sample were evaluated using a Chi-Square Test to determine differences between the basketball and volleyball groups. The observed genotype distributions in the basketball and volleyball

groups are as follows: 46.7% for ID and 47.8% for DD in the basketball group, and 33.3% for DD and 39.1% for II in the volleyball group. Following analyzing the genotype frequencies between the two groups, no statistically significant disparity was observed ( $p > 0.05$ ). During this study, non-elite young male athletes underwent a 6-week training program that combined anaerobic/aerobic and muscular endurance exercises. The goal was to improve their performance in short-term, high-intensity efforts. The results showed that individuals with ACE ID and DD genotypes experienced greater performance improvements compared to those with II genotypes, even when subjected to similar training loads. The distribution of ACE gene polymorphisms has been reported to follow a linear pattern, with  $ID > DD > II$ .

*Keywords:* ACE, Polymorphism, Anaerobic Performance.

# **PERCEIVED BENEFITS AND BARRIERS OF EXERCISE AMONG ACTIVE AND INACTIVE KOSOVAR STUDENTS AT THE UNIVERSITIES OF NORTH MACEDONIA**

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## **Abstract**

The objectives of this study were to compare the perceived benefits and barriers of exercise among active and inactive Kosovar students at the Universities of North Macedonia and to determine the correlation between the level of physical activity and perceived benefits/barriers among students. Physical Activity Questionnaire (IPAQ) and Exercise Benefits/Barriers Scale (EBBS) were used to achieve the research objectives online. After the analysis of the entered data for the needs of this research, 733 Kosovar students were randomly selected. Based on the results of the IPAQ the students were divided into two groups: an active group (n=574) and an inactive group (n=159). Results: The most agreed benefit was the item "exercise decreases feelings of stress and tension for me", whereas the most agreed barrier was the item "there are too few places for me to exercise". The primary factors that make a difference between the two groups were life enhancement, physical performance, psychological outlook, social interaction and physical exertion ( $p < 0.05$ ). Furthermore, the total level of physical activity was positively related to the perceived benefits of exercise, especially with the psychological outlook, life enhancement, physical performance and social interaction subscales, while negatively related to the

barriers to exercise, especially with the physical exertion subscales, exercise milieu and time expenditure ( $p < 0.001$ ). The results of the research can help in the creation of policies, strategies and the development of effective intervention programs that aim to increase physical activity among the student population.

*Keywords:* Barrier, benefit, exercise, motivation, University students.

**SPORT, HEALTH AND THE PEOPLE  
(SHAPE). A WEST BALKAN UNIVERSITY  
NETWORK ON SPORT AND PLAY IN  
COMMUNITY LIFE AND WELLBAING  
(WORK IN PROGRESS)**

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**Abstract**

The Project is aimed to build-up a University Network on Sport in Western Balkans (WB), and design joint actions, in line with the wider European context and European Union (EU) recommendations and programs, to promote a healthy active lifestyle in the population, and to train sport professionals qualified in specific sport fields as applied to the different needs of health and society, contributing to a safer and enjoyable community environment, and to a peaceful social development. The Project builds on a long history of cooperation among EU and WB Higher Education Institutions (HEIs) in sport and physical education. Overall, these contributed to bring WB institutions, at the time still much focused on old Academies and athleticism, a bit closer to their EU counterparts, in terms of implementation of the Bologna Process, university organization, teaching programs, relations to the job market etc., and more aware of research progress in sport science and of its relevance in health and other social areas.

The current Project is aimed to overcome the limits of isolated actions and promote a collective, comprehensive effort to use the great potential of sport, in its various expressions, to help meet the health



and social needs of the Region and bring it closer to the rest of Europe. The Project has the following general objectives: 1) Build-up the Network and strengthen it on the territory; 2) Design and implement a digital platform to support and retrieve all activities; 3) Develop a program of sport activities; 4) Organize a series of Seminars/Workshops; and 5) Design and launch an Advanced Study Program. It is a 3-yr Erasmus Project (2024-2026). Partner Institutions: University of Tetova, University of Sports of Tirana, State University of Prishtina, University of Elbasan, University of Shkodra, University of Rome Foro Italico Italy, University of Vienna Austria.

A Balkan Week of Sport (BWOS) program is defined, focused on the Project's health and social objectives, and on the EU overarching priorities. It is clarified that the program should focus as possible on health and social aspects related to the Network's general objectives and particularly to EU key priorities (inclusion, integration of refugees, gender equality, environment, etc.). The BWOS program was conducted in September 2024 as part of the European Week of Sport (EWOS). In the project in packages 2 and 4 partners are the University of Tetova, University of Sports of Tirana, and the University of Prishtina. Each of the above-mentioned universities will be the host of the BWOS organizations planned in advance during the meetings in Tetova, Tirana and Prishtina. For BWOS events, institutions will publish information that will serve to promote the project and for the good of society.

*Keywords:* Erasmus Project, HEI - High Education Institutions, BWOS - Balkan Week of Sports.

# **CHALLENGES AND OPPORTUNITIES FOR THE DEVELOPMENT OF PHYSICAL ACTIVITY IN THE YOUNGEST COUNTRY IN THE WORLD**

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## **Abstract**

The purpose of the paper is an urgent response to the prevention of non-communicable diseases which are spreading speed in Kosovo. The goal is to contribute to the increase of awareness and promotion of physical activity in the entire population of Kosovo. The sample is divided by age over 18 years, in the entire population, looking for socio-demographic indicators, national research, physical education policies at school, supervision and state policies. The country's charter helps governments and relevant institutions as well as researchers and society in the importance of physical activity, needs and opportunities to improve health, and its preservation. The promotion of physical activity is supported by the main pillars such as: supervision, policies and research. Kosovo managed to contribute to scientific research with difficulty until 2008, since the mostly Albanian population was occupied and their rights to contribute to science were very small. From this it appears that geopolitical problems greatly limited them in doing science.

The prevalence of obesity in Kosovo was 20% with a higher prevalence in women (25.2%) compared to men (15.2%), as shown by data from the STEPS 2019 survey, providing valuable insights into addressing this risk factor. This marked an increase of nearly one

percent from the prevalence of obesity in 2011 (19.2%).<sup>11</sup> As highlighted in the 2016 Lancet series, there is potential in using physical activity to prevent NCDs (eg, obesity).

*Keywords:* GOPA, country card, health, physical inactivity, public health, obesity, physical activity.

# **SOCIO-ECONOMIC AND SOCIO-CULTURAL ASPECT OF INFLUENCE ON ANTHROPOMETRIC AND MOTOR CHARACTERISTICS: EMPIRICAL ANALYSIS OF THE EXPERIENCES OF THE TEACHING-EDUCATIONAL STAFF AMONG HIGH SCHOOL STUDENTS**

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## **Abstract**

Throughout the professional literature, it has been recorded that anthropometric characteristics are in direct correlation with the principles of health improvement; with motor skills, but also the basics of mastered psychological and sociological development. According to the above, in this scientific paper, the problem is considered from the aspect of socio- economic and socio-cultural influences on anthropometric and motor characteristics. In doing so, the analysis is based on the impact on physical activity, but according to individual differences in motor performance, while interacting with environmental factors.

The theoretical framework of this paper is complemented by an empirical analysis, which refers to the experiences of the teaching-

educational staff among the target group of high school students. Namely, the teaching staff of a high school “X” in the territory of the city of Skopje, North Macedonia, was included, in order to see through their experience, the influence of socio-economic and socio-cultural factors on the anthropometric and motor characteristics of high school students. It is about a mutual share of influence of the home environment, the school environment, but also the social groups of interaction on the motor and anthropometric characteristics of the students.

*Keywords:* Anthropometry, motoric, high-school, socio-cultural, environment.

# **THE STATUS OF PHYSICAL GROWTH AND MOVEMENT DEVELOPMENT OF LOWER SECONDARY SCHOOL CHILDREN IN THE SEVEN REGIONS OF KOSOVO**

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## **Abstract**

The purpose of this research is to verify the status of physical growth and movement development of children, as well as their comparison with the standards according to the CROFIT NORMS including the measurements of the basic anthropometric characteristics and movement skills of middle school students of seven centers in Kosovo. The research of this nature has so far only been addressed partially, and that in relatively small samples. In the research, a total of 1951 students of the lower secondary cycle of primary school were treated, of which 952 were girls and 999 were boys.

Based on the results of the descriptive and distribution parameters, a wide range of results has been proven in the parameters of adipose tissue and Body Mass Index, and in particular in the performance of motor tasks, especially in the polygon test and the compressive strength of the hand.

Compared with the results obtained from Crofit norms, it turns out that the average values in BMI are similar, but in the motor variables, there is a marked difference in favor of Crofit norms. Based on the

normative data of the long jump test, especially the complex test of the coordination of walking backwards, a significant difference exists between the students tested with the Crofit norms (about 3.5 seconds for boys and 6.5 seconds for girls).

Through the analysis of changes (T-test for independent samples) between the groups by gender, a significant statistical difference in motor parameters has been proven, while the high number of overweight students, especially sixth graders, is worrying.

In the longitudinal parameters, while in the movement parameters, statistically significant differences were found in the hand dynamometer variables, long jump and partially in flexibility.

*Keywords:* Pupils, morphological parameters, movement skills, comparison, T-test.

# RELATIONSHIP BETWEEN ANTHROPOMETRIC CHARACTERISTICS AND MOTOR SKILLS OF 16-YEAR-OLD BASKETBALL PLAYERS

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## **Abstract**

The research aims, first of all, to identify anthropometric characteristics and movement skills, then research and verify the differences and correlation between anthropometric variables and basic motor skills in 16-year-old basketball players, the importance of playing basketball in the overall development of players, as well as investigating the impact of playing basketball on some anthropometric, motor parameters, and specific tests of the 16-year-old age group ( $\pm 6$  months). The research sample will consist of 100 basketball players from several clubs from Kosovo. All the tests will be regular in the training process in the schools where they were registered, as well as during the day of the test they will not have significant physical injuries or damage. This research will consist of 5 anthropometric variables, 4 basic- motor variables and 7 situational variables. The group of variables consists of tests in the area of basic motor skills adapted for this age group and applied earlier in various research works.



Basketball players will be subjected to measurement procedures under the same conditions during the training process. With the application of descriptive statistics methods, it was possible to prove that we have a normal distribution of results in almost all tested variables, which proved that we were dealing with a fairly pronounced homogeneity of the group of 16-year-old basketball players. Likewise, the correlation values were sufficiently high, both between the variables and within the same variable.

*Keywords:* Basketball, game, anthropometry, motor skills, connectivity, player, etc.

# **COMPARATIVE ANALYSIS BETWEEN THE 2014, 2018 AND 2022 WINTER OLYMPIC GAMES IN TEAM SKI JUMPING**

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## **Abstract**

The main aim of the paper was to prove the role of the development of training technology expressed by the results achieved in the competitions in three Olympic Winter Games and to prove the difference in the results achieved in technical aspect in team ski jumping in the three Olympic Games: Beijing 2022, PyeongChang 2018 and Sochi 2014. The secondary goal of the paper is to verify the difference in the results achieved in terms of length with technique and length in team ski jumping in the three Olympic Games: Beijing 2022, PyeongChang 2018 and Sochi 2014. As a sample, the results achieved in team ski jumping in three Winter Olympic Games are included in this paper: 8 teams from 8 countries Beijing 2022 (11 participating teams - 3 disqualified teams) with 4 skiers for each team, 8 teams from 8 countries (12 participating teams – 4 disqualified teams) PyeongChang 2018, with 4 skiers per team, 8 teams from 8 countries (12 participating teams – 4 disqualified teams) Sochi 2014 with 4 skiers per team. In this paper, ski jumping has been applied as a variable in 3 Winter Olympic Games: Beijing 2022, PyeongChang 2018 and Sochi 2014. Validation of the difference between three groups of results in ski jump length and execution technique from the 3 Winter Olympic Games were subjected to ANOVA analysis of

variance as well as the LSD technique. The obtained results show that: The analysis of differences shows that of the three Olympic Winter Games, in the Olympic Winter Games held in Beijing 2022 the teams competing in cross-country skiing and technical jumping have had poorer results than the teams competing in pole vaulting. skiing at the Olympic Winter Games held in PyeongChang 2018 and Sochi 2014. The analysis of the differences shows that of the three Olympic Winter Games, in the Olympic Winter Games held in Beijing 2022, PyeongChang 2018 and Sochi 2014 the teams competing in long ski jumping have not had differences among themselves. We can say that the goal of the ski jumping competition is to jump as much as possible. However, the style of the jumper is also evaluated, so to win, in addition to the long jump, a good flying technique and a safe landing must be shown.

*Keywords:* Winter Olympics, Beijing 2022, PyeongChang 2018, Sochi 2014, ANOVA.

# THE IMPACT AND BENEFITS OF PHYSICAL ACTIVITY DURING AND AFTER PREGNANCY

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## **Abstract**

**Introduction:** This literature review aims to collect the strongest scientific evidence to date regarding the benefits and impact of physical exercise during and after pregnancy, to the individual characteristics of the woman. Physical activity (PA) during and after pregnancy is crucial for maintaining good health for both mother and fetus. Regular PA exercise has numerous benefits, including reducing the risk of gestational diabetes, hypertension and pre-eclampsia, promoting healthy weight gain and reducing the risk of postpartum depression. Physical activity also helps to prepare the body for childbirth, and helps to recover faster after childbirth. Physical activity after pregnancy can also have a positive impact on the mother's mental health.

**Objectives:** The main objectives of this literature review is to find the latest scientific information about the impact of physical activity and its benefits during and after pregnancy.

**Methodology:** From the literature research, a total of about 1510 articles were identified, of which; 855 from PubMed, 550 Google Scholar, and Cross Reference 105. After restricting the search to allow inclusion criteria (published in the last 10 years - from July 2013 to July 2023 - and in English), a total of 179 articles were analyzed, these articles were screened by analyzing their titles, and we reached 70 full-text articles for the final analysis.

**Data analysis:** Topics were collected and grouped which included: the impact, effects, benefits of physical activity during and after pregnancy.

**Discussion and conclusion:** Information from the literature review highlighted the positive impact of physical activity in women during and after pregnancy.

*Keywords:* Pregnancy; Physical Activity; Exercises During and after Pregnancy; Benefits; Effects; Pregnant Women.

# NATIONAL UNIVERSITY CHAMPIONSHIP 2023 - NATIONAL UNIVERSITY GAMES 2023

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## **Abstract**

The study analyzes the physical condition and performance of participating students in the national university championship of 2023 in the sports of volleyball, basketball, and futsal at the University of Sports in Tirana and other institutions. With a total of 253 students (98 females and 155 males), the study aims to highlight the anthropometric level of the participants, BMI indicators, and offer suggestions for the future. Based on the test results, a comparison is made between universities, gender, and performance in sports. Compared to the year 2022, changes indicate a decrease in the average age of participants, while height and weights remain at considerable levels. The average weight for females is 60.6 kg, while for males it is 73.5 kg. In terms of BMI index, the average for females is 21.8, while for males it is 23.3. The results suggest a need to increase student participation in championships, as well as further monitoring of physical performance to prepare teams for future challenges in the international arena.

*Keywords:* National Championship, University, Universitar, Anthropometric BMI.

# **SOME PARAMETERS OF BODY AND MOVEMENT DEVELOPMENT IN STUDENTS AGED 12-13 YEARS OF “ELENA GJIKA” PRIMARY SCHOOL FROM PRISHTINA**

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## **Abstract**

Creating a database that would show a comprehensive overview of the physical growth and motor development of students is necessary, and could serve as a good basis for identifying new talents as a prerequisite for selection in certain sports. The purpose of this paper was to prove the differentiation of motor skills between the male and female genders, simultaneously proving the differences in the success of achieving the results in the relevant tests according to age and gender. The work carried out in the youth population of a total of 138, of them sixth-grade students, 33 girls and 36 boys, as well as the same number of seventh-grade students, 33 girls and 36 boys, is a sample treated within the project “Status of physical growth and motor development of lower secondary school children in the seven regions of Kosovo,” with the total number of 1950 tested students. With the realization of the analysis and the processing of the results of the general sample, we will have valid information and an objective reflection of the growth and development of children according to gender and certain age groups from the VI class to the IX class. Of special importance are the comparisons in the treated parameters with

their peers from the same school eleven years ago, respectively in 2012, where they were significantly better results of the children tested a decade ago.

*Keywords:* movement skills, physical growth status, T- test, sample, students.



# **RELATION OF MATURATION WITH SOME AGILITY TESTS IN YOUNG FOOTBALL PLAYERS FROM REPUBLIC OF NORTH MACEDONIA**

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## **Abstract**

The aim of our research is to determine the relation of maturation with some agility tests in young football players from R. North Macedonia. In the sample of the population was performed a transversal examination of the maturation, general motor, specific motor skills and anthropometric characteristics of young football players from the Polog region of the Republic of North Macedonia.

Based on MANOVA and ANOVA. It can be noticed that the athletes with different chronological ages 12., 13., and 14 years who do not belong to the same population are statistically significantly different ( $p = .00$ ). In the anthropometric space we found differences in six parameters; Height ( $p = .00$ ); length of left leg ( $p = .00$ ); diameter of pelvis bitrochanter ( $p = .00$ ); diameter of the knee joint ( $p = .00$ ); diameter of ankle joint ( $p = .03$ ); We found differences on boys with different chronological ages 12,13 and 14 statistically significant differences ( $p = .01$ ). Based on the univariate analysis for each variable. It can be noticed that a statistically significant intergroup difference is present in five variables: foot taping ( $p = .05$ ); long jump ( $p = .00$ ); number of 20 meters starting from standstill ( $p = .00$ ); raising the torso for 30 seconds from lying on its back ( $p = .02$ ); deep inclination from sitting ( $P = .04$ ); 10X5 Shuttle run ( $p = .00$ ); Illinois

test without ball ( $p=0.001$ ); zig zag test ( $p=0.001$ ); Agility training ( $p= .00$ ); Compass drill or agility cone started for. Right side ( $p= .00$ ); Compass drill or agility drill started with left side ( $p = .00$ ); Homemade agility test ( $p- .00$ ); and Agility training ( $p = .00$ ).

Conclusion: The organization of the competition system according to the gender maturation will bring an advantage in several segments in the youth football in N.Macedonia and they are: competitions will be more realistic and can lead to a fairer, more developmentally appropriate, and safer playing environment, will ensure equal opportunities for all players based on their physical development stage, will reduce the risk of injuries by matching players with similar physical attributes it also will provide an environment conducive to skill enhancement and tactical understanding, will create a positive atmosphere where players feel encouraged and motivated, will facilitate the discovery and nurturing of potential talent and will encourage continued participation and engagement in football over time.

*Keywords:* Maturation, Agility, Motor Skills, Soccer, Specific Motor skills.

# **MAXIMIZING PHYSICAL PERFORMANCE IN LOWER LIMB AMPUTEES: A SYSTEMATIC REVIEW**

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## **Abstract**

People who are dealing with amputations of lower limbs face many difficulties that have a big influence on their day-to-day lives. The complex effects on biomechanics, exercise capacity, and physiological reactions are a few of these challenges. This study examines 19 articles chosen from PubMed, ScienceDirect, and Google Scholar. Biomechanical studies examine ground response forces, revealing complex relationships during motion, and exercise performance evaluations compare healthy subjects with athletes who have lost limbs, revealing differences in different modalities. In addition, physiological investigations explore relationships among muscle strength, exercise tolerance, and trunk muscle balance in addition to providing maximal oxygen consumption (VO<sub>2</sub>max) prediction models. The results highlight how important it is to implement specific exercise programs to improve muscle strength, improve movement mechanics, and reduce asymmetry in order to increase functional capacity and reduce the risk of injury. Notably, knowledge gained from external mechanical work illuminated the dynamics of energy expenditure and athletic performance, guiding the creation of customized training regimens targeted at enhancing movement efficiency and performance outcomes overall. A key component of comprehensive training programs for amputees that enhances physical conditioning and performance is the integration of

resistance, cardiovascular, and skill-based exercises. This promotes skill development and overall well-being. This systematic review highlights the need for ongoing research to determine the best exercise parameters and determine the long-term training effects, and it lays the groundwork for evidence-based exercise protocols aimed at improving the physical and physiological well-being of amputees.

*Keywords:* Amputees, Exercise interventions, Biomechanics, Physiological effects, Performance outcomes.

# **BULLYING IN SPORTS: ANALYSIS AND MANAGEMENT STRATEGIES IN SCHOOL SPORTING ENVIRONMENTS**

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## **Abstract**

Bullying is a social phenomenon recognized not only by field scholars but also in the school context; however, we often encounter episodes of bullying, and the feeling of being returned to the same situation touches us, reminding us that the concept and behavior have always existed. This paper began as a pilot research initiative in one of the 9-year schools in the city of Durrës, where 319 students from grades V to IX participated (155 girls and 160 boys, 4 did not declare their gender). The ad hoc questionnaire distributed helped us analyze the prevalence and characteristics of bullying today, from the perspective of the age group 9-15 years. Participation in a sports course was reported by (165 participants and 154 non-participants, among whom 42 were bullied during sports games, 11 in changing rooms, 4 during the journey from home to the gym). The presence of bullying in sports among youth is noted, and what is needed is the existence of an anti-bullying program or a law that gradually but firmly establishes moral and ethical values in school and sports structures.

*Keywords:* bullying, sport, adolescence.

# **MOTIVATION AND KNOWLEDGE OF SWIMMING AMONG STUDENTS AGED 11 AND 14 IN THE MUNICIPALITY OF FERIZAJ**

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## **Abstract**

The purpose of the research is to investigate the level of knowledge of children's knowledge about the sport of swimming and whether they have the motivation for swimming as an activity. An important aim of this research is to shed light on the facts of swimming knowledge and potential risks because of the lack of information about water activities. The idea for this research came after many cases of water drownings, including fatal ones, as well as various water accidents. This research also aims to show if there are safe facilities in the areas where they swim, as well as how protected they are during this activity, and how aware parents or guardians are of the potential dangers of their children.

The treated sample are students aged 11 and 14, boys and girls, a total of 200 students (100 girls and 100 boys), in primary and lower secondary schools: in the city "Jeronim de Rada" and from the neighborhood (village) "Ditura" ", Dardani of the municipality of Ferizaj.

The research was carried out through a questionnaire prepared and constructed in a group of questions which produce the expected results according to the purpose.

Based on the analysis of the results, we conclude that swimming is a favorite activity of children, but they have limited access. There is a lack of formal education and there is a lack of physical and programmatic infrastructure, activities in the water take place even without adequate care (parents "try" to teach their children to swim), and that the children have directly or indirectly seen moments of drowning in the water, but that the motivation also exists to develop swimming at the sport level.

*Keywords:* swimming, motivation, students, risks, knowledge, learning.

# ANALYZING THE EXECUTION STYLE OF THE JUMP TYPES AS A KEY FACTOR OF PERFORMANCE

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## **Abstract**

**Aim:** By comparing the three jump techniques such as Countermovement Jump (CMJ), Squat Jump (SJ) and Abalakov (ABL), this study aims to determine the effects of the arm swing technique and the elastic force stored during the eccentric phase, on jumping performance.

**Methods:** The sample of this study consisted of Sport science students, first grade (height:  $171.3 \pm 8.1$  weight:  $62.9 \pm 6.5$  mean  $\pm$  SD). The videos acquired were analyzed using the My Jump 3 program using these parameters: height, weight, height at 90°, lever, leg length; to determine jump height (cm). The data collected from My Jump 3 was analyzed using the SPSS 26 packet for descriptive statistics, ANOVA, and percentage analysis.

**Results:** Based on data analysis we were able to determine differences between the three different jump types: Countermovement Jump, Squat Jump and Abalakov. Although there is no statistical significance ( $p < 0.05$ ), the difference between the ABL and CMJ jump resulted in 3.88 cm in favor of Abalakov resulting in a 11% increase. Between CMJ and SJ, a 2.32 cm difference was presented, in favor of the CMJ jump (7% increase).



Conclusion: We concluded that during the ABL 11% of the performance derived from the arm swing technique present. Similarly, the 7% difference between the CMJ and SJ can be explained by the elastic force stored in the tendons during the eccentric phase of the CMJ jump. The lack of statistical significance may be attributed to our sample, which lacked specialized training for these techniques.

*Keywords:* Muscle Contraction Phases, Agonist Muscles, Antagonist Muscles, Spindle Muscles, Series Elastic Component (SEC).

# **BENEFITS OF OUTDOOR ACTIVITIES ON CHILD DEVELOPMENT: LITERATURE REVIEW**

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## **Abstract**

This study investigates the benefits of outdoor activities on child development. The research highlights that physical inactivity is a major cause of obesity in children and adolescents. Outdoor activities, such as walking and high-intensity exercise, can help children achieve recommended levels of physical activity, improving their physical well-being and mental health. The study uses a comprehensive research strategy, including a literature review from various databases, to examine the impact of outdoor physical activities on children's functional and physical development. The results show that outdoor activities significantly enhance physical, mental, and social well-being. Physically, these activities increase the level of physical activity, which improves cardiovascular health and improves musculoskeletal ability. Mentally, exposure to nature reduces stress, improves mood, and improves cognitive functions. In a social way, these outdoor activities promote social integration, communication skills, and family bonding. The discussion focuses on the need for further research and the translation of these findings into policy and practice to ensure equitable access to nature and promote active and healthy lifestyles. The conclusions emphasize the significant impact of various factors on children's physical activity and outdoor use, affecting their health. Childhood obesity, largely due to inactivity, is a major concern. Despite declining outdoor activity in some areas,

research highlights its positive effects on children's well-being. Encouraging outdoor play, particularly through walking and high-intensity exercise, is crucial for promoting a healthy lifestyle. Effective policy strategies are essential to addressing this issue.

*Keywords:* Childhood, Outdoor activities, Children Development, Physical activity, Physical well-being, Health and Well – being.

# **THE INFLUENCE OF FATIGUE ON SOME KINEMATIC PARAMETERS DURING THREE-POINT SHOOTING IN BASKETBALL**

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## **Abstract**

This study examines the influence of fatigue on several kinematic parameters during three-point shooting in basketball. With the system for kinematic analysis APAS - Ariel Performance Analysis System, are described the position and movements of the players (n=10, Kosova super league) during the three-point shooting. The goal was to prove the differences in kinematic parameters between shooting under normal conditions and shooting after a complex of exercises that cause fatigue in the players. Based on all the results of the data analysis, it has been proven that the changes in the kinematic parameters during the three-point shot did not show a statistically significant difference after a specific period of fatigue. These data suggest that three-point shooting performance is not significantly altered under the influence of fatigue. These results contribute to the understanding of the complex interactions between fatigue and performance in basketball, shedding light on the general importance of physical and tactical preparation to maintain performance levels at critical moments of matches. This study may provide useful insights into the practice of coaching and performance management in basketball. Also these results can be used by coaches and team managers as information to design better training and load dosing

strategies. Specifically, they can focus on developing general training methods that enhance players' ability to maintain optimal performance even under severe fatigue.

*Keywords:* fatigue, kinematic parameters, basketball, performance.

# **12 WEEKS EFFECT OF PLYOMETRIC TRAINING ON ANTHROPOMETRIC MEASURES AND PHYSICAL FITNESS PERFORMANCE IN 14-YEAR-OLD BOYS**

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## **Abstract**

The aim: The aim of this study was to prove the effect of 12 weeks of plyometric training on anthropometric measurements and physical fitness performance. Methods: The research was carried out on a sample of 170 male entities aged 14 years  $\pm$  6 months, primary school students in the city of Kumanovo, North Macedonia. The sample of 170 subjects was divided into 2 groups: Group A: Experimental (EG, n=90, height 167.5, weight 59.40, BMI 21.096) and Group B: Control (CG, n=80, height 166.86, weight 58.180, BMI 20.80). Subjects from the experimental group underwent a 12-week plyometric program, while the control group did not follow any adequate program, except for 2 regular hours during the week in the subject of physical education. For the anthropometric parameters assessment we tested body height, body mass, body mass index, quadriceps circumference and calf circumference, while for the physical fitness performance assessment we used the sit and reach tests, vertical jump, standing long jump, 30 meter sprint, 10x5 shuttle run and agility T-test. The study had a longitudinal character and lasted 12 weeks, with 36 hours of training or 3 hours during the week and 2 hours from the subject of physical education. Results: The results of the study after the application of the experimental model, in the final measurements,

show that all the variables of physical fitness and 2 of the 5 variables of the anthropometric parameters have statistically significant differences ( $p=0.05$ ), between the control group and the experimental one. According to the data from the univariate analysis of variance (ANOVA), in the initial measurements, no significant differences appeared in most of the tests used in this study, except in the 30 m sprint ( $p=0.02$ ) and 10x5 shuttle run tests ( $p= 0.00$ ). While according to the data from the univariate analysis of covariance (ANCOVA), in the final measurements, we find that the data system in the physical fitness space has statistically significant differences in the tests vertical jump (VJ) ( $p=0.00$ ), standing long jump (SLJ) ( $P=0.00$ ), 30m sprint (R30m) ( $p=0.00$ ), 10x5 Shuttle run (10X5Sh) ( $p=0.00$ ), T-test agility (ATT) ( $P=0.00$ ), sit and reach ( SR) ( $P=0.04$ ), while among the anthropometric parameters statistically significant differences were shown by the variables quadriceps circumference (QC) ( $p=0.01$ ) and body height (BH) ( $p=0.04$ ). Conclusion: All the tests are in favor of the experimental group, which can prove that this model of plyometric training, with 3 additional hours per week, in a period of 12 weeks, has a positive effect on the development of the explosive strength performance of the lower extremities, speed, agility and flexibility of the lower back and hamstrings, as well as marked improvements in anthropometry. Practical application: These findings show further evidence for the improvement of anthropometric parameters and the increase of physical fitness performance through the implementation of the plyometric training program model in the children who attended this experiment.

*Keywords:* plyometric training model, anthropometric parameters, physical fitness, student, anova, ancova.

# RELATIONSHIPS AND INFLUENCE OF ANTHROPOMETRIC CHARACTERISTICS AND PHYSICAL FITNESS PARAMETERS IN 100 M SPRINT RUNNING IN ADOLESCENTS

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## Abstract

In this paper, we have searched the relationships and influence of anthropometric characteristics and physical fitness parameters in 100 meters sprint running in teenagers. The purpose of this paper is to prove the relationship between anthropometric characteristics and physical fitness parameters as a predictor system in the 100 meter sprint running as a criterion system. The research was carried out in 170 male subjects aged 14 years  $\pm$  6 months, in the primary schools "Bajram Shabani" and "Naim Frashëri" - Kumanovo, Rep. of North Macedonia. A total of 12 variables were used in the research, of which 7 variables were used for the assessment of anthropometric characteristics, including: body height, body mass, body mass index, chest circumference, thigh circumference, thigh fat and abdominal fatty tissue, 4 variables for evaluating physical fitness parameters, including: 10x5 Shuttle run, agility T-test, standing long jump and standing high jump, and 1 variable for evaluating speed, also: 100 meter sprint running. Based on the results obtained and the analysis carried out, we can conclude that: the variables of anthropometric characteristics and the parameters of physical fitness (as a predictor



system) have a statistically significant impact on the in 100 meters running criteria variable, at the level of reliability  $q=.000$ . It's also worth noting that from the entire predictor system, the greatest individual impact on the 100 meter run criterion variable, have variables: standing long jump (MKGJV) with a negative beta coefficient value of  $-.330$  and a reliability level of  $.000$ , T - agility test (MTT) with a positive beta coefficient value of  $.187$  and a reliability level of  $.003$  and 10x5 Shuttle run (10x5Sh) with a beta coefficient value of  $.150$  and a reliability level of  $.032$ . From these results, we can conclude that adolescents of this age who have developed physical fitness parameters such as explosive strength of the lower limbs and speed with a change of direction – agility, achieve better results in 100 meters sprint running and also we recommend that the same tests be applied by athletics trainers to identify sprint running talent.

*Keywords:* anthropometric characteristics, physical fitness parameters, 100m sprint running, adolescents, regression.

# THE EFFECTS OF SPORTS PARTICIPATION ON ACADEMIC ACHIEVEMENT, QUALITY OF LIFE AND SELF-ESTEEM AMONG YOUNG PEOPLE IN KOSOVO

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## **Abstract**

From the literature we find numerous studies that have analyzed the impact of sport activities on school success. The findings are generally inconsistent. Some studies find weak, moderate correlations, or no impact at all. The aim of this study is to understand the relationship between participating in sport activities with quality of life, self-esteem and school success among youth in Kosovo. It is a quantitative cross-sectional study. The participants were 126 respondents, aged 14-19 years (Mage = 16.75, SD =.88) recruited online, from two high schools of Pristina. Participants completed Global Quality of Life Scale and Rosenberg Self-esteem scale as well as questions related to their sports activities and self-reported average of school grades. 34.9% participants declared that several times a week and 18.3% every day perform sports activities; while 36.5% spend an average of 3 hours or more per week in these sports activities. Companionship and health benefits are the main motivators of involvement in sports activities. Young people believe that sports activities have a positive effect on physical health, mental health and general well-being. A significant negative correlation was found between the hours spent in sports activities and success ( $r = -.217$ ;  $p$

= .020), but there was no significant correlation with the quality of life and self-esteem. A significant positive correlation was found between the frequency of sports activities and quality of life ( $r = .235$ ;  $p = .011$ ), but there is no significant correlation with success and self-esteem. Other studies more focused on this issue can shed more light on these reports, especially on the possibility of interaction of other factors related to school success.

*Keywords:* Sport activities, school, achievement, Self-esteem, quality of life, Kosovo.

# LOW BACK PAIN IN THE HEALTHCARE PROFESSIONALS

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## Abstract

One of the most prevalent musculoskeletal disorders that has a direct impact on people's quality of life is low back pain (LBP). Since 37% of LBP cases worldwide are linked to employment, numerous studies have classified LBP as an occupational health issue.

The purpose of this research is to examine the prevalence, effects, and risk factors of low back pain (LBP) among healthcare professionals.

The stadiometer and SECA scale division were used to measure height and weight. This study included all BMI categories. SPSS Version 23 was used for the data set. Out of 225-healthcare staff and students 87.5% (197/225) had nonspecific lower back pain. 78.7% of the 197 LBP cases were female, and 21.3% were male (CI 95% (2.16-11.2) p value<0.001. The most affected with LBP were 41- 50 years old with 42.13%. 10.1% of participants with LBP were students, 31% were physiotherapists, 44.1% were nursing and 39% were physicians. Nursing were 15.6 times in risk to develop LBP for CI 95% (4.37-55.9) p value<0.0001 and physiotherapist 9.15 times in risk for CI 95% (2.67-31.3) p value resulted=0.0004. Physician were 4.38 times in risk for LBP for CI 95% (1.34-14.2) p value=0.01

Participants that referred to long sitting were 3.99 times in risk for LBP (1.6-9.7) p value 0.002. 34% refer that were in good health

except LBP, 40.1% refer to 1-2 chronic diseases and 25.9% refer to more than 2 chronic diseases. Our research accurately shows that LBP is common in the healthcare sector, particularly among nurses.

The appropriateness of preventative interventions targeted at medical professionals for LBP is supported by these findings.

*Keywords:* Low back pain, healthcare professionals, occupational health.

**8<sup>th</sup> International Scientific Conference on Applied  
Sciences**

# DYNAMIC EVOLUTION: MUSEUM SPATIAL COMPOSITION AND ARCHITECTURAL INTEGRATION

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## **Abstract**

Museums serve as essential repositories of cultural heritage, evolving over time to fulfill diverse societal needs. This paper explores the historical evolution and contemporary manifestations of museum spatial composition, emphasizing the pivotal role of architecture and technological integration. Through a comprehensive literature review and research design, the study elucidates the multifaceted nature of professional activities within museums and their impact on spatial organization. Key findings suggest that museums should integrate administrative-legal research, preservation efforts, exhibit management, and social engagement activities to create holistic and educational environments. Furthermore, the paper presents a spatial composition pattern diagram for museums, highlighting vital functional relationships among various spaces. This study lays the groundwork for future research into museum design and its implications for visitor experiences and societal perceptions.

*Keywords:* Museum design, Spatial composition, Architectural integration.

# **POLYPROPYLENE STRIP REINFORCEMENT FOR SEISMIC STRENGTHENING OF MASONRY WALLS: A PROMISING SOLUTION**

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## **Abstract**

Reinforced masonry walls are a common structural element used in construction to provide stability and support for buildings and other structures. These walls are typically built using masonry units such as bricks or concrete blocks, with or without reinforcement elements such as steel bars or mesh added to improve their strength and durability.

Reinforced masonry walls have been widely used in construction for their strength and durability. This study investigates the addition of polypropylene strips to reinforced masonry walls to enhance their performance. The aim is to improve the structural integrity and seismic resistance of these walls by incorporating a cost-effective and easy-to-install material like polypropylene strips. The research methodology includes experimental testing and numerical simulations to assess the impact of the polypropylene strips on the overall behavior of the reinforced masonry walls. The findings suggest that the addition of polypropylene strips can significantly increase the flexural and shear strength of the walls, making them more resistant to external forces. This study provides valuable insights into the potential benefits of using polypropylene strips in



reinforced masonry walls and highlights their potential as a viable reinforcement solution in construction projects.

*Keywords:* Bricks, masonry, polypropylene strips, shear strength, reinforced.

# WHICH ARCHITECTURE STUDY MODULE DOES OUR COUNTRY AND EUROPE NEED AS EUROPEAN UNION COMUNNITY

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## **Abstract**

The questions about the right profile of the studies in the study programs for Architecture, which will respond to the challenges and demands of the market, the action within the spaces of the European community and our country as a candidate member of the European union.

In my report will be included the requests for changes and additions, the functioning modules so far, the principles of the future and the new accreditations as required by the Law of 2018 where Architecture is part of the group of study programs for regulated professions. Article 147, ONRM no. 82, May 8, 2018.

*Keywords:* higher education, study programs, architecture, qualifications.

# ANALYSIS OF THE FIRE BEHAVIOR OF COMPOSITE BEAMS OF STEEL AND CONCRETE IN MULTI-STORY BUILDINGS

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## **Abstract**

**Purpose:** Unwanted fire is a destructive force that causes thousands of deaths and severe property damage each year. Fire is a spontaneous process of uncontrolled combustion with negative effects expressed through the destruction of material goods and endangering people's lives. Many of the artificial fires were caused by wars, other weather disasters, lightning, but also by poor construction techniques used in the construction of buildings with highly flammable materials. The main factor that motivates us is to design a building that will have high fire safety with which there will be no great economic and human losses due to its premature collapse.

**Method:** Analysis of the fire resistance of construction structures according to technical regulations: The action of high temperature on interconnected-composite structures causes a decrease in the mechanical properties of the two components of the component (concrete and steel), and thus decreases in drastically their load capacity, then they cause major damage and breakage. Fire resistance design of building structures is based on a certain fire scenario. Here are some of the types of fire scenarios that apply around the world. In most European countries, a standard fire time curve according to ISO 834 and a parametric curve are used, the standard curve is very close

to the time-temperature curve used in the United States, ASTM E119. (American Society for Testing and Materials). Constructive behavior of composite elements in multi-storey buildings exposed to high-fire temperatures, according to Eurocode 4, part 2. For composite beams, control procedure: - cross-sectional moment bearing capacity (bending), - horizontal shear, - bearing capacity of the longitudinal section. Composite beams are considered as unprotected steel elements, partially concreted, in aspects of the static scheme as freely supported or embedded elements. Nowadays, several software packages determine the fire resistance of the load-bearing elements of a composite structure. One of the most used software packages in most European countries is Arcelor Mittal, which has been used in the analysis of fire resistance of structural elements of a multi-story building.

**Results:** The fire resistance of the beams is calculated for several cases - types of beams with a height of  $L = 9.6$  m/ - as an unprotected beam only made of steel profile; - protected varnish (painted, sprayed) with commercial material, MONOKOTE MK-6/HD, intumescent paint (INTUMESCENT COATING (ECCS Publ.)), with partial coating of concrete (COMPOSITE BEAM - Partially ENCASED). Analysis of the fire resistance of composite beams. The room temperature is taken as the initial temperature and the heating by the induced fire is done gradually according to the standard temperature curve (ISO 834).

-In the case of the unprotected steel beam that corresponds to the resistance class R15, resistant to fire but has a low torsion coefficient, so how does the stability condition prevail, the beam of the resistance class R15-R240 painted with spray paint is resistant to fire, but this also has torsion, the third case, the beam of resistance class R15-R240 painted with intumescent paint is resistant to fire, but this also has torsion, which meets the conditions stipulated by the regulations (ISO 834). fourth, for the partially concreted beam, a fire resistance class of R 30 to R240 has been obtained, this is a resistance that is expected

for such objects, so it meets the conditions according to EUROCODES.

**Conclusion:** the unprotected beam - does not meet the criteria required according to the same standards, it applies to the cases of beams that are cracked and painted with intumescent paint, and as a final conclusion, the partially concreted composite beam meets the fire resistance criteria and it has fire resistance of class R30 to R240, so it fulfills the criteria set by Eurocode 4. Constructions, in the fire calculation, the standard temperature-time curve is used.

*Keywords:* composite constructions, composite beams, fire resistance, steel profile, concrete.

# **DIMENSION OF THE CONSTRUCTIVE ELEMENTS OF A STEEL FRAME WITH TWO AREAS OF A HALL ACCORDING TO EURO COD 3 UNDER THE INFLUENCE OF SNOW, WIND AND SEISMIC**

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## **Abstract**

**Purpose:** In recent years, as a result of the development of the small and medium-sized economy, there is a renewed interest in the construction of facilities to meet the needs of the economy and the strategy for the development of the economy and the construction of these facilities in the free economic zones everywhere, this is became imperatives of this time where the need arose to design low-rise buildings with large spaces for the needs of local companies but also of foreign companies, some of which have been built and others are waiting to be built for different economic sectors, production, small economy, warehouse, for industrial, agricultural products, etc.

**Method:** We have analyzed the methods which at this time, when the construction of buildings must be carried out faster for reasons of profit in time, the investors are determined between classic construction, assembly or semi-assembly and that of steel, and in most cases at us and in the world, industrial steel structures seem to lead the market, therefore the steel-metal construction method advances compared to other methods for the reason that such

construction is faster, the constructive elements come from factories and their assembly on site is light and fast, they also have an additional advantage that they can be easily dismantled, deployed, change of destinations, etc. For the structure in question, European methods were used, the method of calculating the constructive elements was done with verified software on the global market Arcelor Mittal, which uses European scientific expressions, so calculation-dimensioning is used, with Eurocode 3 for steel.

The design of the object-structure is based on the many requirements that arise from economic needs. Here, a frame with two fields of steel construction material was calculated, for the dimensioning of the structural elements, the load from wind and snow was taken into consideration for the construction area with height above sea level  $H=500\text{m}$ , the seismic behavior of the object was calculated, according to the spectral curve, so the acceleration of the ground was taken into consideration. The structural elements were dimensioned: the end pillar, the middle pillar, the beams for both areas, the connections between them etc.

**Results:** For the object that has dimensions at the base of  $30.00\text{m} \times 50.20\text{m}$ , and that has two fields in the transverse direction of  $15.00\text{m}$  each and in the longitudinal direction there are 5 lamellas with a length of  $10.04\text{m}$ , the object has a height of the main pillars  $H=7.00\text{m}$  and parapet  $h=2.0\text{m}$ , the main elements of the frame are with these dimensions: the main pillars IPE 500, the main beam IPE 600, while the parapet IPE 180, quality steel according to Euro Cod3, S355. Based on the calculations, these cuts are also the final results that it means that they have met all the criteria in every aspect provided by the regulations, i.e. with the European norms/Euro Code3

**Conclusion:** As a conclusion, we can conclude that according to the calculation, elegant cross-sections of all constructive elements, pillars, beams, parapets have been obtained, taking into account the width of the fields  $L=2 \times 15.00\text{m}$  and the entire length of the object  $L_0=50.20\text{m}$  with 5 lamella from  $10.04\text{m}$ , and the height of the object

H=7.00m, and the parapet h=2.00, these dimensions are challenging dimensions for every engineer and every builder, both in terms of dimensioning-calculation and also in terms of construction.

*Keywords:* steel constructions, steel profile, beams, pillars, parapets, loads Wind, Snow, Seismic.



# CONSERVATION AND RESTORATION OF MONUMENTS OF CULTURAL WORKS

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## **Abstract**

Conservation and restoration of cultural monuments is the care, maintenance, and longevity of a monument when it is in favorable conditions as a result of many people who have come to damage it.

Therefore, to conserve a monument is to prevent it from being destroyed or lost in others, to save what remains, to preserve its traces and to reflect a past history in historical architecture.

While restoring a monument of the cultural world, it means returning an architectural object to function, in the old period, in the time period or the geographical space where it is located.

In order to create objects for the conservation and restoration of monuments of cultural culture, the true principles and conventions that regulate these parts of how and should intervene in one of today's cultural architecture.

Conservation or restoration interventions are vital, not only for a monument, but also to highlight the artistic and architectural values, which in any way could be hidden from the past, for various interests with or without awareness.

*Keywords:* Conservation, restoration, architecture, culture, history, art, convention against.

# UNDERGROUND NEW LIVING CONCEPT IN KOSOVO

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## **Abstract**

From the beginning of human existence, housing is considered one of the basic elements for survival and protection from difficult natural conditions. The purpose of this research is to treat underground homes, as a efficient living and nature protected like a new concept of living in Kosovo. In addition, the study will seek to discover the underground houses that were developed in Switzerland, and UK, China, etc. The research is intended to serve as a basic, basis for informing the typologies which can be applied in the territory of Kosovo, advantages, and disadvantages of the underground houses. The work has analyzed the comparison of the built houses, the construction law, the territory of Kosovo and the project proposal which can be applied based on the results of the questionnaire to the citizens of the country. The purpose of the addressed research is to analyze how suitable the changes in terms of housing can be according to the real terrain of Kosovo and based on the results of the research from the questionnaire of the country's residents. The determination of the typology of the construction of underground houses is based on the terrain of the country and the protection of green spaces. The method used for the obtained results of the research is the quantitative method. With the construction of underground houses, nature protection and green areas, it will be helped to preserve the quality of the air and may contribute to the fight against climate change.

*Keywords:* Underground house, Kosovo, housing, typologies.

# THE DEVELOPMENT AND APPLICATION OF INTELLIGENT TRANSPORT SYSTEMS AND THEIR IMPACT ON TRAFFIC SAFETY

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## Abstract

Intelligent transport systems (ITS) have data collected from different sources intelligent modern movement systems and indexes should be determined for the evaluation of their impacts based on their data. There are several methodologies for the evaluation of their impacts on the traffic safety system.

When considering Intelligent Transportation Systems (ITS) as one of the applied methods for the safety of the movement in the context of planning the movement through urban environments and other areas, it is clear to us that the efficiency of the ITS should be valued with full confidence.

With the development and application of Intelligent Transport Systems (ITS), the following efficient and effective results are expected in terms of their impact on road safety, such as:

- For a fast and efficient traffic system,
- To increase safety in the traffic system, as well as
- Reducing the number of traffic accidents.

The purpose of this paper is how to introduce an effective and efficient Intelligent Transportation System (ITS), as well as its impact on increasing safety, reliability and reducing the number of traffic accidents. This paper will analyze the meaning of ITS as well as their impact on the traffic safety system.

At the end of this paper, there will be a conclusion where it is determined how ITS can be applied in the safety system and their impact on this system, which has an impact on safety, reliability in traffic and in reducing the number of traffic accidents.

*Keywords:* Intelligent Transportation Systems (ITS), safety, security, traffic accidents, security system.

# MULTIPLEXING AND SCALABILITY OF DATA IN THE INDUSTRIAL PROCESS AND IMPLEMENTATION

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## Abstract

The determination of the multiplexing process represents a specific task in the industrial process. Different data can be collected and placed in a single channel, with the purpose of management and creation of a system that can be controlled from a single base. The paper also deals with the evaluation of scalability, where is given the possibility of adapting the system itself to possible and relative values. Also, an application will be created which follows the process and provides continuous evaluation for the current state of the parameters. These parameters are stored in a database and are references for the generation of other values adapted to the system itself.

The multiplexing process is an extremely suitable possibility for managing different data through a single channel, but still demultiplexing is also an output, which involves the distribution of data from one channel to several different data.

In the paper, some characteristic schemes will be given which present the structure of an industrial system. Also, some access will be given through computer networks and specific electrical circuits. The paper will also describe some of the characteristic dimensions that are

included in this industrial process; it appears underlined which of those values fulfill the usage criterion. Through an application, some functionality will also be given for the size and characteristic variables for the system that is observed and evaluated.

*Keywords:* Multiplexing, Scalability, Process, Application.

# SNAIL TRACK EFFECT ON INSTALLED PHOTOVOLTAIC MODULE

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## **Abstract**

The process of solar energy conversion occurs in a semiconductor device known as a solar cell. The solar cell delivers amount of electrical power which is defined by an output voltage and current. Connecting together a number of solar cells we create a solar panel called PV (photovoltaic module) module. For large-scale generation of solar electricity, panels are connected together into so called solar array. Solar panels are part of a complete PV solar system, which comprises batteries for electricity storage, DC/AC inverters that connect a PV solar system to the electrical grid etc. Over last years there is an issue occurs called snail tracks effect which are lines of local discoloration that occur on solar panels after long-term usage. These brown or black lines appear near busbars on solar edges or close to microcracks. The name of this effect origin from the illusion like snails or worms have passed over the solar panels. In this paper we will analyze the effect of such snail tracks in process of power generation on solar panel at already installed PV system and will define all advantages and disadvantages of this effect giving results in table form on monthly basis.

*Keywords:* photovoltaic panel, electricity, solar, cell, effect, array.

# TRENDS AND COHERENCE AS VALUES OF URBAN/ARCHITECTURAL BUILT HERITAGE

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## **Abstract**

The character of urban/ architectural built heritage is based on built heritage as: places of learning and improving community culture, places of maintaining and improving heritage and places of urban re-functionalization. The values of this character are based on three main structural pillars:

- Identity,
- Coherence,
- Diversity

Knowing that urban built heritage makes every city unique and establishes its identity, based on key urban/architectural performance elements as: place character, architecture and materialization, unique character, symbolic and aesthetic values! Evaluation of built heritage environment is based on evaluation indicators for two study cases: Çarshia e madhe in Gjakova/ Kosova and City center in Ohrid/ Macedonia; as specific built environment; with historical values, urban architectural concepts and possibilities for integration in modern trends.

Through this research will be presented the answer on raised research question:



- How to establish an integrative concept of the urban built heritage development, based on interrelation Identity-Coherence- Diversity?

Strengthening that integrated architectural design and urban planning will help institutions to combine sectorial activities and will give new inputs to joint interests between different groups and stakeholders through integrated inter- structural and inter- sectorial development.

This process will bring to the situation where is needed more information's and knowledge regarding new challenges on development requirements for those specific urban/ architectural areas, because when heritage conservation, architectural values and urban planning concepts join forces, the outcome will be improvement of urban/ architectural environment with identity, coherence and diversity!

*Keywords:* Trends, coherence, values, built, heritage, urban, integrated, development, sectorial, policy.

# LANDSLIDE RISK ASSESSMENT IN A NEIGHBORHOOD IN THE VILLAGE OF PIROK NEAR TETOVE

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## **Abstract**

Quantitative landslide risk assessment, considering the area and scale of investigation, represents a research challenge that is reflected by need to analyses, in an analytical manner, using various complex methods. Those methods of multidisciplinary and interdisciplinary observation, engineering geological and geotechnical modelling of natural parameters and causes of terrain instability are performed for landslide hazard and risk assessment. The deterministic and probabilistic dynamics models are applied to define and determine the relevant parameters that affect the quantitative landslide risk assessment. This eliminates the possibility of errors due to the subjectivity of the researcher. “Pirok”, near Tetove, is chosen as a case study. This landslide is known as a very active landslide that for a century threatens housing and infrastructure facilities, as well as the population that still lives on it. The “Pirok” landslide is active, deep, slow and complex landslide with periods of..

*Keywords:* Methods, landslide, probabilistic dynamics.

# MAINTENANCE MANAGEMENT ACTIVITIES OF COLLECTIVE HOUSING BUILDINGS

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## **Abstract**

The purpose of this paper is to present a case study about the audit of the maintenance process of the collective housing building in the Municipality of Lypjan - Republic of Kosovo. The research methodology included interviews, audit of the residential facility and maintenance process, and database analysis of facility user requests for maintenance. The results showed that the average attendance of accepted requests is low and the biggest requests are related to the maintenance of the common space, electrical installations and the physical condition of the common spaces, including mainly doors and windows. According to the maintenance management, the need for a better structuring of the initial request acceptance system and greater rigor towards the quality of services was verified. The paper expands the knowledge regarding the maintenance process of buildings for collective housing and this characterization of the maintenance management of the said facilities will hopefully serve as a reference point for such facilities.

*Keywords:* Management, maintenance function, collective housing

# FORM-FINDING OF ARCHES

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## **Abstract**

Parametric design should not be understood as the use of computers to design and manipulate architectural form in new freeform shapes. The algorithms that guide parametric design allow architects to overcome the limitations of traditional CAD software and 3D modelers, reaching a level of complexity and control which is beyond the human manual ability. Algorithms-Aided Design presents design methods based on the use a traditional or visual algorithm integrated with a the 3D modeling software allowing users to explore shapes that are defined by specific parameters.

This research focuses on strategies that help us shape forms by using forces (loads) as the guiding parameter. It explores different approaches of implementing these parameters in the Rhinoceros modeling software through the Grasshopper virtual programing environment that enable us to simulate the behavior arches and form-find the optimal shape under varying conditions.

The research shows that accurate simulation of physics is possible in the environment and that with this kind of form-finding approach the design is always focused on structural optimization. Form-finding defined by force rather than typology allows designers to create new structural solutions, which are not only spatially complex and always constrained to be in static equilibrium, but also free from any prior biases towards known geometries or typologies.

*Keywords:* parametric design, form-finding, force, Hooke's law, catenary, simulation.

# CONSTRUCTION OF FLOATING PHOTOVOLTAIC POWER PLANTS IN THE AREA OF JSC ESM RESERVOIRS

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## **Abstract**

As a serious, socially responsible company as well as the largest production capacity of electricity in state ownership, JSC ESM fully follows the Strategy for the development of energy in the Republic of North Macedonia until 2040. Therefore, the company continuously advocates for the construction and realization of strategic capital projects for the production of electricity from renewable energy sources, which have a major impact on the economic development of the country as a whole, as well as on the protection of the environment.

In this context, the problem elaborated in this paper is very current and aims to address the importance of the construction of the four floating photovoltaic power plants, within the company, with a total installed capacity of 321 MW, and their influence on the energy transition, that is, in the complete replacement of electricity production from coal, with production from solar energy. Apart from the production of electricity from solar energy, these photovoltaic power plants are of great importance because they are not built and do not occupy fertile land, but are built in the area of the reservoirs of the hydroelectric power plants.

In general, the investment of JSC ESM in green energy has an important role and a great influence on the development strategy and in creating sustainable competitiveness of the company. All this will allow the company to be the most important and leading factor in the liberalized market, especially in the time after the great energy crisis in the country and beyond.

*Keywords:* electricity, production capacity, energy transition, floating photovoltaic power plants, renewable energy sources, solar energy.

# EXPLORING SHOCK ABSORBER VIBRATION DYNAMICS THROUGH ARDUINO BASED MEASUREMENTS

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## **Abstract**

The study aims to investigate the vibration dynamics of shock absorbers through the utilization of vibration modules designed for Arduino microcontrollers. Shock absorbers are pivotal components within vehicle suspension systems, tasked with mitigating the impact of road irregularities to ensure passenger comfort and vehicle stability. Despite their critical role, understanding the intricate vibrational behavior of shock absorbers has remained a challenging endeavor.

The research methodology involves the integration of vibration modules onto shock absorbers to facilitate real-time data collection. This innovative approach allows for the precise measurement of various vibration parameters, including amplitude, frequency, and duration. By leveraging the capabilities of Arduino microcontrollers, the study endeavors to capture detailed insights into the dynamic response of shock absorbers under diverse driving conditions. Through a series of controlled experiments, the vibrational characteristics of shock absorbers has thoroughly examined. By subjecting the absorbers to simulated road vibrations and varying driving scenarios, the research aims to uncover the underlying factors influencing their performance. Statistical analysis of the collected data will enable meaningful comparisons between different shock

absorber configurations, shedding light on potential variations in vibration damping capabilities.

The study seeks to explore the implications of these findings for vehicle suspension optimization. By gaining a deeper understanding of shock absorber dynamics, researchers aim to contribute to the development of more efficient and adaptive suspension systems.

In conclusion, this study not only shows the complex dynamics of shock absorber vibrations but also showcases the transformative potential of Arduino-based measurement techniques in automotive research and development. Through innovation and exploration, we pave the way towards safer, smoother, and more responsive vehicles for the road ahead.

*Keywords:* shock absorbers, vibration dynamics, Arduino, vehicle suspension, experimental analysis.



# A COMPARATIVE METHOD FOR ANALYSES OF EFFECTIVENESS OF CONVENTIONAL MACHINE LEARNING METHODS VS DEEP NEURAL NETWORKS IN PREDICTIVE MODEL APPLICATIONS

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## Abstract

This study demonstrates the effectiveness of combining accelerometer data and long short term memory neural networks for the early detection and prediction of stepper motor friction, facilitating increased machine reliability and lifetime.

This research investigates the comparative effectiveness of conventional machine learning methods and deep neural networks, specifically long short term memory, in distinguishing and predicting friction phenomena in a stepper motor. Using data from dual accelerometers attached to the engine, observations were recorded both during typical operation and during induced friction cases facilitated by a 90 degree servo motor along the pitch axis. After that, feature extraction techniques were applied to the data to capture relevant characteristics. Then we used the T-test to see the distribution of the data, ranking the data with the smallest p-value. A long short term memory neural network was trained using this data, achieving a remarkable accuracy rate.

After that, and Long Short Term Memory neural network was trained on the database to enable real-time friction prediction. By exploiting

features such as mean square and root mean square (RMS) of the signal, the model demonstrated ability in predicting the remaining operational life of the engine. The findings shows the fact that machine learning can be much more efficient for the application of this model due to the smaller number of necessary data.

*Keywords:* machine learning, predictive, maintenance model, deep learning.

# DETECTION AND PREDICTION OF STEPPER MOTOR FRICTION BY USING ACCELEROMETERS AND LONG SHORT TERM MEMORY NEURAL NETWORKS

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## **Abstract**

This work is based on the application of neural networks to build the model for predictive maintenance. The model is based on experimental data collected from the experiment just prepared. This experiment aimed to detect and predict the friction in a stepper motor using two accelerometers located on the motor, with friction imposed by a servo motor rotating 90 degrees and rubs against the output shaft of the stepper motor. We have collected a data set comprising 400 cases, equally divided between normal operation and operation under friction, recorded using accelerometers.

The trained model was deployed for real-time prediction of friction in the stepper motor. Using features such as root mean square and root mean square of the signal, the model demonstrated the ability to accurately predict the remaining useful life of the machine. Using a predefined threshold value, the model efficiently distinguished between normal operation and cases of increased friction, enabling the implementation of proactive maintenance strategies.

This study demonstrates the effectiveness of combining accelerometer data and long short term memory neural networks for the early detection and prediction of stepper motor friction, facilitating increased machine reliability and lifetime.

*Keywords:* neural networks, predictive, maintenance model, real time training.

# THE APPLICATION OF MACHINE LEARNING FOR THE MODEL DESIGN FOR THE DETECTION OF SMALL DEFECTS IN MECHANICAL PROCESSING

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## **Abstract**

The object of this paper is the development and implementation of a system based on machine learning for the detection of small defects in an industrial context, using the Raspberry Pi platform. Small defects can have a significant impact on product quality and the effectiveness of the manufacturing process, and are often difficult to identify with traditional inspection techniques.

The approach presented in this paper involves a combination of image processing and advanced machine learning algorithms to detect and classify defects in real time. Using a low-cost platform like the Raspberry Pi offers flexibility and potential for integration into production environments with modest resources.

The model is trained on an extensive database of images taken from industrial processes, including examples of various defects. The optimization of the algorithm has been done taking into account the resource limitations of the Raspberry Pi, while still providing a high level of accuracy and efficiency in fault detection. Despite limited processing capacities, the system achieves satisfactory performance and reduces false errors. Also we have explored the practical aspect of implementing this technology in an industrial setting, assessing the

benefits and challenges of using the Raspberry Pi for quality inspection. Finally, we suggest some recommendations for the implementation of this model in different industries and discuss the possibilities of its extension to other quality control contexts.

*Keywords:* machine learning, raspberry Pi, predictive, maintenance model.

# VERNACULAR ARCHITECTURE AND NATIONAL IDENTITY: BOSNIA AND MACEDONIA REVISITED

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## **Abstract**

Many scholars share the opinion that the creation of the national identity is considered to be one of the most ambitious projects, and is completed in different ways, such as through language, literature, new policies in everyday life and in education, in the production of new literature in art., etc. Others think that tradition also plays a part in being important as a means of creating identity. They even go so far as to say that even if it does not exist, it is their job to invent it, with the reason the same (invented) tradition to fulfill the ideals of the nation or the state itself. On the other hand, architects are convinced that architecture can be implicated in the construction of identity. Architects often highlight not only the potency of architecture to carry a political message, they insist on proving that architecture has a decisive role in creating a national identity.

For this reason, the first part of this paper explores the implication of architecture and the political agenda (ideology) in the construction of the nation's identity. Dusan Grabrijan as an architect explores Bosnian architecture and the way Bosnian architecture should be involved in creating national identity, especially after the WW2. The research primarily follows the writings of Grabrijan, through which the architectural wealth of Bosnia is first clarified and then this (national) architectural wealth is examined to be used in the agenda of creating national identity. The theoretical aspect examined by the architect will be conveyed through architectural examples.

The second part of this paper clarifies the commitment (institutional) of Grabrijan in 1949 in the field research in Macedonia, to first identify the values of vernacular architecture, and then argue the thesis that its values are basis of the creation of national identity. If the latter is not strongly argued, Grabrijan, leave the path open so that in the future, other authors will make numerous attempts to create national identity through the architecture created over the centuries in the country. Recently, Grabrijan is used to draw the same parallel between architecture and political ideology in both Bosnia and Macedonia.

*Keywords:* national identity, tradition, architecture, Macedonia.

# **ANALYSIS TO STRATEGIES TO REDUCE THE NUMBER OF TRAFFIC ACCIDENTS ON ROADS**

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## **Abstract**

The main goal, of road traffic safety strategies is that, by applying appropriate research methods and analysis of the achieved results, provide the necessary quantitative and qualitative identification of a complex system of road traffic safety. The paper presents the analysis and basic guidelines of the Safety Strategy in order to reduce the number of road accidents using the experiences and goals of European Union countries that have many years to implement them in their countries, as well as the critical approach and analysis of the state of traffic accidents in the Republic of North Macedonia even after two national strategies.

*Keywords:* strategy, traffic accidents, road safety.



# EVOLUTION OF ELECTRIC VEHICLE REGISTRATIONS AND CHARGING INFRASTRUCTURE IN NORTH MACEDONIA

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## **Abstract**

This study aims to analyze the transition of the automotive sector in North Macedonia, focusing on the increasing use of electric vehicles (EVs) and the associated challenges. In this context, a comprehensive analysis of the number of EV registrations in North Macedonia over a specific period is conducted, including their growth and the factors influencing this evolution.

Additionally, the EV charging infrastructure and the challenges involved in providing a sustainable and efficient infrastructure to support the use of these vehicles are examined. Beyond the technical and infrastructural aspects, the economic and environmental impact of EV use in the context of North Macedonia is investigated. A qualitative approach also encompasses the analysis of consumer perceptions and expectations regarding EVs and their influence on purchase decisions.

With such an encompassing analysis included in our study, we aim to provide a clear definition of the processes and challenges of EV adoption in North Macedonia, identifying opportunities for further development and necessary improvements in infrastructure and government policies.

*Keywords:* Electric Vehicles, (EVs), environmental impact, economic implications.

# **LOCAL COMMUNITY AWARENESS AND PERCEPTIONS TOWARDS INDUSTRIAL HERITAGE VALUES AND TRANSFORMATION**

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## **Abstract**

Despite the significant impact that industry has had on social and economic aspects of human life, industrial buildings and sites are often overlooked as witnesses of industrial architecture and industrial past. After the decline of production, many times, abandoned buildings are demolished without considering their architectural, cultural and historical values. It was not until last century that the value of industrial sites as cultural heritage was recognized, mostly due to a movement that first appeared in Britain and later began to spread to other countries. In Macedonia, the recognition and protection of industrial heritage did not evolve until much later, and it is still poorly developed, given the continuous demolition of industrial buildings day by day.

Awareness and involvement of the community is one of the many factors that can support protection and prevent demolition of these industrial markers in the city's structure. Using two distinct sites and towns as examples (The first case study is an industrial site in Oberschöneweide, Berlin, while the second site is located in Tetovo), this study focuses on the local community's perception of the values

of industrial heritage, transformation and potential for reuse. The research begins with the examination of the past and present condition of these two sites, and continues with surveys addressed to local populations of these two locations, in order to understand the difference in their awareness and willingness to take measures to protect these industrial spaces.

*Keywords:* industrial buildings, heritage, values, transformation, community.

# AIR QUALITY IN THE REPUBLIC OF NORTH MACEDONIA AND ITS EFFECTS ON HEALTH

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## **Abstract**

Society's efforts for a better life have enabled the current economic and social development. This has been achieved mainly by using technique and technology, as well as mental and intellectual skills in the use and exploitation of natural material and energy assets. On the other hand, this has affected the pollution and degradation of the main parameters of the living environment such as soil, water, and air. While soil and water pollution can be localized and limited, air pollution is universal and has a more dangerous impact.

Therefore, the purpose of this paper was to determine how the air quality was and is in different cities of the RNM and its effects on human health. For this purpose, it is based on daily data from automatic monitoring systems that measure air pollutant parameters. Analyzing the average monthly and annual values, we will determine which of the pollutants were above the permitted limit values according to the air pollution law in RNM and in which city they were higher. At the same time, these values were analyzed for the summer and winter seasons. The analysis includes data from 2012 when the new law on permitted limit values came into force.

The results show that some cities such as Tetova, Skopje, Bitola, and Kichevo result in very high pollution. This is confirmed by the air quality report compiled by IQAir, where RNM ranks second after Bosnia-Herzegovina as the country with the highest regional level of pollution. According to the World Health Organization, air pollution is responsible for about 7 million premature deaths worldwide each year. Meanwhile, various institutions such as the Center for Legal Analysis and Research and the health institutions in the country provide data that on an annual level about 4000 deaths are the result of polluted air.

*Keywords:* air pollution, pollutants, annual average values, PM10 and PM2.5 particles.

# VERNACULAR DWELLING; A COMPARISON BETWEEN PRIZREN AND OHRID

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## **Abstract**

This study presents a comparative analysis of the traditional dwelling units in the cities of Ohrid, North Macedonia, and Prizren, Kosovo. Both cities are renowned for their rich historical tapestries and architectural legacies that reflect a blend of various cultural influences over the centuries. In a certain period of time ruled by same administration, in different places but proximately the same distance from the capital, the dwelling formation as a process linked to the center developed at the periphery increases the issues of the way of building within similarities and differences. This study aims to provide data of the 19 th century cities due to the focusing on the general design principles of house in Prizren and in city of Ohrid, the characteristics of these cities is that inherits the traditional dwelling units. At the analysis of the traditional houses in Ohrid has been selected three most eminent samples in order to have more detail description of the house. In the same manner has been done at the second part that is related to the Balkan traditional house, whereas the characteristic city has been choose the city of Prizren, with its most eminent three examples on the traditional houses. For both areas has been developed table that shows the characteristics and then has also the comprehensive tables in order to see the similarities or the differences between these traditional houses from different areas. This study synthesizes the key findings from the research available, highlighting the architectural and cultural aspects of the dwelling units in Ohrid and Prizren.

*Keywords:* Vernacular architecture, Dwelling, Typology and Balkan dwelling.

# PERFORMING INVESTIGATIONS IN ORDER TO FIND A REASONS FOR STEEL WIRE ROPE BREAKING

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## Abstract

Steel wire rope was broken in exploratory conditions i.e. during hoisting the load. The requirement of the purchaser of the investigations was to find a reason which caused breaking the steel rope. In other words to check fitness for purpose of this rope. Because of that all necessary investigations to solve this problem were performed. As first, quality of delivered rope was checked. More concretely it was checked chemical composition of the base material (steel strands and wires). Besides, quality of the base material i.e. presence of non-metallic inclusions, microstructure, segregation and decarburation of the rope wires was done. This investigation showed that base material is high carbon steel. Its quality fulfill necessary requirement.

Therefore, the next step was to make failure analysis of the rope after long period of exploitation. These investigations contain visual inspection of the rope, metallographic investigations, fractographic analysis and tensile test.

Visual inspection was performed according ISO 4309 and ASME B30.30. standards. Visual inspection was performed to all segments of the rope. To perform visual inspection segments were unwinded and separately tested. It was woud that the most serious damaging was detected near the breaking point.

Performed investigations clear confirmed that wear of the rope is the most often detected type of failure. Besides corrosion of the rope was detected too. Metallographic investigation detected the wear too. Scanning electron microscope confirmed that shear and fatigue are the most often found types of fracture in the rope wires.

It was concluded too that lubrication of the rope is different at different location of the rope. It means that some position there is no lubrication. It is obvious that defects (failures) which caused breaking of the rope appeared in the ropes during Performed investigations confirmed it. Metallographic investigations of the wires and visual control of the ropes segments and strands confirmed that all defects in the ropes appear during the exploitation as result of improper installation, manipulation and handling of the rope.

Nominal value of the load became lower during exploitation. More concretely remained load, which can be hoisted, is in relationship 5:1 with nominal load. So if higher load was hoisted, the rope will be broken as it happened in our case.

*Keywords:* steel wire rope, load, abrasion shear, visual inspection, corrosion.



# EXPLORING THE HIDDEN PSYCHOLOGICAL EFFECTS OF URBAN NOISE POLLUTION IN KOSOVO

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## **Abstract**

Urbanization has led to an increasing prevalence of noise pollution in our daily lives, impacting mental health and well-being. This paper investigates the psychological ramifications of urban noise pollution on Kosovo inhabitants in recent years. Through a modest literature review, this study synthesizes existing research on the subject, examining the diverse effects of noise pollution on cognitive function, stress levels, sleep quality, and overall psychological health. Additionally, it investigates the various types of noise, including traffic noise, industrial sounds, and neighborhood disturbances, and their effects on psychological well-being. The paper explores the moderating factors that may exacerbate or mitigate the psychological impact of urban noise pollution, both on community and individuals levels, such as individual resilience, coping mechanisms, and socio-economic factors. Moreover, this research proposes potential interventions and urban planning strategies aimed at mitigating the adverse psychological effects of noise pollution on community level. By raising awareness of the silent but profound impact of urban noise pollution on mental health, this paper advocates for the implementation of policies and initiatives that promote quieter and more peaceful urban environments, fostering healthier and happier communities.

*Keywords:* Noise Pollution, Psychological Impact, Stress Level, Health, QoL.

# ENHANCING THE POTENTIAL OF SPORTS FACILITIES AT SCHOOLS

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## **Abstract**

The design and condition of school buildings, as well as the creation of welcoming, suitable and pleasant environments, are significant factors that impact parents' school selection and have an important impact on the learning process and children's well-being. The lack of sports facilities in our schools complicates the teaching process and puts physical education teachers under pressure to come up with non-ideal solutions to complete the course, especially during rainy and snowy seasons.

Academic success and mental development are often prioritized by educational institutions, but physical activity-related matters are frequently disregarded, and as a consequence sports environments in schools do not receive sufficient attention. Many times, the lacking of school sport halls are justified by the lack of funding for their construction and maintenance. However, these areas are very vital not only for school students but also for the community as a whole, as they can serve as central points for a variety of social, athletic and cultural events. In some cases, they can also be financially beneficial; schools can rent them and generate income.

The purpose of this research is to analyze the current state of sports spaces in the schools of Tetovo, and offer suggestions on the design of new sports spaces and improvement of old ones. This research is not meant to address detailed aspects of the design of these facilities, but it is a review of the main concerns that need to be covered in the schools of Tetovo.

*Keywords:* Sport facilities, school design, physical educations, sport architecture, community.

# **IMPACT OF APPROPRIATE ORIENTATION OF RESIDENTIAL BUILDINGS ON ENERGY EFFICIENCY: A CASE STUDY IN TETOVO, NORTH MACEDONIA**

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## **Abstract**

While sustainable urban development has become very important nowadays, the tendency of the population to move to the city is continually expanding and this causes higher consumption of energy to satisfy the requirements of the residents. A high percentage of this energy is used for HVAC and lighting of residential buildings. For this reason, the purpose of this research is to analyze the appropriate orientation of buildings which is defined by site planning including the geometry of the buildings, by examining a residential neighborhood within a Tetovo. This paper detects the potential for innovative design strategies to drive substantial energy savings and promote environmentally responsible living. Building orientation within a neighborhood plays an important role in using the power of the sun. The study also explores the important role of site planning in the neighborhood's energy efficiency ecosystem. The arrangement of buildings within the site play a dual role in promoting sustainability. Analyzed position of the residential buildings based on the openings in different orientations gives us the right to make the conclusion, that in Tetovo neighborhood the position of the greatest number of residential buildings is based on sustainable site plan which opens the

dimension of energy efficiency related to the exposure to the sun. Southeast and southwest orientation are suitable for optimal use of solar energy increasing the energy efficiency of the buildings. In Tetovo, a city with a continental climate, the angle at which buildings are positioned relative to the sun's path can significantly impact energy consumption.

*Keywords:* Energy efficiency, residential buildings, orientation, site planning, energy savings.

# DETERMINING THE DANGER THRESHOLD OF INTERSECTION TRAFFIC ACCIDENTS

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## **Abstract**

Accidents at intersections where the traffic is regulated with traffic signals are an everyday occurrence despite the right of way being clearly and unequivocally determined by a traffic sign. The problem is further complicated when one of the two participants is moving at an illegal speed. Hence, the question arises, of whether speed of movement can be imposed as a factor in creating danger, or whether the dangerous situation is the result of not respecting the right of way.

This paper will analyze the methodology of determining the danger threshold of intersection traffic accidents where traffic is regulated by traffic signals, and thus the procedure for determining dangerous traffic signals. In doing so, traffic situations at a four-way intersection will be covered, where both drivers maintain their direction of movement, and the driver who moves along the street with the right of way drives the vehicle at an illegal speed.

*Keywords:* Dangerous situation, danger threshold, traffic accident, speed.

# THE IMPACT OF SOCIO-CULTURAL DEVELOPMENTS ON THE URBAN STRUCTURE OF TETOVO DURING THE PERIOD OF YUGOSLAVIA

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## **Abstract**

The modernization of cities in Yugoslavia in general and in North Macedonia in particular, along with the modernization of social and cultural life, fostered a conception of the city and life in it that differed significantly from the traditional way. Consequently, the process imposed a radical transformation of the city's overall configuration, its public and private buildings, and their utilitarian, aesthetic, and experiential performance. Although the planned interventions were only partially implemented in certain areas of Tetovo, they left an indelible imprint on the city and continue to influence its ongoing development.

This paper aims to provide a thorough analysis of the socio-cultural developments during the period of Yugoslavia and their impact on the urban structure of Tetovo. One aspect examines the socio-cultural developments that have been shaped by the political and economic shifts in the Yugoslav countries. The other aspect is centered on assessing the influence of these developments on Tetovo's urban street network, block configuration, plot arrangement, building distribution, and architectural design. The urban transformations of Tetovo are primarily analyzed through the examination of cadastral maps from 1937 and 1981, as well as the planned urban development of Tetovo in 1960.

*Keywords:* Tetovo, North Macedonia, Yugoslavia, urban transformations.

# INVESTMENTS OF INTERNATIONAL FINANCIAL INSTITUTIONS IN THE INFRASTRUCTURE PROJECTS IN NORTH MACEDONIA

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## **Abstract**

Nowadays, North Macedonia experiences development of large infrastructure projects, supported from international financing institutions such as World Bank, EBRD or European Union. These international financial institutions help the infrastructure sector to candidate countries and potential candidates for joining the European Union, providing financial investments and incentives without which the progress of small and stunted economies, potentially prosperous, would not be possible. It is primarily an important aspect of investing in this sector of economy, as it contributes to improve the infrastructure conditions for easier mobilization, people, equipment and capital. The aim of the paper is to highlight the characteristics of these investments in the infrastructure sector of the Republic of North Macedonia, where, according the government politics, large infrastructure projects are financed through diversified sources of funds, mainly from donations as IPA funds, as well as favorable loans from international financial institutions/bilateral creditors. The results of the analysis highlighted the importance of well-prepared and executed project, accompanied by regular procurement procedures,

type and conditions of the contract, with direct impact on the construction time, cost and quality of the infrastructure projects realization.

*Keywords:* international financial institutions, infrastructure projects, public procurement, contract conditions, North Macedonia.



# A COMPREHENSIVE EXPLORATION OF THE NEXUS OF ARTIFICIAL INTELLIGENCE AND ARCHITECTURE

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## **Abstract**

Artificial Intelligence (AI) has emerged as a transformative force across various domains, reshaping traditional paradigms and revolutionizing industries. Within architecture, AI stands as a catalyst for innovation, offering unprecedented opportunities to reimagine design processes, optimize resource utilization, and enhance built environments' functionality and sustainability.

The integration of AI in architecture represents a paradigm shift, empowering architects to transcend conventional design constraints, optimize building performance, and create immersive, responsive, and sustainable environments. As AI continues to evolve and permeate the architectural landscape, further research and interdisciplinary collaboration are essential to unlock its full potential and shape the future of architectural practice and urban development.

This research reviews the transformative role of Artificial Intelligence (AI) in fostering design creativity and innovation within architecture. While AI is often associated with optimization and efficiency, its potential to augment human creativity and expand the boundaries of architectural design is increasingly being recognized and explored.

This paper explores the multifaceted integration of AI in architecture, elucidating its profound impacts and promising avenues for future

exploration in architecture as a creative, generative, simulation, and optimization tool.

*Keywords:* AI, architecture, paradigm shift, creative, generative, optimization, tool.

# THE INFLUENCE OF GEOMETRIC ELEMENTS ON THE SERVICE LEVEL AT ROUNDABOUTS

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## **Abstract**

The service level is the quality of traffic conditions in the road network, which includes comfort, safety, freedom of maneuvering and so on. There are different service level depending on the conditions and circumstances of the roundabout construction. The purpose of this paper is to highlight the geometric elements as highly important parameters in the uninterrupted traffic flow in roundabouts, as well as the safety elements for an uninterrupted and efficient traffic flow.

*Keywords:* Service level, geometric elements, roundabouts, safety.

# COMPARATIVE ANALYSIS OF NANOMATERIALS TO IMPROVE THE ENERGY EFFICIENCY OF HISTORIC BUILDINGS

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## **Abstract**

The scientific interest in nanomaterials in energy efficient building has increased significantly in the last decade, especially after the introduction of the ambitious concept of building buildings whose energy consumption is close to zero (NZEB). This also leads to an increase in the thickness of conventional thermal insulation materials in order to improve the thermal performance. In some European countries, the thickness of the insulation has almost doubled. This restriction has important economic and technical consequences such as: reduction of internal space, increase of insulation costs and, above all, disruption of the external appearance of existing buildings, i.e. jeopardizing cultural heritage. New buildings have a limited impact on the overall energy reduction because they represent only a small part of the existing building stock. It is estimated that only 1% of Europe per year belongs to newly built building stock. Existing buildings therefore represent the greatest opportunity for improvements in energy efficiency. Moreover, new buildings use four to eight times more resources than renovated ones, which is a sustainable argument in favor of renovating existing buildings. The development of high-performance insulation with as little thickness as possible has become a technically and scientifically justified challenge. But not only has the thickness of the material highlighted

the need for research and development of new materials, but more important factors, especially when it comes to historical buildings. This paper deals with the analysis of nanomaterials to improve the energy performance of buildings, especially those that have cultural historical value and their original appearance should be kept as much as possible in the renovation process. The research consists, first of all, in a review of extensive literature related to the general application of nanomaterials in the construction sector, where the most significant properties in terms of their thermal insulation characteristics are emphasized. Then, on the basis of the obtained data, a comparative analysis of the researched nanomaterials was carried out several criteria have been established for the evaluation and selection of the most suitable materials for the renovation of historical buildings. The conclusions for the selection of nanomaterials with high thermosilation power, the application of which would have a minimal impact on the cultural heritage, are derived from the analysis.

*Keywords:* nanomaterials, energy efficiency, cultural heritage.

# **THE GREEN IMAGE OF MIXED-USE PROJECTS IN TIRANA: GREENBUILDING OR GREENWASHING?**

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## **Abstract**

Sustainable and eco-friendly development has become a key goal in design approaches of contemporary architectural practices. Recent ‘green’ and nature-based tactics ideally aim to reduce the negative environmental effects and strive for improving the social, economic, biophysical, and technological performance of buildings. However, the increased public awareness for nature protection has led to architectural professionals being scrutinized when delivering new projects. As a result, many firms have adapted many of these ‘green’ programs and policies as a marketing strategy for brand image and value. In Albania’s rapidly developing construction sector, green building has been heavily promoted.

When developers present green programs and strategies to advertise a green image, the practice is referred to as greenwashing. Due to a lack of proper scientific data and adequate supervision systems, there is a need to assess such projects more carefully. The purpose of this paper is to evaluate the frequency and methods of representing greenery and nature-based tactics in project description and documentation.

To begin with, four major mixed-use developments in Tirana are selected, the Vertical Forest, Tirana Garden Building, Ekspozita Building and MET Tirana Building. The ‘green’ content offered by

their design team is inspected. Briefs, plans, drawings, and renderings are reviewed, in terms of the use of green strategies, their type, frequency and the implementation strategies. Secondly, an illustrative framework on successful incorporation of greenery and ecological programs to a project is established, to achieve a truthful nature-focused building. Finally, an analysis is conducted, to determine whether the advertised green strategies in these projects are genuine, or simply a marketing tool.

This study found that two of the selected projects, the Vertical Forest and MET Tirana Building display both realistic green strategies, as well as attempts to greenwash equally, one of the developments, Ekspozita Building presents a more obvious greenwashed image and one of them, Tirana Garden Building, shows a false green character, despite its proclaimed sustainable and ecological approach. This study brings to light the prevalence of green programs in architectural project advertisements in Tirana, and by evaluating their authenticity, it increases awareness of the practice of greenwashing.

*Keywords:* Design strategy, green-development, ecological solution, branding, eco-architectural tropes.

# **SOLAR ANALYSIS: THE IMPACT OF NEW TALL BUILDINGS IN THE CENTER OF TIRANA**

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## **Abstract**

A major concern nowadays regarding big cities is the rapid urban growth which has affected mainly urban development. Day by day more tall buildings are added to our cities. On the one hand, they symbolize modernity and prosperity, but on the other hand, they are causing overshadowing in open areas. But also decreasing solar access in urban settlements, which has affected not only our lifestyle but also our health. In addition, greenery presence plays a crucial role in everyday life which brings its particular benefits but also its disadvantages. All of this is caused by not efficiently planning the urban layout and not considering the solar impact on the indoor environment. Meanwhile, also in Tirana we see tall buildings increasing daily. The growth of population makes the need for tall buildings higher. The scope of this study was to analyze the shadow that tall buildings cause in the urban environment depending on their position in the urban site, height, and orientation. This research is focused on two buildings located in Tirana: Aba Business Center and Plaza Hotel Tirana. The building selection criteria is the presence of greenery near them, also for the fact that Plaza Hotel Tirana and Aba Business Center are the first high-rise buildings in Tirana. The analysis is conducted through the 3D volumes of the selected buildings in Revit, so the shadow and daylight impact are more visible to the nearby greenery. The results demonstrated that in the case of



Aba Business Center in which the greenery is located in the west the shadow has a positive impact because it cast mostly in summer when there is more need. On the contrary, Plaza Hotel Tirana has a negativ effect mostly for its location that is in the south of the green areas. In conclusion this type of analysis helps us to better understand the shadow context relationship and to demonstrate the number of hours that the tall buildings over-shade the urban area.

*Keywords:* Urban growth, solar access, tall buildings, neighboring, urban layout.

**7<sup>th</sup> International Scientific Conference of the Faculty  
of Medical Sciences**

## **MEDICAL SCIENCES**

# **THE DOCTRINE OF THE NEURON**

**Alajdin ASANI, Ema BEXHETI, Sadi BEXHETI**

## **Abstract**

The foundations of the Neuron Doctrine have to do with the basic principles that underlie the cellular organization of the brain and the field of modern neuroscience. For this 25th anniversary edition, several neuroscientists, world leaders in the studies of Cajal, Golgi, the history of neuroscience and in modern neuroscience, have come to contribute in their reflections on the importance of the doctrine of neurons during the last 30 years and their predictions regarding its significance in the future, which continues to remain as a foundation for modern neuroscience. Today we discuss more about artificial intelligence, however, the nerve cell is special in that it has the ability to receive information, analyze it and return the answer. In this empirical work, I will try as briefly as possible to inform the objections of the best experts. Nerve cell of the brain and the origin of the name of the nerve cell as a neuron-cell which is described in the book Gordon M. Shepherd entitled: Foundation on the Doctrine of the Neuron.

# **THE IMPORTANCE OF TREATING FRACTURES OF THE SPONGIOTIC AREAS OF THE SKELETON IN PATIENTS WHO SUFFER FROM OSTEOPOROSIS**

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## **Abstract**

Osteoporosis is a metabolic disease characterized by loss of bone mass. The bone weakens and looks like honey bread under a microscope. It is a serious, progressive and economically costly disease. It is considered a silent disease and bone fracture is often the first sign of osteoporosis. It is responsible for more than two million broken bones and \$ 19 billion in costs each year. By 2025, experts predict that osteoporosis will have increased about five times as much.

Purpose of the study:

The aim of this study is to analyze the correlation of osteoporotic phenomena with the frequency of fractures of the spongy bone areas. Increasing knowledge about osteoporosis, risk factors and how to treat it.

Study material and method:

The study material belongs to the period January 2021 to February 2024. We have used the file service of the University Center “Mother Teresa” Tirana; Emergency service at the University Trauma Hospital; File service of the Xhaferr Kongoli Regional Hospital in Elbasan. Our study material includes 62 patients with injuries of spongy bone areas caused by minimal trauma, such as simple falls even from body height, body rotations, immediate lumbar flexion, etc. All are fresh fractures; from the moment of the fracture until their presentation in the Hospitals no more than 10 days have passed By sex: Male (16 -26%); Female (46-74%) By age: Up to 50 years old (10-16%); 51-60 years old (20-32%); 61-70 years old (25-40%); Over 71 years old (7-12%) ) According to the fracture area: radial fractures (18 - 29%); vertebral column fractures (12 - 19%); trochanteric fractures (32 - 52%).

Results and conclusions:

1. To prevent and slow down the phenomena of osteoporosis, especially in women before, during and after menopause.
2. To prevent as much as possible accidental injuries, which cause fractures of the spongy areas of the skeleton, in the elderly.
3. To specify the cause of osteoporosis in men and women and to take appropriate measures
4. Apply anti aggregate preparations to reduce thromboembolic complications
5. Continued treatment of osteoporosis is the main condition for stopping the deepening of osteoporosis

*Keywords:* fracture, spongy area, osteoporosis, thrombolytic complications.

# FEATURES OF ANAPHYLACTIC SHOCK AS THE MOST SEVERE FORM OF ANAPHYLAXIS

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## **Abstract**

Anaphylactic Shock is Anaphylaxis and Anaphylaxis is the most severe clinical manifestation of acute systemic allergic reactions. The rationale of this updated position document is the need to keep guidance aligned with the current state of the art of knowledge in anaphylaxis management.

Special focus has been placed on regions in which national guidelines are lacking. All aspects have been assessed based on scientific evidence supporting statements. This guidance adopts the major indications from the previous anaphylaxis guidelines of the World Allergy Organization (WAO) and incorporates some slight changes in specific aspects such as the diagnostic criteria.

Anaphylaxis is a severe, systemic hypersensitivity reaction that is rapid in onset and characterized by life-threatening airway, breathing, and/or circulatory problems, and that is usually associated with skin and mucosal changes. Because it can be triggered in some people by minute amounts of antigen (e.g. certain foods or single insect stings), anaphylaxis can be considered the most aberrant example of an imbalance between the cost and benefit of an immune response. This review will describe current understanding of the immunopathogenesis and pathophysiology of anaphylaxis, focusing on the roles of Ig E and IgG antibodies, immune effector cells, and mediators thought to contribute to examples of the disorder. Evidence from studies of anaphylaxis in humans will be discussed, as well as

insights gained from analyses of animal models, including mice genetically deficient in the antibodies, antibody receptors, effector cells, or mediators implicated in anaphylaxis, and mice which have been “humanized” for some of these elements. We also will review possible host factors which may influence the occurrence or severity of anaphylaxis. Finally, we will speculate about anaphylaxis from an evolutionary perspective, and argue that, in the context of severe envenomation by arthropods or reptiles, anaphylaxis may even provide a survival advantage.

*Keywords:* Anaphylactic Shock, Anaphylaxis, Histamine, IgG, Ig E, basophils, cysteinyl leukotrienes, epinephrine, food allergy, histamine, Ig E, mast cells, platelet activating factor, urticaria.



# IMPACT OF DYSLIPIDEMIA ON CORONARY HEART DISEASE IN WOMEN

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## **Abstract**

**Introduction:** The increase in the level of lipids in the blood is one of the risk factors for cardiovascular diseases (due to atherosclerosis and thrombosis) increasing premature morbidity, disability, financial cost and mortality, not only in the EU and the USA, but also in countries developing worldwide. It has been proven that lipid disorders promote the development of atherosclerosis and its clinical consequences such as CVD including (coronary heart disease, acute myocardial infarction, peripheral artery disease, heart failure and sudden death). Combinations of lipoprotein levels and lipid fractions play a major risk role in terms of coronary heart diseases.

**Purpose:** Evidence of dyslipidemia as a risk factor for CVD, especially in obese women who suffer from metabolic syndrome or diabetes and have lipid profiles that negatively affect the risk of coronary heart disease.

**Methodology:** International literature review in PubMed, CINAHL, Am J Cardiology, Int J Public Health; in accordance with the purpose and objectives of the study.

**Result:** Coronary heart diseases are the leading cause of death among women and men although they are less common and appear later in women than in men. Each year 345,000 women suffer from an initial

or recurrent myocardial infarction, and 261,000 women die from MI. Compared to men, women, and especially women in the postmenopausal period, remain at high risk for coronary disease. In women, calcification occurs 10 to 15 years later. Multiple angiographic studies of coronary arteries have shown a lower rate of epicardial coronary artery disease in women than in age-matched men. Elevated levels of Lp (a) appear to be more associated with the occurrence of coronary heart disease than with the severity of coronary artery disease in both sexes. Outcome data in women using lipid-lowering medications other than statins are extremely limited.

**Conclusion:** The importance of a healthy lifestyle should begin in childhood and continue throughout life. Although the benefits of lipid-lowering therapy in women with cardiovascular disease are clear, more data are needed in those without cardiovascular disease. Clinical trials for lipid-lowering women with cardiovascular disease to date have used a strategy focused on lowering LDL-cholesterol, which may not be optimal for women who have low HDL-cholesterol or triglyceride levels. which are very important factors affecting coronary heart disease. It remains to be determined whether outcomes among women will improve if treatment strategies are directed toward more aggressive and comprehensive modification of lipoprotein profiles.

*Keywords:* dyslipidemia, MI, lipids, cardiovascular disease, statins.

# THE IMPACT OF MATERNAL SMOKING ON PREGNANCY AND FETUS DEVELOPMENT

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## Abstract

**Introduction:** A common wish for new parents is for their child to be healthy. It is important to understand that the use of tobacco during pregnancy can have serious consequences for the mother and the child.

**Aim:** To evaluate the impact of smoking on pregnant women as well as the relationship it has with fetal problems

**Methodology:** This is a cross-sectional study conducted in the city of Vlora for a period of 2 years (June 2021 - June 2023).

**Results:** A total of 1020 women were studied, of which 330 were pregnant and 690 were born during the study period. Of these women, only 22% were cigarette consumers before pregnancy, and 13% stopped smoking when they became pregnant, while 9% continued smoking. According to the results of the study, 4% of women who have not stopped smoking have had a spontaneous abortion, while 15% of smoking women have given birth to children with low weight, and it also turns out that 6% of smoking women have had premature births, SIDS and placenta previa is 4% of them. Mothers who report that they have less breast milk as a result of smoking are in the figures of 14%. **Conclusions:** The results show that smoking causes health problems for the fetus, and the mother, therefore it is important to organize consultation sessions for smoking mothers. It is

recommended that smoking is stopped from the moment of conception or at any stage of pregnancy intended to ensure a state of health for the mother and a healthy development for the child.

*Keywords:* Smoking, premature, preterm.

# **ACCESS AND USE OF THE AUTOMATIC EXTERNAL DEFIBRILLATOR IN THE MANAGEMENT OF CARDIAC ARREST IN PREHOSPITAL AND HOSPITAL SETTINGS**

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## **Abstract**

Automatic external defibrillator-AED is a mobile electronic medical device that automatically detects, analyzes and treats life-threatening cardiac arrhythmias, such as ventricular tachycardia (VT), ventricular fibrillation (VF) in case of sudden cardiac arrest (SCA). Timely and appropriate use of AEDs stops life-threatening arrhythmias by returning the abnormal heart rhythm to a normal rhythm. AED can be used by a simple person who are previously trained with RKP-AED courses such as; certified first responders and health care professionals. Cardiac arrest is the result of either ventricular fibrillation (VF), and accounts for 10-30 percent of sudden cardiac arrest rhythms. Unfortunately, although based on scientific findings and research, the locations of AEDs are often not known, or people are often unfamiliar with them and their life-saving potential. In fact, early use of AEDs and CPR measures improves the chance of survival in sudden cardiac arrest victims by up to 40% versus less than 10% survival without these simple interventions. It is necessary to organize CPR-AED courses for healthcare professionals, lay people and communities, to learn, gain knowledge and skills in the management of sudden cardiac arrest (that most people are not familiar with them

or how they work) and how to implement CPR-AED measures reducing morbidity, disability and mortality in prehospital and hospital settings.

*Keywords:* Automated external defibrillator, TV, FV, Cardiac rhythm, SCA, cardiopulmonary resuscitation.

# APNEA

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Catholic University "Our Lady of Good Counsel"

## **Abstract**

Sleep related disorders like obstructive sleep apnea (OSA) decrease the quality of life of an individual and may increase the morbidity and mortality of patients. The treatment of obstructive sleep apneas needs to be thoroughly planned and implemented. Patients more at risk to have OSA are more likely to be obese, and/or have specific craniofacial features, also OSA is more common among the male sex. There are many different types of treatment towards OSA, these include: positive airway pressure (PAP), orthodontic treatment, surgical intervention, and in some cases lifestyle changes help in the treatment of OSA. In this presentation we see a patient that was diagnosed with an OSA, and through our approach and individual planning the patient at the end of the treatment had good results and an improved quality of life.

# **EPIGLOTTITIS, ACUTE LARYNGITIS AND CROUP IN CHILDREN ETIOLOGY, EPIDEMIOLOGY, PATHOGENESIS, CLINICAL PICTURE AND TREATMENT**

**Ferihan BAJRAMI**

## **Abstract**

In about 3 % children , viral infection of the airways that develop in early childhood lead to narrowing of the laryngeal lumen in the subglottic region in symptoms such as hoarseness, barking cough, stridor and dyspnea. These infections may eventually cause respiratory failure. The disease is often called acute subglottic laryngitis (ASL). Terms such as pseudocroup, croup syndrome, acute obstructive laryngitis and spasmodic croup are used interchangeably when referencing the disease. Although the differential should include other rare diseases such as epiglottitis, diphtheria, fibronus laryngitis and bacterial tracheobronchitis, the diagnosis of ASL should always be made on the basis of clinical criteria.

Haemophilus influenzae type B, Streptococci including Streptococcus pneumoniae are now important causes of epiglottitis. Croup is a viral infection, usually due to parainfluenza virus, that primarily affects children ages 6 months to 3 years old.

*Keywords:* croup, inspiratory dyspnea, laryngeal obstruction, stridor, subglottic laryngitis, epiglottitis, supraglottitis, Laryngotracheobronchitis.



# PERSONAL EXPOSURE TO CHEMICAL CONTAMINANTS IN HOUSEHOLDS COOKING WITH WOOD AND COAL IN KOSOVO

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<sup>2</sup> National Institute of Public Health of Kosovo

## **Abstract**

**Introduction:** Wood, coal and other solid fuels continue to be used for residential cooking and heating by nearly 3 billion people worldwide, where emissions of hazardous substances from buildings, building materials and building equipment or smoking, ventilation systems, furniture, can cause a range of health problems which can be fatal.

**Aim of the study:** To identify the sources of indoor air pollution, the most vulnerable members and possible health concerns related to the exposure of pollutants in the Republic of Kosovo.

**Methodology:** The total sample size is 2,000 effective interviews (households). The sample counts a total of 28 municipalities. The residential split for the entire sample was 40% urban vs. 60% rural. Selection of households is based on the 'random route' method. Data analysis was done with SPSS in Windows software version 26.

**Results:** Based on this study, type of heating had a somewhat stronger effect on the symptom in winter. In Kosovo, respiratory diseases include a wide group of diseases such as; breathing difficulties, lung cancer, asthma, COPD and pneumonia, seem to affect more women (56%) than men (44%), where the most affected age groups were 55-64 years old (27%) and 65 + years old. (38%). Research findings conclude that women in general are more predisposed to suffer from

these diseases and their susceptibility increases with age. The study also shows that the region of Gjakova 22% of the time, has reported a significantly higher percentage of the population suffering from all diseases caused by indoor air pollution. Of all the diagnoses mentioned during the interview, the cases of the high number of people diagnosed with high blood pressure were worrying, were 65+ with 48%, followed by 55-64 years old, a large part of them were from rural areas with 67% of the respondents.

**Conclusions:** The findings of this study highlight that a significant percentage of Kosovar families are not at all concerned about the air quality in their residential area, even though Kosovo is ranked as the 30th most polluted country in the world. This could potentially be a consequence of the lack of information and awareness of Kosovar families about indoor air pollution in their residential area.

*Keywords:* indoor air, chronic diseases, Kosovo population.

# **PNEUMONIA IN CHILDHOOD-CAUSES, EPIDEMIOLOGY, PATHOGENESIS, CLINICAL PRESENTATION AND TREATMENT**

**Ferihan BAJRAMI**

## **Abstract**

Pneumonia is one of the most common conditions encountered by primary care providers. Pneumonia remains a major cause of morbidity and mortality. Certain organisms cause pneumonia in particular age groups. For example, group B streptococci, Gram-negative bacilli, and rarely *Listeria monocytogenes* cause pneumonia in neonates. In infants younger than 3 months, group B streptococci and organisms encountered by older children occasionally cause pneumonia as does *Chlamydia trachomatis*. Older infants and preschoolers are at risk for infection with *Streptococcus pneumoniae* and *Haemophilus influenzae*. In children older than 5 years, *Str. pneumoniae* and *Mycoplasma pneumoniae* are the key pathogens. Induced sputum increases microbiological yield for *Bordetella pertussis* or *Mycobacterium tuberculosis*, which has been associated with pneumonia in high TB prevalence. Let the patient's age history and clinical presentation and radiographic findings guide your choice of therapy.

*Keywords:* lower respiratory infection, pediatric pneumonia, acute respiratory infection.

# **ASSOCIATION OF POLYMORPHISMS OF THE GENES INVOLVED IN CYCLOPHOSPHAMIDE AND DOXORUBICIN METABOLISM WITH THEIR TOXICITY IN BREAST CANCER PATIENTS**

**Ilir ISMAILI**

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## **Abstract**

Breast cancer is a major morbidity and mortality factor and is among the most frequent female neoplasms globally. Combined cyclophosphamide and doxorubicin adjuvant chemotherapy is frequently associated with a series of toxic effects of different grades and clinical significance. Constitutive polymorphisms in the genes involved in detoxification and metabolism of chemotherapeutics plays a key role in toxic effects predisposition.

The main goal of this study is to determine the genetic association of polymorphisms rs20325282 in ABCB1 gene and rs1695 (A313G) in GSTP1 gene with occurrence of leukopenia and to estimate the possible predictive value of those polymorphisms regarding the risk of toxic effects and adverse reactions.

The polymorphisms were genotyped in DNA samples from 178 cases of breast cancer treated adjuvantly with cyclophosphamide and doxorubicin, after providing the signed consent from each patient. Statistical analyses were performed comparing the clinical data regarding the toxic effects and adverse reactions with the frequencies of the genotypes and alleles of both polymorphisms.

The analyses indicated that polymorphisms rs20325282 in ABCB1 gene and rs1695 in GSTP1 may have a predictive value in determining the probability and/or risk of occurrence of chemotherapy-induced anemia, fever, febrile neutropenia and oral mucositis.

Those findings could be used prospectively for adjustment and personalisation of the chemotherapy according to the individual genotypes combination in each patient.

*Keywords:* breast cancer, GSTP1 gene polymorphism, cyclophosphamide, doxorubicin, toxic effects.

# ULCERATIVE DERMATITIS IN TRAUMATOLOGY

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## **Abstract**

Ulcerative dermatitis in traumatology is a skin continuity disorder associated with increased bacterial flora at the site of injury or other pathogens such as fungus and parasites.

Ulcers appear more often in high pressure locations, where the skin is closer to the bones. In patients with systemic illness, even a minor scratching injury, contact with hygienic chemicals or frequent itching leads to the appearance of dermatoses of various forms and ulcers as a result.

In our paper we present two types of cases, an ulcer in traumatological injury cases of circulatory insufficiencies and ulcer in case of vasculitis after trauma injury in patients with diabetes.

In the first group we have treated 26 patients and in the second group we have 22 patients, different types of trauma in extremities, the average age was 42.3 years, and follow-up was 6 months.

Beside the local clinical picture in different regions, we have compliance with the general parameters, in the blood tests we have leukocytosis, thrombocytosis, high SE and CRP.

Specific blood parameters like RA factor, Vit D, electrolyte, are at normal limits. Treatment was made on a 3-month series of peroral antibiotics by antibiogram, peroral anticoagulants, antiedematous

with concentrated dose, vitamin C, vitamin D and water hypertonic treatment 2-5 times a day and letting the wound open to breath continuously.

In the case of ulcer in case of vasculitis after trauma injury in patients with diabetes, improvement and wound closure was performed for 6 weeks. In the case of ulcer associated with RA factor, we have results of improvement and reorganization of skin from week 4 and the wound gradually closes, the value of glycemia in cases with diabetes are increased during the time of treatments.

Local hygiene and hypertonic water treatment and high concentrations in vitamins and antiedematous in combination with antibiotics and anticoagulants if needed enhance the wound closure and restore skin function faster despite systemic therapy for primary disease. It is preferable to ventilate the wound all the time.

*Keywords:* Ulcerative dermatitis, traumatology, injury.

# NURSING CARE AFTER HIATAL HERNIA SURGERY

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## **Abstract**

**Introduction:** The relationship between hiatal hernias and gastroesophageal reflux disease (GERD) has been extensively debated in recent decades. It has now been established that both anatomical forms (hiatal hernia) and physiological forms (lower esophageal sphincter) play significant roles independently in causing gastroesophageal reflux disease (GERD).

**Objective:** The aim of this study is to analyze statistical data regarding the number of patients with hiatal hernia at the Gastroenterology Clinic and Surgery Clinic within the University Clinical Center of Kosovo (UCCK) in Pristina, for the time period from 2019 to 2021.

**Methodology:** This study is retrospective in nature. Patient data were obtained from protocols at the Gastroenterology Clinic and Surgery Clinic at UCCK. The data include: age, gender, place of residence, days of hospitalization, and treatment regimen. The results were analyzed using computer programs such as SPSS.

**Results:** During the period from January 2019 to December 2021, a total of 279 patients with hiatal hernia were treated conservatively at the Gastroenterology Clinic, while a total of 30 patients with hiatal hernia were treated surgically at the Surgery Clinic. The Female:Male ratio predominantly favored females in most years (2019, 2020). Over the 3-year period, the majority of patients treated for hiatal hernia in both clinics were in the age group over 60 years.



**Conclusion:** In the Surgery Clinic, over the 3-year period, 25 patients with hiatal hernia were treated laparoscopically, while 5 patients underwent open surgery.

**Keywords:** Hiatal Hernia, Nursing Care, Surgery.

# **DIABETES, ITS COMPLICATIONS IN PATIENTS AT THE REGIONAL HOSPITAL “XHAFERR KONGOLI” ELBASAN FOR THE PERIOD 2020-2023 - THE ROLE OF NURSES IN ITS PREVENTION AND MANAGEMENT**

**Shqipe LUTA, Albana SULA, Rajmonda HIDA,  
Elona DYBELI, Elona HASALLA, Armelda TETA,  
Juxhin LUTA, Esmeralda VRETO**

Faculty of Technical Medical Sciences, University “Aleksandër Xhuvani” Elbasan

## **Abstract**

Diabetes mellitus is a chronic, degenerative disease caused by a lack of insulin, which regulates blood sugar levels. When the insulin-producing cells of pancreas do not work normally, glucose levels remain high. If this situation becomes chronic, then diabetes appears.

The purpose of the study: Study of epidemiology, demographics, complications of diabetes. Assessment of diabetes in patients of all ages, taking management and preventive measures and monitoring.

Methodology: A descriptive and retrospective study conducted in the regional hospital of Elbasan was used. In order to carry out this work, 415 patients were studied in the district of Elbasan. Data collection is based on the medical records of diagnosed patients beforehand with diabetes by the doctor and followed up later in the ward of diseases interior.

Conclusions:

- The number of patients with diabetes mellitus in Elbasan district is 415 patients, of which 241 (58%) they are men and 174 (42%) are women.

- The graph of data for both sexes according to place of residence shows that the most affected cases are urban areas. Where affected in the city we have 31%, while in rural areas we have 23% patients.

- It seems clear that women have a longer hospital stay than men with 240 days stay, compared to 156 days of stay for men.

-According to the study part, it is observed that retinopathy is more related to Type II diabetes. 55-65 years old are most affected, followed by the ages +65 years, then 45-54 years and older turn. This is also related to other complications of diabetes. In other ages it is less spread as a result of even the fewest cases of diabetes.

- The most developed complication in patients with diabetes turns out to be retinopathy, followed from Hyperthyroidism, Hypoparathyroidism, etc.

*Keywords:* Diabetes Mellitus, Glycemia, Hypothyroidism, Hyperthyroidism, Insulin, Retinopathy.

# **A SYSTEMATIC ANALYSIS FOR THE GLOBAL, REGIONAL AND LOCAL TREND OF BREAST CANCER, 1990-2019**

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## **Abstract**

The goal of this work is to perform a thorough investigation of the incidence, death and disability-adjusted life-years (DALYs) rates of breast cancer (BC) in local, regional, and worldwide contexts. It examines how variations in breast cancer incidence, death rates and DALYs are caused by elements including socioeconomic position, cultural norms and beliefs. Data were extracted from the Global Burden of Disease study 2019) and were calculated to quantify temporal trends in the age-standardized rates of BC incidence, deaths, and disability-adjusted life-years (DALYs) by region. From 1990 to 2019, the BC incidence, deaths, and DALYs increased worldwide by 128%, 84%, and 77%, respectively. The global age-standardized incidence rate increased, whereas both the age-standardized death rate and age-standardized DALY rate presented downward trends. In particular, Western Europe had the largest burden of BC, and globally, BC was more frequently reported in high-middle and high SDI regions. Expanding upon this thorough examination, the article suggests a range of focused, empirically supported tactics aimed at enabling healthcare decision-makers, physicians, and community leaders. Future BC preventive strategies should therefore focus on

addressing the global health challenge of breast cancer, aiming to improve survival rates globally through the three pillars of health promotion, timely presentation and diagnosis, and comprehensive treatment and supportive care.

*Keywords:* breast cancer, incidence, death, DALY, global rate.

# **THE CAUSES THAT AFFECT THE QUALITY OF NURSE'S WORK**

**Majlinda RAKIPAJ, Neda ÇAKËRRI, Erlini  
KOKALLA, Emirjona KIÇAJ, Rudina CERÇIZAJ,  
Deona TARAJ**

## **Abstract**

**Introduction:** The fatigue response is the body's automatic response to any change in the internal or external environment and facilitates the availability of resources to respond to emergencies. It is an emotion and condition that is perceived by the brain as physical and psychological fatigue caused by excessive activity, and is considered a negative feedback signal which limits the amount of psychological and physical activity.

**Purpose** "The evidence of causes and impact of fatigue in the work of nurses in the Regional Hospital of Vlora, in order to improve fatigue management in nursing practice and avoid mistakes.

**Objective:** The evaluation of the state of fatigue in Vlora's Regional hospital nursing staff, the assessment of the causes leading to fatigue of the nursing staff in the hospital, the assessment of the consequences of fatigue at work and nursing errors.

**Materials and methods:** The study is Cross-sectional type (transversal) Descriptive-Analytical- Quantitative. The study population includes all nursing staff of both sexes working in the respective SRV services, which consists of 320 nurses. The survey includes 117 people of which 111 are professional nurses and 6 are head nurses, of pathology services, surgery, pediatrics, and SRV

emergency. Data collection was done through a questionnaire / interview which was adapted from reviewing in a critical way the literature on work fatigue, its causes and consequences at work and nursing errors. Data collected from nursing staff reporting were analyzed through SAS and Excel programs.

Results: In all 4 relevant SRV services where the study was conducted the nurses of these services reported that they feel tired at work. By type of fatigue: 49.55% of them have psychological fatigue, 41.44% have physical and psychological fatigue, 9% physical fatigue. The most tedious shift: 51.35% of nurses report shift III the most difficult one, 41.44% report shift I and III the most tedious ones.

According to the impact of fatigue on the quality of work, 49% think that fatigue has little effect on the quality of work, 43% say that it often affects work, 5% report fatigue does not affect at all their work and 3% of them say that it always affects work. 37 nurses have stated errors in taking blood tests on the wrong patient. Of these, 54% are often tired, 16% daily tired and 2.70 slightly tired. 68 nurses have made mistakes regarding the administration of medication not on time. Of these 52% are often tired, 22% daily tired and 24% rarely tired. 86% state fatigue as the cause of work errors. According to the main cause of mistakes by often being tired, 47% declare fatigue as the main cause of committing mistakes. From the nurses daily tired 21% have declared fatigue.

Conclusions: The results reported by the nursing staff showed that nurses feel tired at work. Nurses feel more psychological than physical fatigue. Fatigue has affected the performance of errors in the nurses' work.

Recommendations: The Ministry of Health, hospital management staff or hospital management boards should help reduce the impact of fatigue at work. Implementation of training services, seminars by the Ministry of Health should be done regarding the quality of nursing practice, fatigue at work and fatigue assessment and management.

Proper support from the Ministry and employers should come to minimize the causes and consequences of fatigue at work and medical errors.

*Keywords:* Fatigue, effects on nursing work and making mistakes, management.



# **CUMULATIVE REPORT FROM THE BEGINNING OF THE YEAR ON THE “WHOOPIING COUGH” EPIDEMIC IN THE REPUBLIC OF NORTH MACEDONIA UNTIL 18.04.2024**

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## **Abstract**

‘Whooping cough’ is a disease of the lower respiratory tract, mainly passed on by cough droplets, prevalent in infants, and children under five years of age. Even though the number of infected patients has significantly improved with the introduction of the DTaP vaccine this year, we have been going through an epidemic caused by B. pertussis due to the declined number of vaccinated patients. This report presents cumulative information from the beginning of the year, until 18.04.2024, that were provided by the Ministry of Health in Republic of North Macedonia, by the sector of Public Health, regarding incidence, prevalence, morbidity, hospitalization, and currently infected cases, according to regions, age groups and gender in more details. This report also includes the number of vaccinated individuals, number of doses according to regions, inside and outside the capital city.

*Keywords:* whooping cough, North Macedonia, reported cases, crisis management, vaccination, pertussis.

# **THE EVALUATION OF THE FACTORS AFFECTING THE PROFESSIONAL RELATIONSHIP IN HEALTH CARE**

**Neda CAKËRRI, Majlinda RAKIPAJ, Deona  
TARAJ**

## **Abstract**

Nurses do not practice their profession in isolation. Health care is developed through a complex network of relationships which are influenced by individual behavior, society or medical policies. As a result, changes in society or in the healthcare system can present challenges for professionalism.

The health system has a certain hierarchy, where health care providers, starting from doctors, nurses or the rest of the medical staff, have different academic backgrounds, individual values and norms. As a result the sense of priority towards oneself and the profession fosters the development of conflicts between these professionals. Balancing and establishing the wrong relationships directly affects the health and medical care of the patient.

Purpose of the study: The purpose of this study is to determine the factors that affect the nurse- physician relationship in order to identify the causes and problems of this relationship. It also aims to give the necessary recommendations for improving professional behavior.

Objectives of the study: The study aims to determine the factors that affect the professional relationship between the nurse and the doctor. It also identifies possible causes that harm or hinder the establishment of good professional relations. It gives appropriate recommendations

for improving the professional relationship between the nurse and the doctor.

**Materials and methods:** The data of this study are qualitative and quantitative, respectively the data belonging to the theoretical framework and the data collected from the questionnaires. To conduct the study, 30 nurses were interviewed ( $N_1 = 30$ ) in the Regional Hospital of Vlora, randomly selected during the exercise of their profession in this hospital, in different wards, so the sampling of this paper is probabilistic. To conduct the second questionnaire, 20 doctors ( $N_2 = 20$ ) from the same hospital were interviewed, even those randomly selected. After collecting the data in the field, the next step was to upload the data to the computer and then process and analyze the data to obtain the results of the study. Data processing was performed in the SPSS program (Statistical Package for Social Sciences), version 22.

**Results:** After processing the data, it turned out that the average score through which an assessment of the professional relationship of the nurses with colleagues was made, was 5.93, which means that these relationships are rated above the average, so they are relatively satisfactory, but far from the level required by health standards, which require perfect relationships between professionals. The evaluation of the nurse-physician relationship was done through a scoring system from 1 to 10. It resulted that the average of points accumulated, processed through descriptive statistics in SPSS, was 5.20. From the result obtained, the professional relationship of the nurses is perceived by the doctors as a relatively satisfactory relationship, oriented to the intermediate level. The most difficult relationship was that between doctors and nurses. The data showed that young nurses were the ones who appeared most dissatisfied with these relationships, they even felt humbled and insulted. Regarding professional relationships with nurses, 60% of respondents said that this relationship should be improved, while 40% of them were satisfied with this relationship. As far as the relationship with doctors

is concerned, 80% of respondents said that these relationships should be improved. 70% of respondents think that the relationship "doctor-nurse" is difficult. In 67% of cases communication is the one that hinders this relationship, while 23 % of them say that it is the hierarchy of the hospital system that makes this relationship difficult.

*Keywords:* Professional behavior, standards, professional ethics, communication, cooperation, team.

# ASSESSMENT OF KNOWLEDGE OF NURSING PERSONNEL ON HOSPITAL INFECTIONS

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Blerina BANI, Ilda TAKA , Shqipe LUTA,  
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## **Abstract**

**Introduction:** No previous study has reported the knowledge of Albanian nurses about infection control. Aim: Evaluation of knowledge related to hospital infections, of nurses who work in wards with hospitalized patients.

**Material and method:** This is a cross-sectional study conducted during the period January - March 2024. A questionnaire was used which was distributed to 1368 nursing personnel working in hospitals in 12 prefectures of Albania.

**Results:** Correct answers prevail in 14 (73.7%) of 19 questions ( $p < 0.001$ ) (table 3). From the multivariate analysis of factors influencing incorrect answers, only the municipal hospital is a significant independent factor ( $\beta = 0.08$   $p = 0.007$ ). Regarding the level of knowledge, 1298 (94.9%) of the staff answered  $\geq 50\%$  of the questions correctly, while 70 (5.1%) of them did not answer correctly ( $p < 0.01$ ). From the comparison of the level of knowledge according to sociodemographic and professional characteristics, a significant difference was found only for the “PhD” educational level,

which has a higher level of knowledge compared to the bachelor and master levels ( $p=0.04$ ). In the multivariate logistic regression analysis to determine the predictive factors of knowledge, a significant and independent factor was Professional Master ( $\beta=0.62$   $p=0.03$ ).

**Conclusions:** The study suggests that efforts should specifically target staff in municipal hospitals and adopt a multidimensional approach to address the increasing rate of infection among hospital patients, emphasizing the need for ongoing training and increased awareness of medical staff.

*Keywords:* hospital infections, prevention knowledge.

# CARDIAC SIDE EFFECTS OF ANTIARRHYTHMIC DRUGS

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<sup>2</sup>Medical Faculty, “Fadil Sulejmani” University of Tetova

## **Abstract**

Introduction: Antiarrhythmics are medications that prevent and treat a heart rhythm that's too fast or irregular. They can reduce symptoms and help avoid life-threatening complications. Some of these drugs stop irregular, extra electrical impulses. Others block abnormally fast impulses from traveling along heart tissues.

Antiarrhythmic drugs have typical cardiac side effects. These effects are due to their electrophysiological action on the one hand and to the negative inotropy on the other. These electrophysiological effects can cause a depression of sinus node function and/or AV conduction leading to severe bradycardia or asystole. However, the proarrhythmic effects of these drugs are clinically more important, especially the induction of ventricular tachycardia and "torsades". The incidence of these proarrhythmic effects is at least 5% of all patients treated. Patients with reduced ventricular function, "malignant" ventricular arrhythmias, and QT prolongation are especially endangered. Proarrhythmic effects may occur after the first dose.

However, in most instances the risk is increased with higher dosage. The hemodynamic effects of antiarrhythmic drugs are especially important in patients with reduced cardiac function. The negative inotropy of antiarrhythmic drugs is often counterbalanced by the simultaneous decrease in blood pressure leading to an afterload reduction. Antiarrhythmic drugs causing an increase in systemic

resistance may have a more pronounced depressive effect on cardiac function. However, if the acute treatment of severely ill patients in the CCU is excluded, the negative inotropy of antiarrhythmic drugs is not such an important problem as the proarrhythmic effect. As a consequence, antiarrhythmic treatment should be restricted to severely symptomatic patients on the one hand and to those with arrhythmias of prognostic importance on the other. In addition, the patient's treatment should be carefully controlled, especially during the early phase of treatment with antiarrhythmic drugs.

Methods: In diagnostics and therapeutic investigations, which have taken part in the Department of Internal Medicine and Interventional Cardiology Center in Tetovo, methods which have been used during the study are: Electrocardiography (ECG), Laboratory tests/Blood work, Holter Monitor.

Results: 60 patients have been involved in the study, 36 of which males while 24 females, which have been observed for one year. During this period we have seen some side effects. 11.67% (7 patients) of the patients that have been observed have had some side effects to a degree. 1 of those patients had asystole and then we had to reanimate the patient and change his medication to Beta Blockers, 3 others had severe bradycardia and the last 3 patients had a paradoxical response to the medication. While the other 88.33% (53 patients) didn't have any side effects in the cardiovascular system.

Conclusion: Even though antiarrhythmics have some side effects, we will still continue to prescribe them while giving a greater attention to our patients, continuing to observe them more frequently and combining antiarrhythmics with beta blockers in patients that have heart failure.



# ASSESSING VENTRICULAR TACHYCARDIA IN A YOUNG PATIENT: THE ROLE OF MRI IN DETERMINING ICD PROTECTION AFTER FIRST EPISODE – A CASE REPORT

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## **Abstract**

Ventricular tachycardia (VT) poses a grave threat, characterized by rapid and irregular heartbeats originating from the ventricles, often culminating in hemodynamic instability and sudden cardiac death if left untreated. In this report, we detail the case of a 24-year-old male presenting to our clinic with palpitations, chest pain, shortness of breath, and lightheadedness, followed by several episodes of syncope. Symptom onset coincided with New Year's Eve, subsequent to excessive consumption of food and energy drinks.

Upon evaluation, the patient exhibited wide complex tachycardia with a frequency of 240 bpm, suggestive of VT and hemodynamic instability, necessitating successful conversion to sinus rhythm through defibrillation with 200 J. Further investigations, including echocardiography and MRI of the heart, unveiled global hypokinesia of the left ventricle, reduced myocardial shortening, and a band- like subepicardial hypersignal in the midline and apical lateral wall,

alongside an edematous myocardial area. Additionally, heightened perfusion at the aforementioned level indicated a hyperemic zone of non-ischemic nature, implying a multifaceted myocardial pathology encompassing structural and functional anomalies.

Aligned with ESC guidelines, owing to the elevated risk of sudden cardiac death, an implantable cardioverter-defibrillator (ICD) was surgically implanted for secondary prevention. This case underscores the critical need for thorough cardiac assessment in young VT patients, revealing significant underlying pathologies necessitating targeted management strategies. Further exploration into the etiology and prognosis of such findings is imperative to guide tailored therapeutic interventions and optimize patient outcomes.

*Keywords:* VT, ICD, MRI, cardiac toxicity, sudden cardiac death.

# A LITERATURE REVIEW ON THE IMPACT OF ARTIFICIAL INTELLIGENCE IN PHYSIOTHERAPY

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DUKA, Venemin GEGA, Raimonda HIDA, Ilma  
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## **Abstract**

Artificial intelligence (AI) is one of the active research areas to develop systems that imitate human intelligence and is useful in many fields, especially medicine. The first attempt of AI and its application in the specialties of public health and medicine began in the 1960s, with focus on diagnosis and treatment. Artificial intelligence (AI) can improve healthcare by advancing care delivery, decision making and patient engagement. Analyzing the current state of artificial intelligence (AI) is a critical first step toward its integration into physical therapy practice. In this review, we have focused on the studies carried out in the last 10 years, in different countries in the world, to focus on the potential impact of AI in physiotherapeutic rehabilitation. Another reason was to investigate the knowledge and attitude of physiotherapists regarding AI applications in rehabilitation. As well as the impact of AI on physiotherapists in the future in the exercise of their profession. The retrieval of studies was carried out by systematic searches from various academic and research databases, such as Google Scholar, PubMed, Research Gate.

*Keywords:* Artificial Intelligence, physiotherapists, physical therapy, rehabilitation, study.

# **AORTIC ANEURYSM, CASE WITH ABDOMINAL AORTIC ANEURYSM, CARDIOMYOPATHY, RENAL FAILURE AND SECONDARY ANEMIA**

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## **Abstract**

The aorta, as the main artery in the human body with a large diameter, is under the influence of greater tension than other arteries, and with its walls, it resists strong systolic blood pressure. Due to these stressful factors, the aorta is also affected by atherosclerotic processes, infections, trauma, necrotic processes, as well as arterial hypertension, which is harmful in addition to identical diseases such as ischemic cardiomyopathy, cerebrovascular diseases, diabetes, nicotinism, and others. The influence of arterial pressure and the volumetric load exerted on the wall of the Aorta during heart contraction, where the elasticity of its wall is protection for the normal function of the Aorta and the surrounding structures, and any change in elasticity and replacement with collagen, as well as the presence of classical factors of the cardiovascular risk that we mentioned earlier, as well as other diseases such as Marfan Syndrome and Ehler Danlos and others together with the atherosclerosis process that is more frequent in the abdominal aorta play their role as well as aging.

Taking into account all the factors that affect the appearance of Aortic Aneurysm, such clinical and pathological conditions are classified into four forms: Aneurysms, Aortic dissection, atherosclerotic occlusive syndrome, and various inflammations. Aortic aneurysms, whether thoracic or abdominal, detected during routine chest examinations, echocardiography, or abdominal ultrasonography are due to urgent conditions and pain in the corresponding region and the clinical features of these conditions.

Aneurysms are abnormal expansions of the wall of the Aorta more than 1.5 times its normal values, respectively over 5.0 cm for the ascending aorta and 4 cm for the descending aorta, it is called an Aneurysm and it affects its three layers, and this is the true Aneurysm, whereas False aneurysms in the literature are cited to consist only of tunica adventitia and perivascular thrombus mass. Thoracic aortic aneurysms have been referred to by us earlier. The topic of discussion will be Abdominal Aortic Aneurysm (AAA) in the following case presentation:

AAA are focal dilatations of the abdominal aorta measuring 50% larger than the normal proximal segment, or >3cm in maximum diameter.

Epidemiology: AAA represents the tenth cause of death in the Western world, and this prevalence increases with age, approximately 10% of patients older than 65 years have an aneurysm, cited standard literature, men are four times more exposed.

The clinical presentation of these conditions was often asymptomatic except for cases with a tendency to rupture that was incidentally detected during imaging methods.

The purpose of the paper is to present our experiences in the treatment of aortic aneurysms, diagnosis, clinic, and treatment in addition to representative and official ESC guidelines.

**Material and methods:** The objective examination affecting the pulsating mass in the middle epigastrium under the processus xiphoideus up to the umbilicus, then we did an x-ray examination, ultrasonography, and CT of the abdomen, ECG, of course, standard laboratory Hemogram, SE urea, creatinine lipidogram, electrolytes and D-Dimers, CRP According to the internal report in the Internal Clinic, we analyzed the histories of 14 subjects with codes I70.0 to I71.4, a case with AAA, male N. an 84-year-old with comorbidity that we will give in total, and a female subject 56 years as dissection of the Aorta...Clinical entities with Aneurysms of the Abdominal Aorta there were 5 subjects with advanced ages.

*Keywords:* Aortic Aneurysm, Abdominal Aortic Aneurysm, diagnosis, treatment.

# **CORRELATION BETWEEN ESTROGEN AND HISTAMINE PRODUCTION IN HORMONAL REPLACEMENT THERAPY IN POSTMENOPAUSAL WOMEN, ASTHMA AND HISTAMINE INTOLERANCE**

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## **Abstract**

This review paper focuses on the correlation and relationship between mast cells and histamine production in cases with elevated estrogen and in some cases progesterone levels and how the latter mentioned hormones affect the immune system, in particular mast cells, with consequent histamine production, and in a vicious cycle how histamine production can raise estrogen levels due to histamine receptors present in granulosa cells of the ovaries. During clinical practice, it has come to our attention that immune related illnesses were more prevalent in women, especially during menopausal stages of life, but also intolerance to hormonal replacement therapy in women with immune diseases, particularly atopic ones. There were also in more than one cases allergic manifestations present in women who were put on hormonal replacement therapy, mostly skin symptoms, in the form of urticarias, but also cases of rhinitis, persistent coughing and conjunctivitis. Due to this clinical observation we set in to research previous papers on the issue at hand and we found that this correlation was far more intertwined than we

previously suspected, and it was mostly well studied in asthma patients, but it was also understood that there exists more space for researches of this kind of nature to be explored.

*Keywords:* histamine, histamine intolerance, asthma, oestrogen, progesterone, hormonal therapy.



# **THE CLINICAL BENEFIT FROM DETERMINATION OF SCORE2 AND HMOD IN PATIENTS WITH ARTERIAL HYPERTENSION**

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## **Abstract**

Study on the clinical expectations from determination of risk score stratification methods in patients with primary (essential) hypertension.

**Objectives:** The effectiveness of determining SCORE2 and HMOD in reducing systolic and diastolic pressure as well as improving clinical manifestations from treatment based on risk stratification in patients previously treated with antihypertensive therapy. Safety and quality of life of patients were also part of this investigation.

**Patients and Methods:** Open prospective study involving 84 patients with essential hypertension treated with different antihypertensive therapies and who in the past did not have SCORE 2 or the level of organ damage determined. Office blood pressure was measured by a validated sphygmomanometer and ABPM. SCORE 2 was determined using the Score 2 calculator app (ESC CVD Risk calculators) and the

evaluation of HMOD was carried out with basic and more detailed screening tests for HMOD. The Quality of life and safety were assessed by a validated questionnaire.

Results: Based on the risk stratification in 87% of patients, the existing therapy is supplemented with 2 or more other drugs. All clinical parameters (AT, HbA1C, lipid profile and renal function) examined in the study improved significantly (72.9%). There were no changes (27.1%) on heart structure and function, carotid plaque or stenosis and cognitive status after 16 weeks of modified treatment based on risk stratification. Adverse effects were noted in few cases (4.6%) and only 2% were related with the treatment.

Conclusion: Risk score evaluation including SCORE 2 and HMOD assessment should be the milestone of therapeutic strategy in treating patients with HTA.

*Keywords:* risk score stratification, blood pressure, complications.

# **THE IMPORTANCE OF SPEECH THERAPY IN THE AUTONOMY OF PATIENTS WITH DEMENTIA**

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## **Abstract**

Speech therapy intervention enables patients with dementia to use language and communication as a basic element for maintaining autonomy. The choice of appropriate tools and methods in speech therapy is based on the person in the therapy position, therapy as a connection with another, dialogue as a basis that leads to interaction, self-organization as well as joint responsibility between the patient and the therapist.

**Purpose:** This study aims to position speech therapy intervention as part of multidisciplinary management in the treatment of dementia. This study emphasizes the importance of individual or group therapy conditions, work based on systematic counseling on prevention and special education with a focus on language, as a basic pillar of autonomy and improving the quality of life.

**Methodology:** This study is based on a literature review where the knowledge obtained is synthesized in conclusions for the use of diagnostic methods and logopedic treatment. The literature was reviewed based on specialized books and publications, and articles from PubMed, Google Scholar and ResearchGate were also reviewed.

A total of 29 articles were identified and 8 of them were analyzed, because they were studies of the last 10 years and related to the topic.

**Conclusions:** The articles taken into consideration describe the symptoms of language impairment in dementia, semantic aspect, syntactic complexity, fluency, and pragmatic language.

The importance of speech therapy is based on the dialogue principle, group, didactic and psychomotor therapies. Further studies are needed to help not only the patient but also the medical staff who deal with their treatment.

*Keywords:* dementia, language, patient, speech therapy, therapy.

# HIATAL HERNIAS AND GASTROESOPHAGEAL REFLUX DISEASE – CURRENT PROBLEMS

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## Abstract

Hiatal hernias are frequent in recent times, this among others also because of a result of the increase in the percentage of overweight people. Hiatal hernias are the result of displacement of a part of the stomach in the thoracic cavity through the esophageal hiatus, while they can appear at any age.

**Aim of the study:** To show and present our experience in the diagnosis, treatment and follow- up of patients with hiatal hernia, most of whom also have gastroesophageal reflux disease (GERD).

**Material and methods:** Nine patients diagnosed with hiatal hernia but who simultaneously suffered from gastroesophageal reflux were presented to the Department of General Surgery of the Clinical Hospital of Tetove in the period January 2022 - January 2024. The important data for this study were extracted from the patient records treated and followed by the surgeons of this department.

**Results:** Of the nine patients included in this study, five of them were men and four were women. The age of the treated patients was from 38 to 67 years. All patients included in the study were obese, while four of them were also diabetic. The main concerns of the patients have been gastroesophageal reflux, burning and retrosternal pain, regurgitation of gastric juice and sometimes its aspiration in the respiratory tract, palpitations, etc. Diagnosing a hiatal hernia is often

a challenge for both radiologists, endoscopists and clinicians, and requires the simultaneous use of several diagnostic techniques. Barium swallow radiography is the earliest examination that has been used to diagnose hiatal hernias and gastroesophageal reflux. This examination is still used today and gives good and safe data for this disorder. Esophagoduodenoscopy is another examination that is used more often in recent years in the diagnosis of hiatal hernias. This examination also enables taking part of the esophageal mucosa for histopathological examination in cases of exacerbation of the esophageal mucosa as a result of reflux (Barrett's esophagus). All the patients included in this study underwent gastroesophagoscopy, while in two of them, part of the esophageal mucosa was taken due to advanced inflammatory processes for histopathological examination. In both of these patients, there were no signs of metaplastic changes. Other diagnostic examinations such as esophageal manometry, thoraco-abdominal CT and pH test were not used in our patients. All patients included in the study were treated conservatively with therapy to reduce gastric acid secretion such as proton pump inhibitors, histamine receptor antagonists or antacids. All patients responded well to the given therapy and none of them needed surgical intervention to correct the esophageal hernia. In the two patients with advanced signs of inflammation of the esophageal mucosa, repeated esophagoscopy showed healing of the esophageal mucosa. Since all the patients were overweight, they were advised to lose weight, not to use foods that worsen gastroesophageal reflux, not to eat spicy foods, to raise the head of the bed a little while sleeping, and not to eat at least 3-4 hours before sleeping.

**Conclusion:** Hiatal hernias and the more serious disorder that accompanies gastroesophageal reflux are conditions that should be treated seriously by clinicians and surgeons. Good diagnosis and exclusion of metaplastic changes in the esophageal mucosa are maneuvers that lead to the elaboration of an algorithm for safe therapeutic procedures.

*Keywords:* hiatal hernia, management, treatment.

# CORRELATION BETWEEN BMI AND GONADOTROPIN HORMONES IN THE FEMALE GENDER

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## Abstract

**Introduction:** The pituitary gland influences growth and development and its key function is in the activity of sexual/reproductive hormones and the functionality of the glands (thyroid gland, adrenal glands and gonads). Gonadotrophic hormones (gonadostimulins) are so named because they stimulate the function of the gonads - male and female sex glands (testes and ovaries) in which sex cells - sperm and egg cells are created. Overweight is a state of metabolic disorders where excess body fat is accumulated to such an extent that it can negatively affect human health. Obesity as a factor of BMI is related to the functionality of the thyroid gland with its hormones and the pituitary gland with gonadotropic hormones.

**Aim:** This paper aims to present the correlation between of BMI and gonadotropin hormones in reproductive women and women in menopausal period. The purpose of the paper will also consist in the status of gonadotropin hormones and the functional state of these hormones by comparing them with metabolic disorders such as BMI,

obesity and synthesis Foliculo stimulating hormone and Gonadotrop hormon.

**Material and method:** A total of 20 patients will be included in the research, they will be divided according to age groups into two categories. The first group will include patients from: 10-40 years the second group will include patients over 40 years. Blood samples (serum) will be taken for analysis for gonadotropin hormones: FSH, LH, PRL and thyroid gland hormones: TSH, FT4, FT3. The samples will be analyzed by the modern automatic enzyme Fluorescent Immunoassay method (Vidas- Biomerie). BMI will be measured with a metric formula where the patient's weight (in kg) divided by the patient's height (in m<sup>2</sup>) set to the square power will give us the body index-BMI measure(%).

**Research results:** The research results will give a real insight into the data of gonadotrope hormones FSH, LH, PRL and thyroid gland hormones TSH, FT4, FT3 of the female gender in the region of Tetova. The results of the research will also provide information about the correlation of BMI and gonadotropin hormones and thyroid gland.

**Conclusion:** From this paper we will be able to conclude that:

- Gonadotrope hormonal disorders can lead to the phenomenon of metabolic diseases such as BMI.
- These disorders can result in consequences such as: polycystic ovarian diseases in women, Hashimoto's genetic syndrome, Graves disease, infertility in women, etc.

*Keywords:* gonadotropic hormones, pituitary gland, hormone of thyroid gland, BMI, metabolic syndrome, infertility.



# **BENEFITS AND PROFILE OF PROBIOTICS AT SPECIFIC STAGES OF EMBRYONIC DEVELOPMENT IN CHICKEN EGGS**

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## **Abstract**

**Introduction:** Mount Sharr is characterized by a very pronounced biological diversity and a special endemism and a wide spectrum of the variety of flora characteristic of this mountain massif. Teas with nutritional and health benefits can include species such as: sideritis (*Sideritis scardica*), and cantarion (*Hypericum perforatum*) etc. These bioproducts are characterized by special importance in terms of presence, quality and health benefits, therefore the exploration of these species will have a positive cost for consumption as a form of teas or plant extracts for commercial purposes but also for health benefits and on for all the population of the country and the wider region.

**The purpose of the study:** This paper aims to investigate the effect of the herbal extract of teas such as mountain tea (*Sideritis scardica*), and cantarion (*Hypericum perforatum*) applying extract with a certain dose to chicken eggs, at different stages of ontogenesis.

**Material and working method:** In the study, fertilized chicken eggs were taken and incubated in the incubator for 21 days of incubation. The eggs were treated with species such as: sideritis (*Sideritis scardica*), and cantarion (*Hypericum perforatum*) at certain stages of embryonic development. The eggs hatched on day seven, day fourteen and day twenty one. With the macroscopic and microscopic method with a stereomicroscope were analyzed changes in certain stages of embryonic development. The effect of the extract of these teas has been studied on chicken eggs *Gallus domestica*, applying extract with a certain dose to chicken eggs, at different stages of embryonic development during ontogenesis.

**Research results:** The dose given in extract form has resulted in positive benefits of these teas as effective probiotics during certain stages of embryonic development in chicken eggs.

**Conclusion:** This research will explore the effect of the given dose of plant extracts at certain stages of embryo development during ontogenesis to see the benefits of taking the dose in a certain amount and at a certain time to observe the positive effect of these teas.

*Keywords:* tea benefits, *sideritis scardica*, cantarion, effective dose, stages of ontogenesis.

# THE EFFECT OF THE ANTIBIOTIC GENTAMICIN ON THE STAGES OF ONTOGENESIS IN CHICKEN EGGS

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## Abstract

**Introduction:** Various studies have shown that the effects of the action of drugs, in addition to having positive effects, they can also provoke negative effects in different organs of the body, where by giving more doses in some cases it can exceed the therapeutic limit and become toxic and produce pathological effects in both experimental animals and humans. Uncontrolled use and drug overdose can lead to macroscopic histopathological changes and give teratogenic, mutagenic and carcinogenic effects.

**Purpose of the paper:** This paper aims to study the effects of some drugs at different stages of embryonic development in chicken eggs. The research of this paper will consist of the toxic effect of drugs and macroscopic and microscopic histopathological changes in certain stages of embryonic development of chicken eggs.

**Material and working method:** In the study, fertilized chicken eggs were taken and incubated in the incubator for 21 days of incubation. The eggs were treated with the antibiotic Gentamicin at certain stages of embryonic development. The eggs hatched on day seven, day fourteen and day twenty one. Using the stereomicroscope with the

macroscopic and microscopic method were analyzed ontogenetic changes in certain stages of embryonic development.

**Research results:** The given dose of the antibiotic Gentamicin can have negative effects in certain stages of embryonic development in chicken eggs. The dose given in ampullary form in certain quantities to chicken eggs has inhibited and stagnated the processes of embryonic development at different stages compared to control eggs.

**Conclusion:** The given dose of Gentamicin can stagnate embryonic development in certain stages and can provoke changes in certain stages of embryonic development. This phenomenon encourages us to do even more detailed research in this direction to see the effect of the given dose and to analyze what consequences it can provoke overdoses at different stages of embryonic development and within the organism. The lethal dose applied at certain stages of ontogenesis may have lethal consequences for the chick embryo at certain stages of embryonic development.

*Keywords:* dose effect, over dose of Gentamicin, histopathological changes, chicken egg, teratogenesis, mutagenesis.

# **CORRELATION BETWEEN THE DISORDER OF THE THYROID GLAND, OBESITY AND OVERWEIGHT IN THE FEMALE GENDER**

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## **Abstract**

**Introduction:** The thyroid gland is the endocrine gland responsible for the production of thyroid hormones, a regulator of growth, development and basal metabolic rate of the organism. It also has a wide range of physiological effects on the organism such as: general thermogenesis, physiological metabolic effects, growth and developmental features and when these parameters move up and down they lead to acute or chronic pathology. Pathologies of the thyroid gland are very frequent diseases in our country, especially in the female gender. As far as diseases are concerned, when we have iodine deficiency, disbalance of thyroid hormone values such as an increase that leads to hyperthyroidism or a decrease in values that

leads to hypothyroidism, other diseases such as Hashimoto's, Graves etc. Obesity is a state of metabolic disorders, sometimes considered a disease in which excess body fat is accumulated to such an extent that it can negatively affect human health. Obesity is related to the function of the thyroid gland and this metabolic disorders is a very frequently in reproductive female. Body BMI is measured with a metric formula where body weight (in kg) divided by body height (in m<sup>2</sup>) set to the square power gives us the body index-BMI (%) measure.

**Aim:** This paper aims to investigate the correlation of thyroid gland disorders and hormonal imbalance with the phenomenon of body weight as the main causes of this metabolic disease .

**Material and method:** The research will take a total of 80 patients, they will be divided by gender and age groups into three categories. The first group will include patients from: 15 to 20 years, the second group from: 21 to 50 years and the third group from: 51 to 70 years. From the patients included in the research, blood samples will be taken and the hormones will be analyzed: TSH, FT<sub>4</sub>, FT<sub>3</sub> also BMIx will be measured. The data will be processed with serum and will be analyzed by means of the modern automatic method enzyme Fluorescent Immunoassay (Biomerie).

**Research results:** Endocrine disorders are more frequent and appear faster in the thyroid gland. Statistics show that there are millions of people affected by these metabolic syndrome problems. The results of the research will give a real insight into the function of the thyroid gland, the state of the level of hormonal status and the impact of metabolic syndrome of BMI, which can lead to hormonal imbalance and metabolic disorder.

**Conclusion:** From this paper we can conclude that:

- Hormonal disorders of the thyroid gland can be the main cause of the phenomenon of the BMI factor,
- The correlation of thyroid hormone status and metabolic status are in continuous correlation with obesity, overweight, infertility, diabetes and hyperlipidemia.
- These changes of the thyroid gland and the BMI can have negative consequences for human health such as in osteoporosis and electrolyte imbalance.

*Keywords:* thyroid gland, obesity, hyperthyroidism, hypothyroidism, metabolic syndrome, BMI.

# **AIR TRAFFIC MANAGEMENT DURING COVID-19 IN WESTERN EUROPE AND THE CONSEQUENCES OF THE PANDEMIC IN COMPARISON TO NORTH MACEDONIA**

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## **Abstract**

The COVID-19 pandemic has caused an unparalleled disruption in the aviation industry, marking an unprecedented reduction in flight numbers from March to May 2020. Since then, the aviation sector has been grappling with the challenges posed by this crisis, highlighting its significant vulnerability to external shocks. Despite encountering previous aviation crises, the impact of COVID-19 stands out as unprecedented in modern aviation history. While there was a modest recovery in global passenger traffic in 2021, with 2.3 billion passengers recorded, representing a 49 percent decrease from pre-pandemic levels in 2019, this improvement was compared to the substantial 60 percent decline observed in 2020. However, global airline seat capacity surged by 20 percent during this period, surpassing the growth in passenger demand. As a result, the overall passenger load factor dropped to 68 percent in 2021, down from 82 percent in 2019. Airlines worldwide faced significant losses, totaling \$324 billion in 2021, following losses of \$372 billion in 2020. The aviation industry has been severely affected by the COVID-19 pandemic, witnessing unprecedented declines in passenger volume and airline revenue. In response to the pandemic, governments implemented various non-pharmaceutical measures to control local



outbreaks in the early stages, with air transportation identified as a significant contributor to the spread of COVID-19. This led to the imposition of flight bans by countries and regions during the initial waves of the pandemic, exacerbating the challenges faced by the aviation sector.

The COVID-19 pandemic has had a profound impact on the aviation industry worldwide, and North Macedonia is no exception. The effects of the pandemic on aviation in North Macedonia have been significant, leading to disruptions in air travel, changes in passenger behavior, financial challenges for airlines and airports, and the implementation of various safety measures to prevent the spread of the virus.

*Keywords:* aviation industry, crisis, passengers, vaccines, government, air transportation.

# URINARY TRACT INFECTIONS AND PROSTATE SPECIFIC ANTIGEN TPSA

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## Abstract

**Introduction:** The urinary system consists of four main organs: the kidneys, ureters, bladder, and urethra. These organs function is to filter the blood, remove degradation products, form urine, and eliminate urine from the body. In recent years there have been encouraging steps in understanding and studying the pathogenesis of urinary tract infections (UTIs) and the prostate specific antigen TPSA.

**Aim:** The purpose of the research will focus on biochemical markers such as: urea, creatinine, uric acid, urine degradation products and identifying parameters of diseases of the urogenital tract. The urinary status parameters will also be analyzed such as: proteinuria, hematuria, glucosuria, bilirubin, urobilinogen, pH-parameters which are present during diseases and infections of the urogenital tract. The purpose of the paper will also analyze bacteriological and virological parameters such as ureoplasma, mycoplasma, chlamydia, toxoplasma and cytomegalovirus, which are identifying parameters for infections of the urogenital tract in different age groups and human genders. This study will also consist of the measurement of the prostate

specific antigen TPSA as the main marker for the identification of prostate diseases.

**Material and method:** In the research, a total of 80 male patients will be taken to analyze the urinary status. Urine analyzes will be performed by collecting urine in sterile cups and using the urine microscopy method and urine strip test using the chromatographic method, where these analyzes will be performed according to the European guidelines standards manual (2023). Vitek is an identification system that can identify bacteria and yeast. This test uses biochemical reactions and nutrient usage of the microorganism to make the identification of bacteria and antibiogram. The test requires that a sufficient amount of growth be obtained during a set growth period of 18–70 hours. The patients of the study group for Antigen specific of prostate will be analyzed through the blood serum in ng/mL of the patients with the immunoassay fluorescent test method with Vidas Biomerie.

**Research results:** From the results it was concluded that urinary infections are frequent and appear during the attack with bacteria and viruses such as ureoplasma, mycoplasma, chlamydia and cytomegaloviruses, which are identifying parameters for infections of the urogenital tract in different age groups of the male gender.

**Conclusion:** From the results of the research we will conclude that:

- The parameters of the urinary system will be able to give a real insight into urinary tract infection diseases.
- Biochemical markers can identify the functional state of the urinary tract.
- Antibiogram and cytomegaloviruses-microbiological and virological status can give an insight into the type of urinary infections.

- Prostate-specific antigen TPSA can be taken as the main marker for the identification of tumoral disease of the prostate gland.

*Keywords:* urogenital tract infections, urine, TPSA, urine parameters, antibiogram, tumor diseases.

# LIPID DISORDERS IN UREMIC ENVIRONMENT

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## Abstract

Uremia is a clinical syndrome characterized by chronic end-stage renal failure, high concentrations of nitrogen-degrading products (urea, creatinine, uric acid in the blood) and is associated with many electrolyte disorders, metabolic acidosis, abnormalities in lipid fractions, apolipoprotein mic, mineral-bone disorders, homocysteine, oxidative stress, chronic inflammation, insulinemic resistance, resistance to erythropoietin, lack of vitamin D and malnutrition and MIA syndrome (Malnutrition-Atherosclerosis-Inflammation) etc. Kidney failure is associated with a high risk of cardiovascular disease. One of the main mechanisms underlying this increased cardiovascular risk is uremic dyslipidemia. Abnormalities of apo/lipoproteins are generally a combination of abnormalities of all lipid fractions. The lipoproteinemic profile during uremia is manifested by an increase in triglycerides, an increase in LDL cholesterol, an increase in VLDL, IDL, an increase in lipoprotein (a) and a decrease in HDL cholesterol. These disorders that manifest in the early stages of chronic kidney failure are the cause of early atherosclerosis and vascular dysfunctions. Chronic kidney failure

with apolipoprotein mic disorders are the main cause of cardiovascular disease (CVD). Uremic dyslipidemia directly affects glomerular capillary endothelium damage and renal disease progression.

Conclusion:chronic uremia causes profound changes in the metabolism of apolipoproteins, promoting the development of early atherosclerosis and cardiovascular diseases. The uremic environment itself and increased oxidative stress apparently influence the modification of circulating lipoproteins by changing their biological properties and can be considered as uremic toxins. Therefore, it is necessary to control the lipid profile in the early stages of chronic renal diseases to slow down the progress and progression of renal failure and cardiovascular consequences.

*Keywords:* uremia, lipid disorders, chronic kidney disease (CKD),cardiovascular diseases (CVD).

# **PULMONARY MANIFESTATIONS IN PATIENTS WITH SYSTEMIC LUPUS ERYTHEMATOSIS (SLE)**

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## **Abstract**

Systemic Lupus Erythematosus (SLE) is a chronic autoimmune systemic disease of the connective tissue with multifactorial etiology, but precisely unknown, although the etiology of SLE involves an interaction between genetic predisposition, environmental environment, hormonal factors, a change in the immune system (congenital or acquired). 4-6% of patients with SLE during the course of the disease manifest symptoms of diseases of the respiratory tract manifested by pneumonia, etc. Clinical manifestations are manifested by: shortness of breath, cytopenia, fever, malar rash (on the face in the shape of a butterfly), other skin rashes, arthritis, polyarthralgia, vasculitis and pleuro-pulmonary. The pathogenesis of SLE is characterized by an impairment of the clearance of apoptotic cells. by phagocytes, autoreactivity of B-cells and T-cells, leading to an abnormal production of autoantibodies. In the clinical examination, symptoms of: dyspnea, cough, fever, temperature >38°C, chest whistling, rapid pulse, tachycardia, etc. were observed. Treatment should be started immediately with broad-spectrum antibiotics. oxygen therapy, high doses of

corticosteroids are the mainstay of treatment. In severe cases, daily doses of methylprednisolone can be used from 1-2 mg/kg per day for three to four days) with a subsequent decrease according to the clinical response, in severe cases it is preferable to give immunoglobulin, immunosuppressant such as cyclophosphamide and azathioprine, biological drugs (monoclonal antibodies) such as Rituxan, Rituximab or plasma exchange may be used in severe refractory cases.

The purpose of the study: the purpose of the paper was the manifestations of SLE, the determination of clinical, microbiological characteristics and risk factors of pulmonary manifestations in patients with SLE.

Material and methods: in the study we had 40 patients with SLE included in the study (30 were females with an average age of  $20.60 \pm 5.00$  years while 10 were males with an average age of  $21.70 \pm 4.30$  years) treated with more than three therapies. years. The following laboratory analyzes were determined in all patients: computed tomography of the lungs, C-reactive protein (CRP) erythrocyte sediment, blood count (Er, Hb, Htc, thrombocytes-Th, Le), differential blood count (lymphocytes, granulocytes, monocytes), blood glucose, serum urea and creatinine, uric acid, total proteins, microalbuminuria, albumins, electrolytes, iron (sFe), C3 and C4 and antinuclear antibodies (ANA).

Statistical processing: the obtained results were processed with statistical methods arithmetic mean value, standard deviation  $X \pm SD$ . The statistical processing of the parameters obtained between the groups was analyzed with the student "t" test, and Mann-Whitney "U" test. The results were processed with the SPSS statistical program. 26

Results: From the total number of women (no=30), 5 of them and from the total number of men (no=10), 3 of them showed symptoms of acute pneumonia. In the laboratory examination, all eight patients were found: increased sedimentation of erythrocytes, increased Le, PCR, low oxygen saturation (Spo): 77-80% (normal Spo: 96-99%),



while computed tomography consisted in parenchymal infiltrative density of multiple effusion in both pulmonary lobes (mainly in the lower lobes) that we also verified the diagnosis of acute pneumonia.

Conclusion: SLE patients often have manifestations of respiratory complications with pneumonia, it can affect almost any segment of the respiratory system and in severe cases it can end with exitus lethalis. Severity scales for developing pneumonia may misclassify low-risk SLE patients with poor prognosis. In the treatment of underlying disease, it is essential to start treatment with broad-spectrum antibiotics and corticosteroids early in the course of the disease.

*Keywords:* Systemic lupus erythematosus (SLE), respiratory tract disease.

# **CARDIOVASCULAR COMPLICATIONS OF PATIENTS WITH CHRONIC KIDNEY DISEASE(CKD)**

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## **Abstract**

Patients with chronic kidney disease (CKD) in the initial stages have a high risk of developing cardiovascular diseases (CVD), which with the progression of the disease have a mortality rate of 40-50%. As the most frequent risk factors in the occurrence of CVD patients with CKD are: early vascular atherosclerosis, hypertension, diabetes, dyslipidemia, MIA syndrome, hyperfibrinogenemia, proinflammatory cytokines (interleukin 6), oxidative stress, smoking, sedentariness etc. Although to date there are no options available to reduce the manifestations of CVD in CKD and uremic patients treated with HD, but therapy with angiotensin-converting enzyme inhibitors (ACE-inhibitors) and  $\beta$ -blockers, dietary compliance (hypoproteinemic), balance of diabetes, treatment of dyslipidemia, moderate activity, treatment with ketosteril supplements, sorbister powder are recommended from the beginning of the onset of the disease and have shown high positive effects in slowing down the progress of chronic renal diseases and preventing CKD

The aim of the work: was to discover the prevalence of CVD in CKD and uremic patients treated with chronic hemodialysis.

Material and methods: in the prospective-cohort ("cross-sectional") study, 100 patients were selected (45 were women with an average age of  $58.00 \pm 6.50$  years and 55 were men with an average age of  $59.30 \pm 7.00$  years) with CKD and uremia treated with bicarbonate HD over 72 months with a frequency of 4.5-5 hours three times a week, at the Nephrology Clinic in Skopje. In the study we also had a group of healthy individuals (volunteer donors) who served as a control group of 70 individuals (30 women and 40 men) with an identical average age of:  $57.40 \pm 8.20$  years. All patients, even in the control group, examined the lipid profile and measured the size of the left ventricle every 6 months within 24 months.

Statistical processing: From the basic statistical methods, arithmetic mean value and standard deviation  $X \pm SD$ , Student's test, t" test, Mann-Whitney U test and Wilcoxon test were used. The results were processed with the latest statistical program. SPSS V26.

Results: Left ventricular hypertrophy (LVH) was detected by ECG and echocardiography considering and calculating left ventricular posterior wall dimensions (LVPWd), interventricular systole (IVS) and diastole (IVS)  $IVSd > 12$  mm. In the female gender with ESRD, 49.70% had LVH, 38.0% had symptoms of uremic pericarditis, 46.0% -arrhythmia, 56.70% -myocardiopathy, 48.60% suffered from ischemic heart disease and 28.9% mitral regurgitation was detected. In male patients treated with HD: 52.40% suffered from atherosclerotic ischemic heart disease, 57.50% had LVH, 36.80 had uremic pericarditis, the other had 54,80%, myocarditis-58.30% and 26.80% had mitral regurgitation. In the examined group of 48.0%-59.0% manifested CVD.

Conclusion: in conclusion we can verify that new therapeutic options, modifications of the HD process, the use of biocompatible membranes with high flux and coated with tocopherol, increasing the duration of HD, supplementation with antioxidants-

ketosteril,sorbisterit), treatment of hypertension, diabetes, etc. It should be started in the initial stages of CKD in order to prevent the occurrence of early vascular atherosclerotic processes and CVD.

*Keywords:* cardiovascular disease (CVD),chronic kidney disease (CKD),hemodialysis.

# CARDIAC TROPONINS (cTn-I) IN PATIENTS WITH UREMIA

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## Abstract

Cardiovascular diseases (CVD-acute myocardial infarction, congestive heart failure, myocardial ischemia, etc.) still remain the most frequent cause of mortality in uremic patients treated with chronic intermittent bicarbonate hemodialysis (HD). A large number of uremic patients treated with HD have high concentrations of cTn-I even though they may not have clinical symptoms suspected of cardiovascular disease (CVD). A large number of studies in patients with CKD in the pre-terminal phase and uremic ones have documented that between high levels of cTn-I and impaired heart function there is a high correlation. Therefore, high concentrations of cTnI are considered important and predictive biomarkers. early for the occurrence of acute coronary syndrome, acute coronary infarction, pectoral angina, etc. in pre-terminal CKD and uremic patients treated with intermittent HD bicarbonate.

The aim of the work: was to determine the prevalence of increased cTnI in preterminal CKD and uremic patients treated with chronic HD and their diagnostic role in predicting CVD compared to the healthy population (control group).

**Material and methods:** The working materials for the determination of cardiac Tn-I used the blood taken from the veins of 90 patients (of which 50 men with an average age:  $61.50 \pm 7.40$  years and 40 women with an average age:  $58,70 \pm 8.50$  years old) treated over 60 months with chronic bicarbonate HD (with a frequency of 4.5-5 hours three times a week) at the University Clinic of Nephrology with HD in Skopje. In the study we also had a control group of 60 healthy individuals (35 men and 25 women with an identical mean age of  $59.30 \pm 5.00$  years-volunteer donors).

**Statistical processing:** the obtained results were processed with statistical methods arithmetic mean value, standard deviation  $X \pm SD$ . The statistical processing of the parameters obtained between the groups was analyzed with the student "t" test, Mann-Whitney "U" and the Wilcoxon test. The results were processed with the SPSS statistical program. 26

**Results:** the highest values of cTn-I ( $> 1.0 \mu\text{g/ml}$ ) were observed in 34% of patients with arterial hypertension (HTA) - where Tn-I values were  $= 2.070 \mu\text{g/ml}$ , in 29% of patients with diabetes mellitus. (DM). cTn-I values  $= 2,030 \mu\text{g/ml}$ , in 27% of patients with chronic glomerulonephritis (GMN chr), Tn-I values were  $= 1,070 \mu\text{g/ml}$ , in 18% of patients with chronic Interstitial Pyelonephritis (IPN Chr) values of cTn -I were  $= 1.050 \mu\text{g/ml}$ , in 9% of patients with Adult Dominant Renal Polycytosis the values of Tn-I were  $= 0.090 \mu\text{g/ml}$ . Between the values of cTn-I from CKD and uremic patients and the control group, it was verified that there was a statistically significant difference for  $p < 0.001$ .

**Conclusion:** in conclusion we can conclude that ESRD patients treated with HD, regardless of the underlying disease, maintained high concentrations of cTn-I with a statistically significant  $p < 0.001$ , compared to the values obtained from the control group, healthy individuals.

**Keywords:** cardiac troponin-I (cTn-I), uremia, cardiovascular diseases (CAD).

# LIPID DISORDERS AND HOMOCYSTEINE (Hcy) IN PATIENTS WITH CHRONIC KIDNEY DISEASE (CKD)

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## **Abstract**

Disorders of lipid fractions and hyperhomocysteinemia (HHcy) in patients with CKD in the initial stages of the disease are risk factors for the onset of early atherosclerotic processes and cardiovascular diseases (CVD-acute myocardial infarction, congestive heart failure, hypertrophy of the left ventricle), arrhythmia, cerebral stroke etc. Uremic dyslipidemia consists in the disorder of all lipid fractions (low level of HDL-ch, high concentrations of LDL-ch and triglycerides). Patients with CKD and those treated with hemodialysis Intermittent chronic (HD) manifest high levels of Hcy >15.0 µmol/l, HHcY which in recent years is considered as an independent risk factor for the occurrence of early atherosclerotic cardiovascular complications.

The purpose of the work: was to evaluate the level of Hcy in serum and the correlation with the lipid fractions of patients with preterminal CKD and uremic ones treated with HD.

Material and methods: The cross-sectional study included 100 patients (45 women with a mean age of 57.00±8.30 and 55 men with

a mean age of  $58.50 \pm 5.40$  years) with ESRD treated with chronic HD over 48 months with a frequency of three. once a week for 4.5 hours, at the Clinic of Nephrology and Hemodialysis-Skopje and 100 patients (40 women and 60 men with an identical average age of  $57.60 \pm 4.60$  years) with preterminal CKD. All subjects examined within 12 months we examined changes in Hcy and Lipid fractions (total cholesterol-tCh), Triglycerides-TG, LDL-ch, HDL-ch (high-density lipoprotein cholesterol). Glomerular filtration rate-GFR:  $59-44$  ml/min/1.73 m<sup>2</sup> determined according to the MDRD formula (Modification of Diet in Renal Diseases). In the study we also had a group of healthy individuals (no=60, of which 25 women and 35 men aged  $55.90 \pm 8.50$  years) who served as a control group for comparing the values obtained between patients and the control group.

Statistical processing: the obtained results were processed with statistical methods arithmetic mean value, standard deviation  $X \pm SD$ . The statistical processing of the parameters obtained between the groups was analyzed with the student "t" test, Mann-Whitney "U" and the Wilcoxon test. The results were processed with the SPSS statistical program 26.

Results: serum Hcy concentrations in patients without HD were manifested with the values of: The level of Hcy in serum appeared significantly increased in patients with preterminal CKD ( $26.40 \pm 4.00$   $\mu\text{mol/L}$ ), while in patients treated with HD were:  $36.00 \pm 5.40$   $\mu\text{mol/L}$ ) but Hcy level was higher in patients with ESRD compared to patients with preterminal CKD and the control group for  $p < 0.0001$ . Lipid profile also showed a significant difference between CKD patients and those treated with HD compared to the control group also for  $p < 0.001$

Conclusion: considering the results of this study that Hcy, tCh, LDL-ch, TG values are significantly higher while HDL-ch values are lower in patients with CKD and ESRD compared to the control group, it can be preferred. that determining the concentrations of Hcy and lipids as well as dietary and drug treatment in the initial stages of CKD would



significantly affect the prevention of the development of pre-mature atherosclerotic vascular processes (coronary, cerebral and peripheral arteries)

*Keywords:* Homocysteine, lipid profile, pre terminal and terminal chronic kidney disease.

# OUR EXPERIENCE ON CARDIAC RESEARCH: EXERCISE VS CARDIOVASCULAR DISEASE

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## **Abstract**

**Introduction:** The benefits of moderate exercise are extensively demonstrated, but current evidence supports that strenuous exercise increases the risk of atrial fibrillation and ventricular arrhythmias, and accelerates vascular aging (our own results suggest). Unfortunately, limitations of human studies and available animal models hamper research and its transferability in the field. Novel techniques are warranted. Ex vivo multicellular preparations may overcome many of these limitations. Specifically, living myocardial slices (LMS), ultrathin sections of heart tissue with preserved cellular properties, extracellular matrix, and structural architecture, are attracting increasing interest in the cardiac research field.

**Objectives:** To develop a human LMS-based ex vivo model to recapitulate the myocardial remodeling occurring after exercise. Secondary objectives will be to test the effect of moderate and strenuous exercise intensities in different cardiac chambers and to identify potential therapeutic targets.

**Methodology:** In previous work of the group, animal models were the mainstream of experimental research. The upstream methodology will be based on Living Myocardial Slices.

Slices will be produced using a vibrating microtome from the rat's heart. Each slice will be cultured within biomimetic electro-

mechanical chambers filled with culture media, in an incubator at 37°C. Different pattern interventions will be made through electro-mechanical stimulations (HR and preload) and through culture media, to mimic exercise like conditions (inflammatory “plasma”). Remodeling will be compared between exercise intensities, different cardiac chambers and both sexes, and after therapeutic interventions with anti-inflammatory/anti-oxidative drugs. When the model is fine-tuned we will switch to human heart samples.

Anticipated results: Our approach will enable many applications for translational research including the study of remodeling for basic insight into mechanisms of disease, exercise induced remodeling specifically and the testing of new therapeutics and preventive approaches.

# OBESITY, THE BURDEN OF 21ST CENTURY

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## **Abstract**

**Introduction:** Obesity is a complex multifactorial disease that accumulated excess body fat leads to negative effects on health. In 1985, less than 15 percent of Americans were obese. By 2014, that number more than doubled to 38 percent of adults. Worldwide, around 2.3 billion adults are considered to be overweight (body mass index (BMI) between 25 and 30 kg/m<sup>2</sup>) and 700 million, obese (BMI  $\geq$  30 kg/m<sup>2</sup>). As far as science tells us, still we don't know how much obesity is due to a lack of willpower? How much is genetic? How much is due to our environment? The latest scientific data suggest that even in an "obesity promoting genome", with healthy eating habits and active lifestyle, weight control is possible.

**Pathophysiology:** Obesity is the result of an imbalance between energy obtained from food and energy expended. It is a disease of a set point. The disruption of homeostasis of the hypothalamic center for hunger and satiety is the main culprit. Highly processed foods and obesity promoting genes increase the set point but rewarding dopaminergic pathways play a big role. It is well documented that eating high carbohydrate meals increases the activity of the dopaminergic system in the brain, and insulin spike-despike movements, both making the unhealthy foods more pleasing and more desirable, that would end with overeating.

Consequences: Studies show that obesity not only increases the risk of diabetes type 2, cardiovascular disease and cancer, subsequently increasing the all-time mortality rate.

Treatment plan: Prevention should be the primary target. Treating already obese patients is a challenge. A healthy diet plan and physical activity is a recommendation. Bariatric surgery was documented helpful. The latest treatment with GLP-1 agonists seems promising, but side effects such as muscle loss during weight loss seems to be concerning.

*Keywords:* obesity, sedentary lifestyle, anti-obesity agents, quality of life.

# **NURSING CARE AWARENESS AND COMPLICATIONS OF IMMOBILIZATION WITH CASTS**

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## **Abstract**

Fractures are common injuries that can affect anyone at any age. Nowadays, with the advancement of technology, there has been an increase in traumatic injuries. Immobilization with casts is the most common procedure used in the treatment of fractures. If not applied correctly, it can be associated with various complications, increasing morbidity and hospitalization.

## **Objective of the Study**

1. Evaluation of the proper indication for the application of casts based on their benefits.
2. Understanding the complications associated with immobilization with casts.
3. The role of nursing care in preventing early detection of complications from immobilization with casts.

**Materials and Study Method:** Our study is a retrospective study conducted in the time period from January 2021 to August 2023. A total of 168 complications of varying degrees were considered. Among these patients, 110 were males and 58 females, with the oldest being 82 years old, the youngest 3 years old, and an average age of 36.8. The most common complications were pain (72%), itching (40%), burning sensation (38%), and swelling (30%) inside the cast.

The most severe complication accompanying cast treatment is compartment syndrome, fortunately, with no reported cases.

Conclusion: Experience and practice gained in the orthopedic traumatology service are crucial for the successful application of casts as conservative treatment for fractures. Careful observation of patients who have been casted helps in the early assessment of complications and the avoidance of problems that may accompany them.

*Keywords:* fracture, complication, nurse, cast, prevention.

# EFFICIENT ANESTHESIA: NAVIGATING LOW-FLOW TECHNIQUES

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## **Abstract**

We investigated the effect of Nitrous Oxide (N<sub>2</sub>O) on controlled hypotension in low-flow isoflurane- fentanyl anesthesia in terms of hemodynamics, anesthetic consumption, and costs.

**Methods:** We allocated forty patients randomly into two equal groups. Then maintained fentanyl infusion (0.1 µg.kg<sup>-1</sup>.min<sup>-1</sup>) for 10 minutes. Next, we continued it until the last 30 minutes of the operation at a dose of 0.7 µg.kg<sup>-1</sup>.hour<sup>-1</sup>. We administered thiopental (4-6 mg. kg<sup>-1</sup>) and 0.08-0.12 mg.kg<sup>-1</sup> rocuronium bromide at induction for both groups. We used isoflurane (2%) for anesthesia maintenance. Group B received a 50% O<sub>2</sub> -N<sub>2</sub> O mixture and Group A received 50% O<sub>2</sub> -air mixture as carrier gas. We started low-flow anesthesia (1 L.min<sup>-1</sup>) after a 10-minute period of initial high flow (4.4 L.min<sup>-1</sup>). We recorded values for blood pressure, heart rate, peripheral O<sub>2</sub> saturation, inspiratory isoflurane, expiratory isoflurane, inspiratory O<sub>2</sub> , expiratory O<sub>2</sub> , inspiratory N<sub>2</sub> O, expiratory N<sub>2</sub> O, inspiratory CO<sub>2</sub> , CO<sub>2</sub> concentration after expiration, Minimum Alveolar Concentration. In addition, we determined the total consumption rate of fentanyl, fentanyl and isoflurane as well as bleeding.

**Results:** In each group the heart rate decreased after fentanyl loading. After intubation, values were higher for Group A at one, three, five, 10, and 15 minutes. After intubation, the patients reached desired



hypotension values at minute five for Group B and at minute 20 for Group A. MAC values were higher for Group B at minute one, three, five, 10, and 15 ( $p < 0.05$ ). FiO<sub>2</sub> values were high between minute five and 60 for Group A, while at minute 90 Group B values were higher ( $p < 0.05$ ). Iso (inspiratuvar isofluran) values were lower in Group B at minute 15 and 30 ( $p < 0.05$ ).

**Conclusion:** Our conclusion seems succinct and to the point. It outlines the benefits of using fentanyl instead of nitrous oxide in low flow isoflurane anesthesia. We've highlighted achieving desired mean arterial pressure (MAP) levels, sufficient anesthesia depth, hemodynamic stability, and safe inspiration parameters as the outcomes of this approach. This suggests that the use of fentanyl offers advantages in maintaining the patient's physiological parameters and ensuring a safe anesthetic experience.

*Keywords:* Nitrous Oxide, MAC, rocuronium bromide, MAP levels.

# **PREVALENCE OF PEPTIC ULCER IN THE DISTRICT OF ELBASAN IN THE PERIOD JANUARY 2023- DECEMBER 2023**

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## **Abstract**

**Introduction:** Peptic ulcers are lesions of the gastrointestinal mucosa that deepen beyond the "muscularis mucosae" layer, dependent on the acid-peptic activity of gastric fluid. It usually occurs in the stomach and proximal duodenum. This pathology is relatively common in the world. Ulcers are usually chronic and recurrent.

**Aim:** The aim of this study is the evaluation and reflection of the prevalence of peptic ulcer in the district of Elbasan for the period January 2023- December 2023.

**Methodology:** This is a descriptive study. The material and data were collected from the physical registry at the Center for Digestive Endoscopic Examinations at the Regional Hospital "Xhaferr Kongoli" Elbasan.

**Results:** During this period, a total of 79 patients with peptic ulcer were diagnosed, of which 70% were diagnosed with duodenal ulcer and only 30% with gastric ulcer. The most affected age group was 60-69 years old (32%) and the gender with the highest predominance belongs to men with 70%. The most frequent symptoms presented by

the affected people were epigastric colic (43%), melena (34%), and hematemesis (11%). Only 3% of patients diagnosed with this pathology had retrosternal burning as a primary symptom. 58% of cases were hospitalized. Most of them were not affected by complications, only 14% had stenosis as a complication, and in 3% of the presented cases, biopsy material was taken due to malignant transformation.

**Conclusions & Recommendations:** Based on the results of the current work and the negative effects on health and quality of life, it is proposed for health care providers to pay more attention to the assessment of these patients. The importance should be given to information in order to take appropriate measures for the prevention and diagnosis of ulcers as early as possible. The study should be followed by other studies that last longer in time and in a larger sample.

*Keywords:* hematemesis, melena, peptic ulcer, prevalence.

# ANTENATAL CARE

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## **Abstract**

**Introduction:** Antenatal or perinatal care includes medical checks and examinations of pregnant women during the pregnancy period, but in a broader sense it also includes the follow-up of patients before conception as well as after birth (the puerperium period).

During pregnancy, ultrasound examinations are usually carried out approximately once a month, but there are four important checks that give us the right data and are sufficient for those pregnancies that are considered normal and non-pathological.

In our country, medical checks of antenatal care are divided into those of primary medicine, namely maternal and secondary and tertiary medical care, which includes hospitals to which patients are instructed to perform more detailed examinations.

**Purpose:** With the help of these examinations, it is possible to monitor the progress of the pregnancy, to detect defects, diseases and threatening conditions for the mother and the child, to prevent and treat a number of phenomena with a negative impact, to plan the optimal time and way of birth and pregnant women are offered information and support to make the right decisions.

**Method:** Prenatal follow-up includes taking microbiological smears, measuring weight, blood pressure, glycemia, laboratory tests of blood and urine, determination of blood group and Rh-factor, serological analysis of seats and determination of antibodies for specific

infections, ultrasound and anomaly detection. There are four main ultrasound examinations:

- At the beginning of the first trimester, through ultrasound, the age of the pregnancy is assessed based on the last menstrual cycle, the number of embryos, the positioning of the pregnancy (in the uterus or outside), the presence of the heartbeat; this also includes the information offered to the pregnant woman regarding the controls, progress, possible disorders, diet and supplements during pregnancy, etc.
- The 1st trimester (at week 11-14) is the time to screen for fetal abnormalities. With this non-invasive method, which consists of ultrasound and biochemical data, it is intended to single out the group of pregnant women who have a higher risk of being affected by certain anomalies, such as Trisomy 18, 13 and 21, Turner's Sy, neural tube defects (spina bifida and anencephaly), or abdominal wall closure defects. With ultrasound, fetal biometry is performed and measurement of nuchal translucency -NT, which is defined as the accumulation of liquid in the neck of the fetus. The presence of the nasal bone - NB and the Doppler of the ductus venosus - DV are also taken into account. NT increases in fetuses with cardiac defects and chromosomal abnormalities. In 85% of cases, fetuses with trisomy 21 and aneuploidy are detected. The maximum value of NT should be 2.5 mm; that is that the risk for Sy Down is great if the value is 2.5 and above. The other method is biochemical -PRISCA (Prenatal Risk Calculation software), which is done through taking the mother's blood in which the level of hormones is measured: double marker test or Prisca 1, (between weeks 10-14) and triple test or Prisca 2 (between week 15-20) for those women who did not benefit from the double test. In Prisca 1, the level of two hormones in the mother is evaluated: free beta hCG (human chorionic gonadotropin), which if high, there is a high risk for Trisomy 18, and PAPP-A (pregnancy associated plasma protein-A), which if it is low, the chances are higher for Down Sy. With Prisca 2, the level of three hormones in mother's blood is

determined: AFP (alpha-fetoprotein), the high level of which is associated with neural tube defects, while the low level is associated with Down Sy or multiple pregnancy; hCG - the increase of which can be a signal for the presence of Sy Down; and the third parameter is unconjugated estriol (UE) - a decreased level of which increases the risk for Trisomy 21. In the quadruple screen test, Inhibin-A is also included, the increase of which gives a high risk for Down Sy. The ultrasound and biochemical data should always be combined with the data of other factors, such as the age, weight, ethnicity of the pregnant woman, etc. It should also be mentioned that these ultrasound and biochemical markers are indicators of an increased probability for the detection of these syndromes and possible anomalies, but they do not serve to establish the final diagnosis. If the screening is positive, to confirm the diagnosis, invasive intervention with cordocentesis, chorionic villus biopsy or amniocentesis -AC is necessary.

- The 2nd trimester (between weeks 20-22), the growth of the fetus is followed by ultrasound and the anatomy in a more detailed way, the morphology of the organs and tissues is seen. It also excludes the possibility of various anomalies, such as Down syndrome, the placenta and its insertion, the umbilical cord and the length of the cervix are analyzed. If the screening is suspicious, amniocentesis is recommended (taking amniotic fluid with a needle, under continuous ultrasound control), through this 99% of some chromosomal disorders such as Down, Turner and Klinefelter are detected. Many genetic disorders can also be detected, such as cystic fibrosis.

- The 3rd trimester is the part where the development and proportional growth of the fetus is followed, the dopplers of the different arteries in the mother and the fetus are performed, the maturity of the placenta and the amount of amniotic fluid are evaluated. After the 34th week, cardiotocography - CTG is performed, which records the fetal heart rate and the intensity and duration of uterine contractions. Non-stress test is a non-invasive method that is used in the third trimester, applying oxytocin infusion

in order to cause uterine contractions and at the same time to evidence the fetal reaction to such a situation. Conclusion: all pregnant women who use the follow-up of their pregnancy through the methods of medically determined norms, have a lower rate of morbidity and mortality, progress and a more positive outcome compared to those who do not use them or do not have access to these medical services.

*Keywords:* prenatal care, screening, fetal well-being.

# THE CONSERVATIVE THERAPY AND ASSISTED REPRODUCTION TECHNOLOGY IN THE TREATMENT OF MALE INFERTILITY

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## **Abstract**

The aim of this research was to investigate the treatment of male infertility through assisted reproduction technology (ART) and conservative therapy, amidst the backdrop of a global rise in infertility rates. The increasing prevalence of infertility among couples worldwide has raised significant concerns regarding its etiology and the efficacy of available treatments. Since the groundbreaking discovery of in vitro fertilization (IVF) in 1968, followed by the historic birth of Louise Brown in 1978, the landscape of reproductive medicine has undergone profound transformation. Over the past decades, IVF has emerged as a cornerstone of assisted reproduction, with over 8 million babies born worldwide through this technology. In the United States alone, the utilization of ART continues to rise steadily, with 86,146 infants born through ART in 2021, representing 2.3% of total births. Notably, a higher proportion of infants conceived through ART were multiples (twins, triplets, or more), with approximately 12.5% of ART-conceived infants being multiples, compared to 3.2% of the general population. Furthermore,



infants conceived through ART exhibited a higher incidence of low birth weight (14.7%) and preterm birth (19.7%) compared to the general population (8.5% and 10.5%, respectively), underscoring the importance of ongoing research into optimizing ART protocols and outcomes (CDC, 2021). This research aims to contribute to our understanding of the evolving landscape of infertility treatment, exploring both ART and conservative therapies, with the ultimate goal of improving reproductive health outcomes for individuals and couples facing infertility challenges.

*Keywords:* Assisted Reproduction Technology, In Vitro Fertilisation, male infertility, conservative therapy, global rise in infertility rates.

# UNDERSTANDING AND MANAGING STRESS AMONG MEDICAL SCIENCE STUDENTS

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## **Abstract**

According to WHO (World Health Organization): “Stress can be defined as a state of worry or mental tension caused by a difficult situation.”. Even though the consequences that come from stress can be various, starting from frequent headaches, anxiety, problems with increasing body weight, and continuing with the appearance of many other chronic diseases in the cardiovascular, immune and digestive systems, in present-day life stress is unavoidable.

Since we cannot completely remove it, it is important to find ways to understand and manage it.

For this reason, a large number of scientists have researched in this direction. Knowing that stress occurs in all age groups for different reasons, stress research is a very broad field. Trying to define the field of research more precisely, we focused on the stress that appears among the 18-25 age group, in particular students. The students of the Faculty of Medical Sciences were taken as a case study in this research. A questionnaire addressed to students of all study programs offered by this faculty attempted to determine the level of stress among them, the causes and methods of stress management. The purpose of this research was to understand what steps should be taken by the university to help students in their well-being and achieve better academic results.

*Keywords:* Stress, students, Medical Science, academic life, stress management.

# THE RELATIONSHIP BETWEEN COGNITIVE DEFICITS AND CLINICAL CHARACTERISTICS IN PATIENTS WITH SCHIZOPHRENIA

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## **Abstract**

**Introduction:** Schizophrenia is an endogenous psychotic disorder with a chronic course, which is characterized by dysfunction in multiple domains: perceptions, thinking, emotions and cognition.

**Objective:** The main aim of the study was to introduce the relationship between clinical characteristics and cognitive deficits in patients with schizophrenia.

**Methods:** The research involved 53 randomly selected male and female respondents from 18 to 60 years of age, who suffer from schizophrenia according to the diagnostic criteria of the International Classification of Diseases – ICD 10 acute schizophrenia treated in the Psychiatric Hospital Skopje-Skopje. We used the following measuring instruments: the Positive and Negative Syndrome Scale (PANSS) and the Schizophrenia Cognition Rating Scale (SCoRS).

**Results:** The results indicated that the acute schizophrenic patients had higher rating scores in the SCoRS assessment ( $M=45.736$ ,  $SD=8.908$ ) in the first week after psychosis onset. A high degree of positive and negative symptoms was a strong predictor of higher cognitive deficits in patients with schizophrenia. The positive relationship was observed between the PANSS-Positive and SCoRS level ( $F(53)=0.559$ ,  $sig.=.001$ ,  $p<.01$ ). At the same time a positive

relationship was observed between the PANSS-Negative and ScoRS level ( $F(53)=0.283$  sig.=.001,  $p<.01$ ).

**Conclusions:** In the course of our longitudinal prospective study, we found that clinical characteristics of schizophrenia had a great impact on cognitive dysfunction, whereby this is evident in the acute phase of the disease.

*Keyword:* cognitive deficit, positive symptoms, negative symptoms, schizophrenia, treatment.

# **PEDIATRIC CASE PRESENTATION: PANHYPOPITUITARISM CO- OCCURRENCE IN EARLY CHILDHOOD - A CASE OF MULTISYSTEMIC SYNDROMES MANIFESTATION**

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## **Abstract**

Panhypopituitarism is a rare condition characterized by deficiency of all anterior pituitary hormones. Its occurrence in early childhood often presents with diverse clinical manifestations affecting growth, development, and metabolism.

We present a case of a 5-year-old child with panhypopituitarism diagnosed in early childhood. The patient exhibited multisystemic symptoms including growth failure, delayed developmental milestones, hypoglycemia, and recurrent infections. Further investigations revealed underlying etiology and associated syndromic features.

The patient underwent comprehensive endocrine evaluation, imaging studies, confirming the diagnosis of panhypopituitarism. Hormone replacement therapy was initiated, and the child showed improvement in growth parameters and overall clinical status.

This case highlights the diagnostic challenges and management strategies in early childhood panhypopituitarism, emphasizing the

importance of a multidisciplinary approach involving pediatrics, endocrinologists and other specialists for optimal patient care.

Keywords: Panhypopituitarism, Multisystemic, Hypoglycemia, Growth, Multidisciplinary.

# **RECTUM METASTASIS - SECONDARY DEPOSIT FROM PULMONARY CARCINOMA**

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## **Abstract**

Rectum metastasis like a secondary deposit after primary pulmonary carcinoma have a dissemination in rectum approximately a 3% of diagnostic cases, in our study we have examine group of 8 patient, 5 male and 3 female in period of time March 2021 to March 2024

After diagnostic examination we verified a stadium of carcinoma IIIa, immediately started with induction therapy, after III cycles of chemotherapy, in examination we found a significant reduce of metastatic changes in the rectum, only in 2 patients make a operation treatment with resection of part of rectum and made a terminal anastomosis and all of patient treated for primal lung carcinoma with surgery and 2 of them with lobectomy and 1 with lobectomy and 3 of patients are treated only with chemotherapy in clinic complex Mother Theresa in Skopje.

After analyses of data from our group of patient we have made a conclusion that patient with primary lung carcinoma with metastatic changes in rectum who are in size less a 5 cm without changes in local lymphatic nodes are indicated to approved a induction therapy before a surgery treatment and have best chance to have minimal surgery and good quality of life.

*Keywords:* metastasis, rectum, chemotherapy, surgery.

# **THE LEVEL OF KNOWLEDGE OF THE STUDENTS OF "ALEKSANDËR XHUVANI" ELBASAN UNIVERSITY, ON THE RISK FACTORS AND THE PRACTICE OF SELF-EXAMINATION FOR THE EARLY DETECTION OF BREAST CANCER**

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## **Abstract**

Breast cancer is a worldwide concern that has a significant impact on women's health. Today, breast cancer accounts for 1 in 8 cancer diagnoses, representing a quarter of all cancer cases in women.

Objective: Identifying the level of knowledge of the students of "Aleksander Xhuvani" Elbasan University on risk factors and the practice of breast cancer screening methods.

Methodology: The study is cross-sectional. The questionnaire was self-structured based on similar studies and distributed online. The sample included in the study is random. The questionnaire included socio-demographic questions, questions on risk factors and questions about BSE as one of the breast cancer screening methods.

Results: The number of students included in the study is 369, whose age ranges from 18-44 years. The vast majority of the students included in the study belonged to the Faculty of Technical Medical



Sciences. It turns out that 97.4% of the students had information about breast cancer, where the main source of information for them was university studies (64.2%). Only 33.1% performed breast self-examination, where the family history of breast cancer, having sufficient information and being a student of FSHMT were the factors related to self-examination. The study shows that students have satisfactory information on risk factors.

**Conclusion:** Most of the students included in this study did not have information on the benefits, time and method of performing breast self-examination, therefore there is a need to hold informative meetings in the auditorium, by specialists in the field.

*Keywords:* breast cancer, knowledge, self-examination, student.

# **THE PREVALENCE OF INFLAMMATORY BOWEL DISEASES IN THE REGION OF GOSTIVAR DURING THE PERIOD OF 2018-2022**

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## **Abstract**

Lifestyle, especially nutrition, has changed over the centuries, tending to the consumption of fast foods, unhealthy lifestyles that increase the risk of many different diseases. This is expressed by the high incidence and prevalence of many chronic and acute diseases, which in different populations around the world are of different degrees. Nowadays, cardiovascular diseases and diabetes are the first diseases that have a high mortality rate, while inflammatory diseases of the gastrointestinal tract cannot be overlooked, which occupy the third place in terms of mortality rate. The aim of this paper consists in describing the pathology of inflammatory bowel diseases, presenting statistical data for cases with inflammatory bowel diseases in the region of Gostivar, in the 5-year period from 2018 to 2022. The main objectives of this paper is the identification of cases with two main inflammatory bowel diseases: ulcerative colitis and Crohn's disease, pathological description, determination of prevalence, etiology, clinical diagnosis and drug treatment of these disorders, incidence of these disorders by gender and age groups affected by ulcerative colitis and Crohn's disease.

From the total number of 376 examined patients, for the period of 5 years, from 2018 to 2022, sick with inflammatory bowel diseases were of age 15-82.

In the population included in the research, we can conclude from the data analysis in the 5-year period, according to gender, men have a higher prevalence of inflammatory bowel disease (one of the factors may be smoking), while it belongs to age. group is the age group from 31 to 50 years old.

Regarding the form of inflammatory bowel disease, in the population included in the research, 44% of patients were diagnosed with ulcerative colitis, compared to 23% of patients with Crohn's disease.

*Keywords:* prevalence, inflammatory bowel diseases, Crohn's disease, ulcerative colitis.

# **RATIONAL AND IRRATIONAL USE OF ANTIDEPRESSANTS IN THE REGION OF TETOVO**

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## **Abstract**

The main purpose of this study is to analyze and evaluate the attitudes and practices of using antidepressants, herbal products for the treatment of depression, as well as raising awareness about the use of antidepressants among respondents in Tetovo and the surrounding area. The target population randomly selected for the study were females and males aged 18 to 57 years.

The study was conducted through the survey process with the Google Questionnaire platform.

The vast majority of respondents used antidepressant with a doctor's recommendation with a figure of 71%, where the majority of antidepressant users were female, while 29% used antidepressant without a doctor's recommendation.

Pharmaceutical preparations most often used benzodiazepines for the treatment of depression which since these results as a recommendation should be taken to raise awareness of the population for the treatment of depression and not only for its simultaneous treatment.

Regarding the period of use of antidepressants without a doctor's recommendation according to the patient's need is very large from the

study done and measures should be taken to raise awareness among the population not to use at all without a doctor's recommendation and if used follow the instructions given by the doctor.

The number of users of herbal products is very small and disturbing as most individuals choose to use benzodiazepines to manage their distressing symptoms and from this we can recommend raising awareness by pharmacists to patients when purchasing products and making a clarification on the use of herbal products as an alternative.

From the study, the majority of respondents think that the use of antidepressants as needed has been effective and that they are aware of the side effects of use, which should result in a massive awareness of the population including doctors, pharmacists and patients about the use of antidepressants.

*Keywords:* rational,irrational,antidepressants,side effects.

# **ROCURONIUM BROMIDE – ESMERON**

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## **Abstract**

High doses of neuromuscular-blocking agents were associated with an increased risk of postoperative respiratory complications compared with low. Neostigmine was associated with a dose-dependent increase in the risk of postoperative respiratory complications. Post hoc analysis revealed that appropriate neostigmine reversal eliminated the dose-dependent association between neuromuscular-blocking agents and respiratory complications.

Methods: The use of neuromuscular-blocking agents was dose dependently associated with increased risk of postoperative respiratory complications. Neostigmine reversal was also associated with a dose-dependent increase in the risk of respiratory complications. However, the exploratory data analysis suggests that the proper use of neostigmine guided by neuromuscular transmission monitoring results can help eliminate postoperative respiratory complications associated with the use of neuromuscular-blocking agents. Reduced doses of rocuronium should be used in newborns and small infants.

Result: Duration of action increases with repeated administration of neuromuscular-blocking agents, and intraoperative use of high doses of neuromuscular-blocking agent may affect respiratory safety.

In a hospital-based registry study between January 2022 until June 2022 on 70 patients that I have worked with who received intermediate-acting neuromuscular-blocking agents, I have tested the

primary hypothesis that neuromuscular-blocking agents are dose dependently associated with the risk of postoperative respiratory complications. Also I have evaluated the association between neostigmine dose given for reversal of neuromuscular-blocking agents and respiratory complications. Post hoc, I have evaluated the effects of appropriate neostigmine reversal on respiratory complications.

**Conclusion:** Based on your study, it appears that there is a significant relationship between the dosage of neuromuscular-blocking agents administered during surgery and the risk of postoperative respiratory complications. Overall, these results underscore the importance of careful dosing and monitoring of neuromuscular-blocking agents during surgery to minimize the risk of postoperative respiratory issues. Further research and clinical guidelines may be warranted to refine dosing protocols and optimize patient safety in this regard.

*Keywords:* neuromuscular-blocking, neostigmine, rocuronium.

# THE EFFECTS OF COVID-19 ON MEDICAL EDUCATION: A SURVEY OF THE STUDENTS' PERSPECTIVE

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## Abstract

The study was based on a google questionnaire for the analysis of the effects of COVID 19 on medical education. Part of this study were 112 participants from the Faculty of Medicine in the University of Tetovo. The questionnaire was developed in Albanian languages. The response format included multiple choice questions in which the participants were asked to choose the most reasonable answer for them on the given list of options. 62% of the participants have attended online lectures before the pandemic, 38% didn't attend online lectures before. Only 3% were not given the chance to ask questions during the online lectures, while 96% were given the chance to. 74% of the participants said that the material given before and after the lectures was helpful, while 26% said that it wasn't helpful. 15% of the participants rated their interaction with the professors during e classes better than physical classes, 30% rated it as good as the physical classes and 55% rated it as as physical classes are better than e-classes. Majority of the students with a percentage of 72 rated physical classes as more efficient than e-classes, 23% rate it as e-classes are as good as physical classes and the rest of the 5% of them rate the e-classes as better than the physical classes.

*Keywords:* COVID-19, Pandemics, medical education, studies, online learning, conventional learning.



# AESTHETIC SURGERY OF THE ABDOMINAL WALL - CASE REPORT

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## Abstract

Abdominoplasty, commonly known as a tummy tuck, is a surgical procedure aimed at enhancing the aesthetic appearance of the abdominal wall. It involves the removal of excess skin and fat, as well as tightening of the abdominal muscles to create a smoother and firmer contour. The standard abdominoplasty is one of the many techniques used for the abdominal aesthetic surgery. This procedure, which consists of dermolipectomy, is effective in restoring the abdomen to its youthful shape in most patients. The same procedure was used in the clinical case presented. The abdominoplasty procedure needs to be tailored to the trunk anatomy and to the aesthetic goals. Those with a small amount of infraumbilical protuberance without excess skin may be treated with endoscopic muscle plication and abdominal liposuction. After the patient had undergone gastric bypass surgery and had lost weight, and the patient could not remove the excess skin in the abdomen through exercises even after many interventions that the patient has done, where the skin was excessive and painful from the weight loss, she requested that an abdominoplasty be performed. After the procedures and analyzes of the medical professionals, they could perform the operation where the excess fat and skin will be removed and the weekend connections were restored to create a softer and more aesthetic abdominal profile. The patient recovered well with excellent results from the intervention.

*Keywords:* Abdominoplasty, Liposuction, Body Countouring, Abdominal etching.

# PLACENTA ACCRETA: A CASE REPORT AND REVIEW

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## **Abstract**

Placenta accreta is a general term used to describe pathologic adherence of the placenta into the myometrium, with an estimated incidence of 1:1000 deliveries with a reported range from 0.04% rising up to 0.9% (1). Placenta previa is presented secondary to an abnormal placentation near or covering the internal cervical os. 5–10% of women with placenta previa have placenta accreta. Both placenta accreta and placenta previa are severe pregnancy complications and are currently the most common indications for peripartum bleeding, hysterectomy and preterm delivery, are most commonly associated with previous cesarean delivery, uterine surgery or trauma. (2). Early detection and prompt intervention with a multidisciplinary team and delivery at a center with adequate resources, including massive transfusion are essential to reduce neonatal and maternal morbidity and mortality.

Case report A 30-year-old woman, gravida 3, para 2, at 38 weeks of gestation period, presented to the department of Gynecology and Obstetrics, complaining of abdominal pain and vaginal bleeding. The ultrasound revealed a healthy fetus and a placenta with a low insertion. A transvaginal ultrasound was performed and a placenta that covers all the cervical opening was diagnosed (Placenta previa totalis). No uterine contractions were found on the cardiotocogram. The patient was hemodynamically stable with a mild anemia, and

admitted to our department for observation and a blood transfusion was required. Because of persistent bleeding an urgent cesarean delivery was performed, followed with a massive postpartum bleeding, a hysterectomy and blood transfusion were required, the patient was transferred to the intensive care unit for monitoring and treatment.

*Keywords:* Placenta accreta, Peripartum hysterectomy, Previous Cesarean section, Placenta previa.

# **BIOCHEMICAL MARKERS IN THE FIRST TRIMESTER SCREENING FOR FETAL CHROMOSOME ABNORMALITIES**

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## **Abstract**

Every pregnant patient has a risk of carrying a fetus with chromosomal abnormality. Early antenatal recognition of pregnancy with high risk for aneuploidy, including biochemical markers in the first trimester of pregnancy, contributes in screening of chromosomal abnormalities and reducing the need for invasive testing. The aim of our study is to evaluate the importance of using biochemical markers during the first trimester of pregnancy for screening of the chromosomal abnormalities. We made a comprehensive search on key databases including GoogleScholar and PubMed for articles related to this topic. Screening in the first trimester of pregnancy is combined by maternal age, ultrasound measurements with assessment of biochemical markers. PAPP-A (pregnancy associated plasma protein A) and  $\beta$ -HGC (free beta human chorionic gonadotropin) which depends on gestational age, smoking, maternal weight, method of conception and ethnicity, are part of guidelines recommended markers when screening for trisomies, because they show different patterns of up or down regulation in the three common trisomies, which provides individualized risk assessment for each of these trisomies. Also, we found that a lot of studies demonstrated low maternal concentrations of PIGF in common trisomies, a marker that

is used for screening of preeclampsia. These biochemical markers are often abnormal in fetal trisomies and the mechanisms leading to abnormal maternal serum levels of such markers are still debated, but their determination is recommended for prenatal screening and pregnancy follow-up.

*Keywords:* screening, pregnancy, biochemical markers.

# **EXSANGUINOTRANSFUSION - CASE REPORT**

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## **Abstract**

**INTRODUCTION:** Double Volume exchange transfusion(DVET), is an intervention that is used for treatment of hyperbilirubinemia and hemolytic disease in neonates when phototherapy is not effective to prevent kernicterus, to eliminate the sensitized erythrocytes and circulating antibodies of the mother in the blood of the newborn, to correct the anemia and other risks for heart failure to maintain euvolemia.

**CASE REPORT:** 29 years old mother with a second healthy and regularly controlled pregnancy without chronic diseases, 0 ,Rh positive blood type gave birth to a healthy full term newborn by vaginal delivery, 3420 gr, 50cm, apgar score 9/9 . First hours after birth the baby presented neonatal jaundice immediately was put intensive phototherapy. The TBS in the first 7 hours was 286, the baby's blood type was A positive with positive direct Coombs test , OA isoimmunisation with sensibilisation. After six hours of phototherapy total bilirubin in the serum was 290 and anemia Hb-120. Exsanguinotransfusion with "O"RH poz erythrocytes in "AB" plasma was performed. First hour post ET results showed decreasing TBS-201a and after six hours 160..139, increasing hemoglobin levels HB-138...157; Tr-Na-160...145; K-6.0..5.4; Ca-1.9..2.1; ph-7.24..7.29. The baby was treated with antibiotic therapy. Discharged after 5 in healthy condition on exclusive breastfeeding.

**CONCLUSION:** The aim of this study is to show that even though prenatal care is improved, all Rh –negative mothers receive RHOGAM, hyperbilirubinemia is very common in neonates and if not detected and treated in time can demand more invasive procedures like exsanguinotransfusion or can lead to kernicterus, permanent brain damage.

*Keywords:* hyperbilirubinemia, exsanguinotransfusion, TBS.

# **MORTALITY AND MORBIDITY IN LATE PREMATURE COMPARED TO TIMELY NEWBORNS**

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KAPUSHEVSKA, Kefser LUSJANI, Shpresa  
MUAREMOVSKA**

## **Abstract**

**INTRODUCTION:** Late prematures are newborns from the 34th week of pregnancy to the 36.6th week and make up the largest and growing percentage of prematures in general. Physiologically, they are less developed and have a limited compensatory response to the external environment compared to term newborns. In most cases, they are treated as term newborns.

**PURPOSE:** The purpose of this study is to compare mortality and morbidity between late preterm and term newborns, analyzed over a three-year period.

**METHODS:** A retrospective study of 11,966 live newborns was carried out, data obtained from the database in the neonatology department at SSGJO "Mother Teresa" Skopje in the period from 01.01.2020-31.12.2022.

**RESULTS:** Out of 11,966 newborns, 11,253 - 94.04% were born on time; late prematures are 698 - 5.83%.



	<b>Late-preterm</b>		<b>Term neonate</b>	
<b>Asphyxio livida</b>	35	5,01%	224	1,99%
<b>Asphyxio pallida</b>	12	1,71%	76	0,67%
<b>Infectio connatalis</b>	<b>153</b>	<b>21,915</b>	<b>1517</b>	<b>12,6%</b>
<b>RDS</b>	13	1,86%	6	0,05%
<b>Hyperbilirubinemia</b>	234	33,52 %	889	7,90%
<b>TTN</b>	103	14,75 %	300	2,66%
<b>Hypoglucemia</b>	102	14,61 %	87	0,72%
<b>Apnoe</b>	3	0,43%	2	0,017%

Conclusion: Late pretermes have a much higher risk of morbidity and mortality compared to term newborns. Long-term evaluation, monitoring and treatment of this at-risk subgroup is necessary.

*Keywords:* premature, mortality, morbidity.

# MINIMAL INVASIVE STRABISMUS SURGERY

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## **Abstract**

**Objective:** To describe the principles and various techniques of Minimal Invasive Strabismus Surgery (MISS). This term was coined for a strabismus surgery technique that minimizes tissue disruption. Instead of accessing the muscles through a large opening, with this technique the main surgical steps will be performed through a small opening in the conjunctiva.

**Materials and methods:** In this study, reports of the results of 324 consecutive operations with the MISS technique on the smooth muscles performed on 258 patients using only two small L-shaped openings were processed.

**Results:** On the first postoperative day, in the primary position, redness was barely visible in 129 eyes (50%) and only moderate redness was visible in 49 eyes (19%). No serious complications were registered. Preoperative visual acuity and refraction remained unchanged at 6 months ( $p > 0.1$ ).

**Discussion:** This study shows that minimal invasive smooth muscle surgery is feasible and effective in achieving orthophoria. This paper proved that the MISS technique is superior in the postoperative period due to minimal conjunctival swelling and no corneal complications were observed.

# **DECIPHERING THE MICROBIAL WORLD FOR FORENSIC INVESTIGATION- A SYSTEMATIC REVIEW AND META ANALYSIS**

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## **Abstract**

Forensic Microbiology, also known as the forensic of death or Microbial Forensics is an emerging branch of science that is widely used in the diagnosis of causes and manner of death, identification of individuals, detection of crime locations, and estimation of postmortem interval.

The aim of our review is to present significant achievements of selected studies on the thanatomicrobiome (microorganisms found in the body, organs and fluids after death) and epinecrotic community (microorganisms found on decaying corpses) and how these microorganisms combined with Forensic Entomology {forensic field that uses insects found on cadavers) can provide crucial information that can be used in forensic investigations. Change of species composition observed in each community is a valuable feature that gives a lot of information related to the crime and can form a “microbial clock” that is mainly used in the estimation of post-mortem interval (PMI). In other cases, such noticeable changes in the microbiome can determine the cause or the actual place of death.

Another approach of our study review is to present the applications of microbial forensics in protecting human health from acts of biocrime, bioterrorism, or biowarfare.

Although Microbial Forensics has been constrained by a lack of available and cost-effective sequencing of microbial samples, using different microbiological techniques combined with Metagenomic Sequencing nowadays, have enhanced and shown a promising turn in the development and usage of the microbial forensic toolkit for forensic identification.

*Keywords:* Forensic Microbiology, thanatomicrobiome, epinecrotic community, Forensic Entomology, Microbial clock, biocrime, bioterrorism, biowarfare, microbiological techniques, Metagenomic Sequencing.

# LABOUR INDUCTION

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## **Abstract**

Labour induction is a process used to stimulate or initiate uterine contractions and cervix dilations to start the childbirth process when it hasn't begun naturally. It can be recommended for various reasons, such as prolonged pregnancy, medical conditions or concern for the health of the mother or baby.

Common reasons to initiate a labour induction include:

- prolonged pregnancy, if a pregnancy extends beyond 42 weeks
- preterm rupture of membranes, if the amniotic sac ruptures before 37 weeks of gestation and labour does not begin on its own
- oligohydramnion or polyhydramnion, a condition characterized by low or high level of amniotic fluid
- preeclampsia or pregnancy induced hypertension
- foetal growth restriction
- gestational diabetes
- chorioamnionitis, an infection of the placental tissues and amniotic fluid
- foetal distress, if foetal monitoring indicates that the baby is experiencing distress
- maternal health conditions such as heart or kidney disease

Common techniques for labour induction include:

-medications, synthetic Oxytocin is the most common medication used to induce labour. It is administered through an IV drip and helps stimulate contractions

-membrane stripping also known as membrane sweeping, it involves a healthcare provider sweeping their fingers between the cervix and the amniotic sac to separate them slightly, which can trigger the release of natural prostaglandins and stimulate contractions

-Foley-catheter, a catheter with an inflatable balloon is inserted into the cervix to stimulate dilation and contractions

-amniotomy, also called breaking the water, this procedure involves intentionally rupturing the amniotic sac to release the amniotic fluid, which can stimulate labour to begin

-Prostaglandin medications, such as Misoprostol (Prostaglandin E1) or Dinopristone (Prostaglandin E2) are sometimes used to soften and ripen the cervix, which can help initiate labour. Oral Misoprostol is effective at inducing labour in late pregnancies. Compared with the Dinopristone applied intracervically is a cheap and heat stable synthetic Prostaglandin E1. In some countries Misoprostol is not licenced for purpose of inducing labour. Where is used, evidence suggests that an appropriate dose may be 25-50mcg.

Purpose: the purpose of the work was to identify how many of the total number of induced labour cases were in ending in spontaneous labour and how many by cesarean section.

Methods: the study included a total of 196 pregnant women of the age between 18-42 years. The work is prospectively carried out during the study of the data of the pregnant women, which has been collected from official documents, namely from the Evidence Protocols of the delivery room and the Department of the Obstetrics Pathology at the specialized hospital for obstetrics and gynecology. The method of induction was performed with Oxytocin infusion in 172 cases and Prostin vaginal applicators in 24 cases.

Result: from the analysis of the collected data, it has been proven that in the time interval January-May 2023 in this hospital, out of 196 patients induced to give birth, 129 births or about 66% ended in spontaneous birth, while 67 births or about 34% with cesarean section. Out of 129 inductions with spontaneous labour, 90 succeeded with one induction or ca. 69.77%.

*Keywords:* labour induction, oxytocin, prostaglandin.

# **APPROACH TO THE PATIENT WITH CLINICALLY AND BIOCHEMICALLY ACTIVE PRIMARY HYPERPARATHYROIDISM DESPITE NEGATIVE SESTAMIBI 99MTC**

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## **Abstract**

**Introduction:** Primary hyperparathyroidism (PHPT) resulting from increased parathyroid hormone (PTH) secretion. In 80% of cases the cause is a solitary adenoma. It occurs more often in women. The gold standard in the diagnosis of PHPT is MIBI 99m Tc scintigraphy. **Patient presentation.** A 35-year-old woman is referred to an outpatient clinic due to high values of PTH, calcium and frequent recurrent nephrolithiasis. From the laboratory analysis we show: PTH 317 pg/ml, Ionized calcium 1.71 (1.16 to 1.31 mmol/L); phosphates 0.73mmol/L; Vitamin D3 18.68 ng/ml. The patient is referred for neck ultrasound and bone densitometry (DEXA). A hypoechoic nodule with dimensions of 0.69x0.63x0.67 cm is visualized on ultrasound under the right lobe of the thyroid gland. In the DEXA scan, osteopenia is detected (T-score -2.2). Sestamibi scintigraphy was performed in two repetitions where no adenoma of the parathyroid gland was detected. The patient is referred for neck computed tomography (CT); a small nodule suspicious for



parathyroid adenoma is visualized. Due to the clinical manifestation and the constant high values of hypercalcemia, the patient is referred for parathyroidectomy. After the operation, a few days later, the values of PTH (63.5 pg/ml) and ionized calcium (1.18 mmol/L) were normal. Conclusion. Sestamibi scintigraphy is rarely negative during clear clinical and biochemical signs. The sensitivity of Sestamibi is 80-100%, and in cases where it is negative, especially when the volume of the nodule in PHPT is small, additional analyzes such as neck CT, 18FCholine PET/CT enable the decision-making of the definitive treatment – parathyroidectomy in PHPT.

# CATHETER ASSOCIATED URINARY TRACT INFECTION

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## **Abstract**

Urinary infections are among the most frequent nosocomial infections, not only in urology and intensive care wards, but also in most other wards, especially surgical ones where patients have to be catheterized for a longer time.

Aim of the study: to present the most frequent causes of urinary infections in patients admitted to the urology department of the Clinical Hospital of Tetovo in which the urinary catheter has been placed for a longer period of time.

Material and methods: this study was done in the urology department of the Clinical Hospital of Tetovo in the period June - December 2023. The study included 19 patients hospitalized in the department of urology, and operated on for various urinary pathologies. Urinary infection has been recorded in some patients as a result of their catheterization for a longer time. Samples for urine culture were taken from the urinary catheter through the injection after the urinary tube was well disinfected with 10% betadine solution.

Results: in the group of patients included in this study, 16 of them were men and three women. The age of the patients ranged from 34 to 79 years. Of the 19 patients with uro infections, 9 of them suffered from diabetes, while the other two had previously been treated with chemotherapy. Based on the results of the urine culture, the most frequent cause of urinary infections turns out to be the bacteria *E. coli*,

which was isolated in 13 cases, while other causes were the bacteria *S. aureus*, *Klebsiella* species, *Pseudomonas aeruginosa*, *Enterococcus* species. The treatment of the patients was done by giving antibiotics according to the antibiogram of the urine culture, frequent replacement of the urinary catheter and the administration of fluids.

Conclusion: urinary infections present serious problems in urology, intensive care and surgical departments where patients are catheterized for a long time. Since the bacteria isolated from urine cultures are similar in most patients in our study, it is estimated that some of these infections are nosocomial, especially since their eradication is difficult due to bacterial resistance to many antibiotics.

*Keywords:* urinary infections, urinary catheters, nosocomial.

# **OUR EXPERIENCE IN THE MANAGEMENT OF BLUNT ABDOMINAL TRAUMA**

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## **Abstract**

Blunt abdominal trauma is a frequent injury with a high rate of morbidity and mortality. The most frequent causes of these injuries are traffic accidents, falls from a height, martial sports, while among children the frequent causes are injuries from bicycles or scooters. In children up to 14 years of age, blunt lesions of the abdomen take second place after those of the head in terms of frequency.

**Aim of the study:** the purpose of this paper is to show our experience in the treatment of patients with blunt abdominal trauma, the correct and quick management of which is often a real challenge even for experienced surgeons.

**Material and methods:** the study included all patients initially treated in the emergency center of the Clinical Hospital of Tetovo, while some of them were transferred to the Surgery Department due to blunt abdominal injuries. The study covers the time period from January 2022 to January 2024. The important data for this study were extracted from the records of the treated patients.

**Results:** Most of the patients treated in the Emergency Center of the Clinical Hospital of Tetove due to various traumas have also been checked to exclude the possibility of abdominal traumas. After taking the anamnesis about how the injury happened, and about the patient's

main complaints, the physical examination was performed, as well as various laboratory and imaging examinations. If peristaltic sounds are not heard during auscultation, this is a sign that lesions of the abdominal organs may be present. Signs of circulatory disorders in the sense of hypotension and weak pulses can suggest any internal bleeding, even more often abdominal blunt trauma. If the X-ray of the pelvis shows bone fractures, the patient should be observed more carefully because there may be profuse bleeding, which is sometimes very difficult to manage. Most of the patients after a detailed check-up and if the laboratory analyzes and imaging examinations were within normal limits, they were discharged from the hospital with the instruction to come for a check-up in case of deterioration of their condition. Only some of them, due to their poor condition and changes in laboratory analysis or imaging results, were hospitalized and followed in our clinic. They were treated conservatively, while two of them were referred to the tertiary center due to serious lesions of multiple systems - polytraumas.

**Conclusion:** Blunt abdominal trauma presents serious emergent problems, the diagnosis and treatment of which requires a team approach, and they often are a real challenge even for experienced surgeons.

*Keywords:* blunt, abdominal, trauma.

# **COVID-19 INFECTIONS AFTER THE COVID-19 PANDEMIC**

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## **Abstract**

Although more than three years have passed since the covid pandemic, this infection continues to be present from time to time, especially during the periods of the flu epidemic, where it is often difficult to distinguish whether a patient is affected by the SARS virus or the influenza virus.

Aim of the study: COVID-19 and influenza have similar symptoms, therefore it is often difficult to distinguish between these two infections based only on clinical signs, respectively if a person with respiratory problems is infected with the virus of COVID-19 or influenza. Our experience in differentiating these infections will be the focus of this study

Material and methods: Patients with signs of viral infections of the respiratory tract and not only, treated during the last two years in the PHO - "Alba-Med" Diber, are included in this study. The necessary data for this study were obtained from the records of these patients.

Results: In our clinic during the last two years, 197 patients with signs of severe viral infections of the respiratory tract have been treated. The age of these patients ranged from 18 to 87 years, where most of them, namely 109, were over 50 years old. Of the 197 patients with severe respiratory viral infections, 103 of them were vaccinated against COVID-19 with two doses, while 52 patients, mostly over the

age of 55, were vaccinated against the seasonal flu. Forty-nine patients were simultaneously vaccinated against both COVID-19 and seasonal flu. In 29 patients, the concerns were more severe, and among other things, accompanied by a loss of taste and smell, which suggests that these patients were infected with the COVID-19 virus. The disease has been much more serious in elderly people over 65 years old, mainly because most of them have accompanying cardiovascular and respiratory diseases, or diabetes, etc. What is more important is the fact that there are people with such concerns even among those vaccinated twice against COVID-19.

**Conclusion:** Although more than three years have passed since the COVID-19 pandemic, this virus still remains active in our environment and sometimes causes serious infections even in vaccinated people.

*Keywords:* COVID-19, infection, vaccinated.

# **A CASE OF CRITICAL STENOSIS OF A CEREBRAL ARTERY FOLLOWED BY A SHORT-TERM ONSET OF DECEREBRATION MOVEMENTS**

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## **Abstract**

**Background:** Acute ischemic stroke (AIS) is high risk to patients' lives because of the urgency

of the condition. Multiple studies consistently cite that timely diagnosis and urgent medical treatment is of great importance for the patient's outcome and to be effective treatment delays should be reduced in hospital. The purpose of this case report is to summarize the experience of hospital management of a patient with acute neurological deterioration. **Material and methods:** On 05.03.2024, patient I.U. at the age of 67 who lost consciousness for an unspecified duration was brought by ambulance to an emergency center one hour after the appearance of complaints in the form of a short-term speech disorder (unintelligible speech) and tingling of the left arm and left leg. During the neurological examination, a somnolent state, left facial paresis and left-sided paralysis were found, i.e. NHHS scale 13. **Results:** Initial CT reveals a critical stenosis of the medial arteria cerebri on the right with a large thrombus present at the narrowing. Meanwhile, an indication for thrombolysis was established, but due to a sudden deterioration of the clinical picture with the appearance of decerebration movements, i.e. NHHS scale 22, the team of doctors, a neurologist and an interventional cardiologist, with the help of



mechanical removal of the thrombus, in the shortest possible time, saved the patient's life, but also her motor functions of the limbs, hemiplegia turned into hemiparesis. Conclusion: neurological disability calls for further optimization in the treatment beyond the interventional options.

*Keywords:* cerebral infarction, decerebration.

# **RISK FACTORS OF PRESSURE ULCERS AND THEIR TREATMENT**

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## **Abstract**

Pressure ulcers or decubitus are frequent problems in people with sensitivity disorders or those with prolonged immobility. These complications are mostly seen in elderly people and those with serious illnesses that prevent the patients' mobility.

Aim of the study: To show, based on our experience, the causes of pressure ulcers, the factors that increase the risk of pressure ulcers, the possibility of their prevention and the way of treatment of pressure ulcers.

Material and methods: The study included 32 patients with decubitus treated on an outpatient basis and in the surgery clinic of the Clinical Hospital of Tetove during the period March 2021 - March 2024. The data in the interest of this study were extracted from the records of patients treated in this clinic.

Results: Of the 32 patients included in the study, 19 of them were men and 13 were women. The age of the patients included in the study was from 54 to 83 years. The causes of decubitus were different, but in most of the patients the cause of ulcers was the immobilization of the patients due to cerebral hemorrhages, respectively in 17 of them. In 5 cases, the reason for the appearance of decubitus was fractures of the femur or pelvis, while in 10 other cases, diabetic neuropathy and pressure ulcers in the feet were the cause of these wounds. The place of localization of compressive ulcers, except in patients with diabetic

neuropathy, was the gluteal and sacral regions. Some of the factors that increase the risk of pressure ulcers are age over 65, mandatory bed rest, diabetic neuropathy, chronic diseases and those affecting immunity, radioactive radiation and chemotherapy, urinary and fecal incontinence, malnutrition, etc. The best way to ménage the pressure ulcers is the frequent control of people at risk, especially the body regions most at risk for the occurrence of pressure ulcers, such as bone prominences, the gluteal and sacral region, shoulders etc.

Treating decubitus is difficult and requires special care for the wound by regularly debriding it, refreshing its edges and removing all necrotic tissue. The wound should be rinsed regularly with disinfectant and physiological solutions. Today there are some good substances for the regeneration of wounds that enable a faster closure of pressure ulcers. However, maximum caution should be shown to people at risk and they should be educated in preventing the appearance of pressure ulcers.

Conclusion: Pressure ulcers are problems that are difficult to manage, and often require a long time to heal, or sometimes require plastic surgery to close the wounds. For this reason, special attention should be paid to persons at risk of these lesions in order to prevent their appearance.

*Keywords:* pressure ulcers, prevention, management, complication.

# **ROAD SAFETY AMONG ELDERLY DRIVERS, AN ISSUE OF PUBLIC HEALTH**

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## **Abstract**

Introduction/ Aim: Our society has gone through many changes over the years. This continuous dynamism is accompanied, among other things, by the aging of the population and rapid motorization. A combination of these two phenomena has led to the growth of a population category requiring special attention: elderly drivers. Elderly drivers are a vulnerable group to road accidents. Due to its complexity, this topic constitutes a fundamental public health problem. This review aims to identify and summarize the factors that expose elderly drivers to road accidents to find appropriate methods to reduce this health event.

Methodology: For this review, were used publications on PubMed, Medline, and Hinari, searched through the string [(older drivers OR elderly drivers) AND (car OR motor OR vehicle) AND (accidents OR crash) AND (risk factors OR determinants)]. Only English papers, published in 2014- 2024 were included. All the results were exported to Rayyan reference management software. After filtering them, the

duplications were removed and all the remaining papers were evaluated for their suitability based on titles and abstracts.

**Results:** The review included 13 suitable papers, conducted in the USA, England, Iran, France, Singapore, and Japan. According to the review, a significant percentage of elderly drivers have experienced at least one crash or near-crash event, ranging from 13% to 62.2%. The study also found that older drivers have a high risk of experiencing more severe crashes. The review identified several factors that can impair driving ability, including health issues such as dementia, vision problems, glaucoma, multi-morbidities, falling, and other disorders. It has also been demonstrated that multiple medications can cause road traffic crashes in older people. Additionally, the review highlighted that in some cases, elderly drivers are more responsible for crashes when they drive under the influence of alcohol.

**Conclusions:** Driving for older people is an important and complicated issue of public health. The decline in cognitive and physiological functions that worsen with age has created a need for preventive measures to optimize older drivers' ability to operate motor vehicles.

*Keywords:* Older drivers, public health, aging, factors, driving.

# **ARTERIAL HYPERTENSION IN THE YOUNG AGE GROUP, LONGITUDINAL RESEARCH FOR THE PERIOD JANUARY 2023 - JANUARY 2024**

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## **Abstract:**

Arterial hypertension (HAT) in young people in recent years is a frequent phenomenon and with its duration, harmful consequences may appear for their health. Uncontrolled and unbalanced HTA can cause damage to various organs of the body, including the heart, blood vessels, brain, kidneys, and eyes. Hypertension is a risk factor for the development of cardiovascular diseases (acute myocardial infarction, stroke, heart failure, etc. A large number of studies on HTA in young people have verified that it appears as a consequence of physical inactivity, adiposity, malnutrition, stress, smoking, etc. HTA can cause damage to blood vessels, including their narrowing (atherosclerosis), damage to the coronary arteries, kidney, causing kidney failure, damage to the retina (hypertensive retinopathy), etc. Therefore, early detection of HTA at a young age and in the early stages and medical treatment should be the main focus of health professionals in order to prevent the aforementioned complications.

**Aim:** To prevent the risks and diseases that have a predisposition to appear in young people from HTA and to make the youth population aware of the harmful effects that can appear from HTA.

Materials and Methods: as working material, the diaries of the 18-30-year-old age group in the department of internal diseases near the Clinical Hospital of Tetove in the period January-2023-January-2024 were used.

Results: According to statistics, men were 3 times more prone to hypertension compared to women. From total age to 80% of young people (women + men) HTA manifestations were as a result of physical inactivity, stress, malnutrition, anxiety, excessive consumption of salt, adiposity, lifestyle, while close to 20% of young people express during the history taking that also influence social networks, mistrust in the circle they live in and bullying.

Conclusion: In conclusion, we can propose that education about the management of HTA in young people through awareness and drug treatment can apparently affect the prevention and prevention of this frequent phenomenon and the aforementioned complications.

*Keywords:* arterial hypertension, arteriosclerosis, cardiovascular diseases.

# NEW-ONSET EPILEPSY IN ELDERLY PEOPLE – A CASE REPORT

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## **Abstract**

**Background:** New-onset epilepsy in elderly people often has underlying etiology; the most common acquired etiologies include cerebrovascular diseases, primary neuron degenerative disorders associated with cognitive impairment, intracerebral tumors, and traumatic head injury.

**Aim of this case report** is to describe the background, treatment and outcome of a 71-year-old female patient with acute onset of a tonic-clonic seizure ten minutes before hospitalization in the Department of Neurology in Clinical Hospital Tetovo.

**Material and method:** In this case, we have focused on analyzing medical data from the patient's history for possible causes of new onset epilepsy in the elderly.

**Results:** The patient first presented to the emergency room, in the afternoon, with hypertension, for which she received symptomatic treatment and her condition calmed down, but during the night, she again comes to the emergency room with hyperglycemia and with the intake of insulin, the glucose drops to normal values. In the following days, there was an increase in the level of glucose in the blood, so after 6 days, the patient returned to the hospital. After performing the axial tomography of the brain, she had a tonic-clonic seizure, which



lasted about 2 minutes. After hospitalization, the patient was confused and 4 more seizures were registered in the following 2 hours, which she passed easily.

Conclusion: Interpretation of diagnostic tests in elderly patients with seizures is often complicated by comorbidities, and treatment decisions require careful consideration in the context of age-related physiologic changes, comorbidities, and the use of concomitant medications.

# ECTOPIC PREGNANCY

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## **Abstract**

An ectopic or extrauterine pregnancy is one in which the blastocyst implants anywhere other than the endometrial lining of the uterine cavity. Nearly 95 percent of ectopic pregnancies implant in the fallopian tube. The remaining 5 percent of non tubal ectopic pregnancies implant in the ovary, peritoneal cavity, cervix, or prior cesarean scar. Fortunately, urine and serum beta-human chorionic gonadotropin ( $\beta$ - hCG) assays and transvaginal sonography allow earlier diagnosis. As a result both mat survival rates and conservation of reproductive capacity are improved. Regardless of location, D-negative women with an ectopic pregnancy who are not sensitized to D-antigen are given IgG anti-D immunoglobulin. In first-trimester pregnancies, a 50- $\mu$ g or 300- $\mu$ g dose is appropriate, whereas a standard 300- $\mu$ g dose is used for later pregnancies. Abnormal fallopian tube anatomy underlies many cases of tubal ectopic pregnancy. Surgeries for a prior tubal pregnancy, for fertility restoration, or for sterilization confer the highest risk. After one previous ectopic pregnancy, the chance of another is increased fivefold. Among several factors that help explain the incidence of ectopic pregnancies are: (1) greater sexually transmitted disease prevalence, (2) diagnostic tools with improved sensitivity, (3) tubal factor infertility, (4) delayed childbearing and accompanied use of assisted reproductive technology, and (5) increased intrauterine device (IUD) use and tubal sterilization, which predispose to ectopic pregnancy if the method fails. Ectopic pregnancy remains the leading cause of early pregnancy-related to death. Still, current diagnostic and

treatment protocols have resulted in substantial declines in fatality rates. One analysis showed a 56-percent decline in the ectopic pregnancy mortality ratio between the 1980 to 1984 epoch and the 2003 to 2007 epoch. During this later span, African-American women were approximately three times more likely to die as a result of ectopic pregnancy complications than white women were. Inadequate access to gynecologic and prenatal care may partially explain this trend. In most of these cases, death is directly related to severe hemorrhage from tubal rupture. Risk factors that increase the likelihood of tubal rupture include ovulation induction, serum  $\beta$ -human chorionic gonadotropin ( $\beta$ -hCG) level  $>10,000$  IU/L, and never having used contraception. Appreciation of these characteristics can aid prompt surgical intervention.

**Methods and Materials:** This original research is a prospective observational study conducted in Special Hospital for Gynecology and Obstetrics “Mother Teresa” Skopje; the Operative department, in period of one year from 01.01.2022- 31.12.2022. The study includes Ectopic pregnancy and its complications. A total of 13 cases were included in this study.

**Results:** The total number of cases with Ectopic Pregnancy was 13, of which 25 % of them had complications ( Rupture of fallopian tube ). The patients were the age of  $30\pm 5$ . All cases ended up with surgical procedures, with 55% of them with Laparotomia transversalis sec Pfannenstiel and 45% of them with Laparoscopy.

**Conclusion:** It turned out that early detection of ectopic pregnancies leads to fewer complications and the most preferred method of treatment was Laparoscopy.

**Keywords:** Ectopic pregnancy, Rupture of fallopian tube; Laparoscopy ; serum  $\beta$ -human chorionic gonadotropin.

# **ISCHEMIA AND PURULENT PERITONITIS OF THE SMALL INTESTINE AFTER SPONTANEOUS DELIVERY**

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## **Abstract**

Introduction: Ischemia and obstruction of the small intestine is a complication in obstetrics, although in rare cases, especially after spontaneous births.

Case report: The case presents a 37-year-old patient, with a controlled third pregnancy, spontaneous conception and no previous operations, who was hospitalized at our hospital in the 40th week of pregnancy, with regular labour contractions and cervical dilatation of 6 cm. Previously, two spontaneous deliveries weighing 3160 gr and 4050 gr.

The labour period was normal and also the vaginal delivery, in vertex presentation, the male new-born's weight was 4600 gr and length 53 cm and Apgar Score 9/9. The postpartum period in the hospital was without complications and after a few days the mother and the new born were discharged home. Exactly three weeks after delivery, the patient starts having diffuse abdominal pains. She was visited in a private hospital, where abdominal echo, X-ray, blood and urine analysis were performed. X-ray showed free air in the abdomen and in the abdominal ultrasound scans an oedematous part of the intestine was observed. They prescribed an infusion of antibiotics and spasmolytics on an outpatient basis and send her home with a

recommendation to return for daily check-ups. The following three-four days she felt temporary pain until the pain became severe, she became febrile and in a worsened general condition. On 17.04.2021 she was urgently admitted to the tertiary care centre with Dg abdomen acutum. CT scans with contrast and additional examinations were performed. The pains persist despite antispasmodic therapy and the abdomen continues to be painful on palpation. An exploratory laparoscopy was indicated, during which an ischemic part of the ileum was observed and it showed that it was twisted/torqued. Restoring the physiological position did not give validity of the intestine. After resection of the ischemic segment and extraction of the same through a mini-Caesarean section, T-T anastomosis of the intestine was also performed, followed by lavage and drainage and relevant postoperative therapy. On 23.04.2021, the patient was discharged home in good health. The histopathological diagnosis was "Ischemic enteropathy. Peritonitis fibrinopurulent".

Conclusion: peritonitis, obstruction and twisting of the intestines represent late complications after vaginal delivery and should be considered as a serious critical condition for pregnant women, whose treatment should be undertaken as soon as possible.

# OSTEOMALACIA IN PUERPERIUM WOMEN

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## **Abstract**

Osteomalacia means “soft bones”. Osteomalacia is a metabolic disease that weakens bones, and its characteristic features are muscle and joint pain, diffuse bone pain especially of spine, pelvis and legs, bone fractures and deformities, difficulty walking. It is a disorder of decreased bone mineralization that occurs in adults due to vitamin D deficiency.

Our case report is a 30-year-old patient who immediately after birth developed osteomuscular pain, muscles weakens in the proximal extremities associated with hypertrophy and muscular hypotonia, trouble getting up from sitting, difficulty walking and “waddling” gait. Myopathy is the result of excess parathyroid hormone (PTH), decreased vitamin D level, hypocalcemia and hypophosphatemia.

The course of the pregnancy and the birth passed without complications, as well as the development of the newborn.

Although osteomalacia is a relatively rare disease, in a postpartum period in the patient, the diagnosis requires careful physical examination, blood tests to measure levels of calcium, phosphate and vitamin D, urine tests, X-rays, bone mineral density scan, bone biopsy.

To establish the diagnosis, we may often need consultation with rheumatologist and endocrinologist.

Taking supplement therapy, such as high doses of vitamin D and phosphate, adequate exposure to sunlight is a common strategy of treatment.

Depending on the cause, recovering from osteomalacia can take from six months to a year

*Keywords:* osteomalacia, osteodensitometry, vitamin D.

# DIAGNOSTIC IMAGING OF BILIARY TRACT CANCERS USING AI

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## **Abstract**

Biliary tract cancers (BTC) include gallbladder cancer (GBC), ampulla Vater cancer (AVC), intrahepatic (IHC) and extra-hepatic (EHC) bile duct cancer. These types of cancer are referred to as epithelial malignancies of the biliary tree. After hepatocellular carcinoma, biliary tract cancer is the most frequent hepatobiliary cancer, accounting for approximately three percent of all gastrointestinal malignancies. with an extremely high mortality rate. The prognosis for advanced biliary tract cancer is not particularly promising; the median survival time is less than a year, wherever there are few therapeutic options available. Imaging modalities such as CT, ultrasound and especially MRCP remains the best options for the diagnosis of BTC.

Artificial intelligence is a very important and promising tool nowadays, especially in radiology. AI applications in medicine refers to the use of AI algorithms to improve medical diagnosis, treatment and patient care. Recently there is an increase in the use of AI.

AI has the potential to enhance radiology staff performance. Medical imaging is increasingly implementing deep learning (DL) and machine learning (ML)- based techniques for improving diagnostic reliability.

*Keywords:* AI, biliary tract, cancer, imaging.



# **PUBLIC HEALTH PRESENTATION: PUBLIC HEALTH AS THE CHALLENGE OF FUTURE**

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## **Abstract**

Public health, as a health activity, aims to improve the quality of life of the population through various preventive, promotional and educational measures, which are undertaken by institutional structure at different levels.

The goals of public health are: prevention of epidemics, protection of the living environment, workplaces, settlements, food and water, continuous monitoring of the health status of the population, promotion of community activities, organized response to various disasters, ensuring quality, access and responsibility for health protection to the entire population, the initiation of new plans for health protection and innovations.

What were the goals of the WHO in 2015 and what are the future goals in 2024.

The methodology of work and public health in the future is based on the impact divided into 5 levels. They are: socio-economic factors and education, changing the context to make individuals default decision healthy, long-lasting protective interventions, clinical interventions, counseling and education.

Public health organizes all the challenges of the future in a plan drawn up with the aim of achieving the maximum effect and the goal

towards them. An important method of public health is its promotion and raising awareness in society.

*Keywords:* Public health , Goals , Promotion , Multidisciplinary.

# PREVENTION OF FETAL GROWTH RETARDATION

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## **Abstract**

Introduction: Fetal growth restriction (FGR) is a frequently encountered pathology in obstetrics and affects 5-10% of pregnancies. It is one of the three main causes of perinatal deaths, after premature births and fetal malformations. In approximately one third of cases with FGR, cause or pathology is not found, which makes it difficult to prevent or treat them effectively. Fetuses with normal weight are found in the 50th percentile, while fetuses with FGR are in the 10th percentile. The term SGA (small for gestational age) has to do with constitutional growth rates and the statistical determination within which the newborn is considered smaller for gestational age. Whereas the term FGR (fetal growth restriction) refers to delayed growth below the 10th percentile as a pathological phenomenon, which is based on ultrasound and other diagnostic methods. Mostly, FGR is a consequence of insufficiency of uteroplacental circulation, placental and fetoplacental function. The current management of FGR consists of fetal surveillance to detect a decline in the baby's health and deliver when this can be safely done. Therefore Doppler ultrasound is considered the chosen technique. The use of low-dose aspirin for preventing FGR and preeclampsia (PE) has been one of the most important research topics for the last 10 years.

Several national protocols recommend the treatment with low-dose aspirin for high risk pregnancies, starting around 12-16 weeks of gestation. It favors placentation by its proangiogenic, antithrombotic and anti-inflammatory effects.

**Purpose:** To estimate the effect of low dose-aspirin started in early pregnancy on the incidence of fetal growth restriction and preeclampsia in women identified as being at risk of preeclampsia.

**Methods:** 150 pregnant women at risk of PE had to receive low-dose aspirin (100-150mg) daily. The first group (out of 75 women) began therapy at 12 weeks, while the second group (out of 75 women) began after week 16. Both groups were followed up to term with respective ultrasound and Doppler examinations. **Result:** The reduction of FGR was significant in the group of women who started low dose-aspirin. The increase in mean birth weight was 196g (CI 107-285g) when aspirin was started before 16 weeks of gestation or less compared with 70g (CI 15-124g) when aspirin was started after 16 weeks.

**Conclusion:** Daily-low dose aspirin initiated before 16 weeks of gestation was associated with a significant decrease in the incidence of preeclampsia, fetal growth restriction and preterm birth in women identified to be at risk for preeclampsia.

**Keywords:** low-dose aspirin, fetal growth restriction, preeclampsia.

## **DENTAL MEDICINE**

# **PROSTHETIC PROBLEMS IN PATIENTS WITH PERMANENT DENTITION**

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## **Abstract**

The aim of the study is to assess the frequency of treatment of dental defects with prosthetic appliances according to gender, jaws, age groups and time period.

Material and methods: For this purpose in the period 2021-2023, 1785 patients were examined. From this group 52.83% of them were male patients while 47.17% were female patients. The age of the examinees was from 13 to 82 years, with an average age of 48.2 years.

Results: The results show that the percentage of males is 51% and the percentage of females is 49%, while the percentage in the maxilla is 58% and in the mandible 42%. The age group 60-69 years has a higher percentage of prosthetic appliances(31.04%), while the age group 20-29 years has a lower percentage(8.31%), and the age group up to 19 years is represented by 0%. According to the time period, the period of 6-10 years has a higher percentage of prosthetic appliances(39.71%), while the lowest percentage of present prosthetic appliances is in the period of 30 years and more(1.15%).

## **Conclusion**

1. Men and women value oral health and show almost identical care for the prosthetic treatment of their dental arches.
2. Prosthetic treatment in a higher percentage of the maxillary dental arch shows the importance that patients pay to aesthetics.

3. Differences between the results of different authors regarding dental systems rehabilitated with partial prosthetic appliances, according to age groups, can be described to:

- variations during the planning of the study process
- excessive representation of certain age groups and
- types of prosthetic appliances which may have an impact on the examined contingent.

4. Prosthetic appliances in general, due to the action of biological and mechanical forces, as a result of their damage, negative action on the teeth and the supporting apparatus, as well as on the surrounding soft tissues and ridges, should be repeated every 5- 7 years.

*Keywords:* Prosthetic appliances, dental arches, treatment, frequency.

# **REHABILITATION & IMPLANTATION IN AESTHETIC AREA**

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## **Abstract**

The success of a dental implant is not only evaluated by osseointegration as it was in the early days of implantology, today the requirements are expanding and besides osseointegration, aesthetic outcomes also play an important role. Requirements, especially aesthetic ones can often be difficult to achieve, and implant failures in the aesthetic area can be multifactorial. Once implant failures occur in the aesthetic area, many cannot be fully corrected to meet the requirements of patients and the medical team. These complications should be handled by a dental disciplinary team. In our case series, surgical considerations, including cases of asymmetry / due to implant placement or bone loss resulting from inadequate techniques or treatment failures, such as papillary asymmetric deficits with biological adhesions, are given. We draw on our experience in treating aesthetic failure of dental implants.



# **THE ROLE OF ANTIBIOTICS IN THE TREATMENT OF OROFACIAL INFECTIONS**

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## **Abstract**

Antibiotics play an important role in the treatment of orofacial infections. Orofacial infections are infections that appear in the oral cavity, involving the jaws, teeth, salivary glands or face, which can be of odontogenic or non-odontogenic origin. Their treatment is conservative, surgical or combined.

In our paper, we present the role of antibiotics in the treatment of orofacial infections from different etiological causes. Antibiotic treatment depends on the nature, causes and degree of infection, they are usually used when there is an infection that can spread or cause serious health complications. .

The use of antibiotics should be done in accordance with the clinical situation and the degree of infection, being careful that unnecessary or undesirable use of antibiotics can cause antibiotic resistance and cause unnecessary side effects.

Most of these infections can be treated surgically, including drainage, endodontic treatment, and exodontia in order to control them without using antimicrobials.

# DENTAL TRAUMA INVOLVING PERIODONTAL TISSUES: CLINICAL ASPECTS

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## **Abstract**

Dental traumas are frequent in pediatric patients. Namely, data indicate that one out of ten individuals had sustained dental trauma during childhood and adolescence. Traumatic injuries might involve deciduous and permanent dentition, while special attention should be given to injuries of the periodontal tissues in immature permanent teeth.

The lecture will focus on different types of injuries of the teeth with involvement of the periodontal tissues. Clinical cases, methods of treatment, outcome and finally, complications that might occur following these types of traumas, will be presented.

*Keywords:* Clinical aspects, trauma, dental.

# **EFFECT OF THIRD MANDIBULAR MOLAR ANGULATION AND LEVEL OF ERUPTION ON INCISAL MANDIBULAR CROWDING IN PATIENTS WITHOUT PREVIOUS ORTHODONTIC TREATMENT**

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## **Abstract**

Mandibular incisal crowding is described as the discrepancy between the mesiodistal widths of the four permanent incisors and the available space in the alveolar process. The aim of this research is to assess the potential influence of mandibular third molars on the development of incisal mandibular crowding through determination of third molar angulation and eruption level. Examinations are performed on mandibular study plaster orthodontic models and orthopantomography images of 94 patients, aged between 12 and 22 years. Based on the Little's index of irregularity: the sample is divided in two groups. Angulation of third molars was determined by measuring the angle which is formed between the lines that pass through the axis of the third molar and the second molar. Evaluation of the eruption level of the mandibular third molars is determined according to Pell and Gregory. A significantly higher index of irregularity according to Little was determined in Study compared to Control group for Mann-Whitney U Test:  $Z=-8.259$ ;  $p=0.00001$ . The level of angulation of the 3rd to the 2nd molars had non-significant effect on the incisal mandibular crowding for consequent

( $R(54)=0.155;p=0.268$ ) vs. ( $R(54)=-0.075;p=0.595$ ) in the Study group and ( $R(40)=0.131;p=0.427$ ) vs ( $R(40)=0.357;p=0.026$ ) in Control group. Level B eruption of mandibular third molars was present with higher frequency (76.9%) in the examination group and (55.6%) in the control group. There is no great correlation between the angulation of third molars, the level of eruption and the mandibular incisal crowding.

*Keywords:* Third molar, incisal mandibular crowding, third molar angulation, eruption level, Pell and Gregory, Little's index of irregularity.

# COMPLICATIONS DURING ROUTINE EXTRACTION OF MAXILLARY TEETH

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## **Abstract**

Tooth extraction is a difficult and complicated process, and it involves a series of practical actions which in certain situations can cause various complications. Therefore, the dentist must take due care during this process. Complications during routine or simple tooth extraction are several and various in both jaws. The complications that may occur during simple extraction of the teeth located in the upper jaw, or the maxillary teeth include: soft tissue injuries, hard tissue injuries, injuries to adjacent teeth, injuries to surrounding structures, creation of oroantral communication, aspiration or swallowing of extracted tooth parts, instrument breakage, intense post-dental extraction bleeding and submucosal emphysema. These complications have their specific characteristics, consequences, diagnostic methods and treatment, as well as ways of their prevention. The paper deals with the complications during the simple extraction of maxillary teeth in respect of their clinical characteristics, consequences and treatment. In addition, it also discusses the protocol of diagnosis and management of these complications. In order to prevent and minimize the complications during the ordinary extraction of maxillary teeth, the dentist must follow the basic principles of oral surgery and undertake a series of necessary actions. However, in some cases of routine extraction of maxillary teeth complications are inevitable, hence the preventive actions cannot absolutely avoid their occurrence.

*Keywords:* complications, simple tooth extractions, maxillary teeth.

# INCIDENCE OF IMPLANT LOSS DUE TO PERI-IMPLANTITIS

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## **Abstract**

Peri-implantitis, an infection unique to implant sites, triggers inflammation in surrounding soft tissues and gradual bone erosion around a functional osseointegrated implant. Its onset and severity are influenced by multiple factors such as the overall health of the tissues adjacent to the implant, the specific design of the implant, the level of surface roughness, its external morphology, and the amount of mechanical stress it experiences during use. The primary culprits in implant failure are typically spirochetes and mobile forms of Gram-negative anaerobes, although instances attributed solely to mechanical overloading are also seen.

Diagnosing peri-implantitis involves a comprehensive assessment, including observations of changes in gingival color, bleeding tendencies, probing depth of peri-implant pockets, presence of pus or suppuration, radiographic examinations, and a gradual decrease in bone height surrounding the implant.

Treatment approaches are tailored to whether the condition presents as peri-implant mucositis or full-blown peri-implantitis. Central to managing implant infections is a focus on controlling the spread of infection, detoxifying the implant surface to remove microbial biofilms, and promoting the regeneration of lost alveolar bone tissue.

The findings from this research provide insights into the prevalence and risk factors of implant loss due to peri-implantitis, informing clinical strategies for prevention, early detection, and targeted treatment. Understanding the epidemiology and etiology of peri-implantitis-related implant loss is crucial for enhancing long-term implant outcomes and optimizing patient care in implant dentistry.

*Keywords:* implant, peri-implantitis, bone, infection, factors, surface.

# **GENOTYPIC DETECTION OF ANTIBIOTIC RESISTANT MICROBES**

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## **Abstract**

Microbial resistance to antibiotics is a global public health concern and has a significant impact on the treatment of infectious diseases. Studying the genotypic discovery of microbial resistance to antibiotics is a key aspect to understanding resistance mechanisms and developing effective strategies for managing this challenge. This abstract provides an overview of current progress and future challenges in the field of genotypic discovery of antibiotic-resistant microbes. Advanced genetic analysis methods used to identify specific resistance genes are discussed, as well as the role of new technologies such as genetic payloads and bioinformatics-based methods. Recent findings from genetic science research are presented in the context of antibiotic resistance management strategies globally. Challenges ahead include improving techniques for identifying new resistance mutations, as well as expanding capacities for monitoring and reporting microbial resistance globally. Effective interventions to address these challenges will help tackle the antibiotic resistance crisis and ensure sustainable and effective antibiotic use in medicine.

Keywords: Microbial resistance, antibiotics, genotypic discovery, resistance mechanisms, genetic analysis.



# **PREOPERATIVE PATHOSES OF IMPACTED MANDIBULAR THIRD MOLAR RELATED TO DEMOGRAPHIC CHARACTERISTICS OF THE PATIENTS**

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## **Abstract**

The study aims to identify the association of preoperative pathoses with age and sex among patients attending third mandibular molar surgery and predict the benefits of this surgical intervention. In this study we examined 80 patients including panoramic radiographs and clinical condition, referred for impacted third mandibular molar surgery. Pathological conditions included pericoronitis, decay on third mandibular molar, decay on distal surface of adjacent second molar, external root resorption of adjacent second molar, crowding of frontal mandibular teeth, periodontal pathologies. Also the behavioral aspects related to oral health of the patients are considered, like smoking, which affects the preoperative pathoses among patients undergoing third molar extraction. Pericoronitis was observed more in men (70.3%) compared to women, according to the other parameter this pathology grows with age of the patients. Periodontal disease of adjacent second molar appears to be more common in women with 48.8% than men, according to age it gets lower by growing age.

Resorption of the external root of adjacent second molar was present in both men and women with 5%, also getting lower with growing age. The crowding of frontal mandibular teeth was more common in women with 39.5%, and according to age it gets lower with growing age of the patients. Furthermore, smoking as a bad oral health behavior affects the occurrence of preoperative pathoses. The prevalence rate of preoperative pathological conditions on patients undergoing third molar surgery is higher in women compared to men, but it gets lower by growing age.

*Keywords:* mandibular third molar, impaction, preoperative pathoses, demographic characteristics.

# **PATHOLOGY AND DATA OF INFLUENZA VIRUS INFECTIONS IN REPUBLIC OF NORTH MACEDONIA**

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## **Abstract**

The influenza virus appears in different annual outbreaks, giving different symptoms and distribution patterns. These outbreaks are sudden and spread rapidly, causing more profound fatigue and weakness than the common cold.

Using data from the "Public Health Institute of the Republic of North Macedonia", this study investigates the spread and morbidity of the virus within the population. The virus is usually spread through the air, by coughing or sneezing. When the virus is inhaled, it attacks cells in the upper respiratory tract, causing symptoms such as: fatigue, fever, cough and pain. Inadequate treatment can cause secondary infections. Using rigorous methodology, including data analysis and statistical comparison, this research shows the prevalence of seasonal influenza in North Macedonia.

Orthomyxoviruses, which include types A, B, and C, undergo replication and antigenic variation, contributing to vaccine formulation changes each year. Initial flu symptoms include fever, body aches and breathing problems. Comparative analysis between October 2022 and 2023 highlights a 33.3% increase in flu cases, highlighting an increase in the spread of the virus. This study highlights the necessity of continuous surveillance and vaccination

strategies to mitigate the public health impact of influenza in North Macedonia.

*Keywords:* influenza, outbreaks, symptoms, morbidity, vaccine, transmission.

# **ANTIBIOTIC PRESCRIPTION ON EVERYDAY DENTISTRY (USE AND MISUSE)**

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## **Abstract**

As antibiotics are commonly used in dentistry, it is crucial to understand the appropriate use to prevent the development of antibiotic-resistant bacteria. On the other hand, the misuse of antibiotics can have serious consequences, including adverse drug reactions and the growth of antibiotic-resistant bacteria. Therefore, it is essential to use antibiotics responsibly and only when necessary in everyday dentistry.

Dental caries, pulpal necrosis, trauma, and periodontal disorders can all cause dental infections, which can have serious effects for both the soft and hard tissues of the oral cavity. Dental infections may cause pain, fever, and edema. Surgical and endodontic treatments are used to treat infected teeth first, followed by antibiotics.

When doing dental operations, antibiotics are typically utilized to treat prophylactic, local, focal, and nonodontogenic infections. It has been observed that only approximately 12% of dentists correctly and sufficiently prescribe antibiotics, highlighting the significance of thorough recommendations. Prescription antibiotics may have unfavorable side effects, including allergy and dermatological conditions, as well as hypersensitivity reactions.

To prevent the difficulties of needless antibiotic prescriptions, particularly bacterial resistance, and detailed recommendations should be developed.

The purpose of this study is to outline the indications for antibiotic therapy in dentistry and to examine the most prevalent forms of antibiotics used in dental practice, organized by pharmacologic class. Furthermore, the sorts of antibiotics that are deemed safe during pregnancy and childhood are discussed.

*Keywords:* Antibiotics, bacterial resistance, prophylaxis, dentistry.

# **PRESERVATION OF DISTAL BONE DEFECT AFTER SURGICAL EXTRACTION OF IMPACTED THIRD MOLAR**

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## **Abstract**

Extracted teeth are still considered a clinical waste and therefore being discarded. It is evident that obtained and prepared autogenous dentin graft (ADG) may be used for guided bone regeneration (GBR) because of similar biochemical characteristics to human bone.

**Aim:** To present a novel procedure in a clinical setting that employs freshly extracted teeth that are processed into a bacteria-free particulate dentin, and then grafted immediately into extraction sites or bone defects. Monitoring the clinical and radiological parameters in the postextraction defects of the alveolar ridges for a period of 6 months, proving the rapid healing capacity of ADG on the bone and soft tissue structures in the jaw bones.

**Methods:** Clinical measurements were performed using a questionnaire for monitoring the postoperative clinical manifestation, bone measuring calipers and for measuring the horizontal changes of the alveolar ridge and a graduated probe for measuring vertical dimensional changes, also paraclinical-radiological examinations to follow-up bone density.

**Results:** During the follow period of six months, clinical measurements of post-extraction dimensional changes of the alveolar

ridges showed minimal horizontal and vertical bone resorption with preserved alveolar ridge volume, with an accelerated bone regenerative process without special postoperative complications.

Conclusion: Dentin particulate grafted immediately after extractions should be considered as the gold standard due to its osteogenetic, osteoinductive and osteoconductive effects on bone tissue regeneration.

*Keywords:* autologous dentin graft, bone substitutes, socket preservation, Smart dentin grinder.



# COMPLICATIONS IN IMPLANT DENTISTRY

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## **Abstract**

Dental Implantology is a complex discipline that requires its practitioners to have a high level of expertise in a wide range of areas, many of which evaluate at a rapid pace.

Implantology as a growing field has become an integral part of dentistry within a short time, rehabilitating patients with teeth that not only look aesthetically comparable to natural teeth, but also functionally correspond to them.

Dental implants have gained increasing popularity over the years, as they are able to restore near-normal, partial and full function to edentulous arches.

However, as with almost any surgical procedure, complications or implant failures occur, making the technique of its placement very sensitive.

This article reviews the complications of dental implants, their etiologic factors, and ways to manage these problems.

## **PHARMACY**

# **KNOWLEDGE OF HEALTH PROFESSIONALS ON THE INTERACTION OF DRUGS WITH FOOD IN THE REGION OF KICHEVO AND THE SURROUNDINGS**

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## **Abstract**

**Introduction:** The effect of the drug on a person may be different than expected because that drug interacts with another drug that the person is taking (drug interaction), food, drink, dietary supplements that the person is consuming (drug-supplement interaction/ food) or another disease that the person has (drug-disease interaction). A drug interaction is a situation

in which a substance affects the activity of a drug, i.e. effects increase or decrease, or they produce a new effect that neither produces on its own. These interactions can occur from accidental misuse or due to a lack of knowledge about the active ingredients included in the respective substances.

**Aim of the study:** The aim of this study is to assess and analyze the knowledge of health care workers, including pharmacists and doctors, working in the region of Kichevo and its surroundings regarding possible interactions between food and drugs given to patients. The main focus is to identify gaps in their knowledge and understanding of these interactions.

**Study methodology:** The data were obtained through a survey of health workers in the city of Kichevo, North Macedonia and its surroundings through a structured questionnaire. The study sample includes health care workers, mainly pharmacists and doctors but also other health professionals. In total, 140 health professionals were included according to the inclusion criteria.

**Results and conclusions:** It was observed that in general pharmacists/pharmaceutical technicians have higher knowledge of food-drug interactions than general practitioners/specialists. Differences in knowledge have also been noted between specific groups of professionals. It has been seen that pharmacists have more extensive knowledge of drug-food interaction than pharmaceutical technicians, while among doctors it is observed that the differences in knowledge of drug-food interaction are not significant. But it has also been noticed that health professionals have low and insufficient knowledge about the drug-food interaction. Regarding the drug-food interaction, health professionals have in-depth knowledge when the drug interaction is related to alcohol, but this does not apply when it comes to interactions with specific foods such as citron, salad, caffeine, etc.

**Keywords:** Food-drug interaction; Health care professionals; Medication; Knowledge.

# THE EFFECT OF CANNABIDIOL OIL TREATMENT ON CARBOHYDRATE METABOLISM IN STZ-INDUCED DIABETIC RATS

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## Abstract

Cannabidiol (CBD), the predominant non-psychotropic cannabinoid found in *Cannabis sativa* L., has attracted considerable attention due to its diverse biological activities and favorable safety profile. However, limited studies have explored the effects of CBD on carbohydrate metabolism and its effects on blood glucose concentration. Thus, this study investigates the effects of CBD oil on blood glucose, insulin concentration, and key enzymes related to carbohydrate metabolism in the liver of diabetic rats.

CBD oil extract was obtained through CO<sub>2</sub> extraction from decarboxylated *Cannabis* flos and then diluted with olive oil (w/w). Diabetes was induced using streptozotocin-STZ (45 mg/kg body weight). The rats were divided into six groups, comprising a negative healthy control group, an untreated diabetic group, a metformin-treated group, and three CBD-treated groups with different doses. Following an overnight fast, the rats were administered CBD extracts at doses of 25, 50 and 100mg/kg b.w. respectively, for 8 days.

Treating diabetic rats with CBD-25 mg/kg b.w. resulted in a decrease in glucose-6-phosphatase activity and an increase in glucose-6-phosphate content in the liver. However, it had no impact on blood glucose and insulin levels, as well as fructose-1-6- biphosphatase, glycogen phosphorylase, hexokinase and glycogen content in the liver.

Conversely, administering CBD at 50 mg/kg b.w. led to reduced activity of G6Pase, F16BPase and GP activity, accompanied by a decrease in both blood glucose and liver glucose. When compared to diabetic rats there was no effect on insulin and glycogen concentration.

At a dose of 100 mg/kg b.w, CBD showed significant decrease in F16BPase and GP activity, along with a lower liver glucose concentration, as well as an increased HK activity and G6P content. Nonetheless, no effects were observed in blood glucose and insulin levels.

The results obtained confirmed the glucose-lowering effect of CBD oil, with the most effective control observed in the group receiving 50 mg/kg. While CBD oil did not exhibit insulinotropic effects, it successfully normalized glycaemia by inhibiting gluconeogenesis and restoring decreased glycolysis in diabetic rats. These findings emphasize the potential therapeutic value of CBD regarding diabetes mellitus treatment.

*Keywords:* carbohydrate metabolism, cannabidiol, anti-diabetic effects, STZ-diabetic rats.

# **PATIENT INFORMATION LEAFLETS - ESSENTIAL TOOLS ON SAFE AND EFFECTIVE USE OF MEDICINES**

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## **Abstract**

The patient information leaflets (PILs) are an essential tool for informing patients about the safe and effective use of medicines. Today we have many sources for obtaining information about medicines: their use, indications, side effects, interactions, but PIL still remain as one of the important written information about the medicines, that should be in every package. Each medicine authorized under a marketing authorization must have its own PIL. The content of the information leaflet is based on scientific information, which is part of the SmPC- Summary product of characteristic. Patient information leaflets are essential tools for empowering patients and promoting informed decision-making. The concept of PIL was introduced into European legislation in 1977 but not obligatory in practice. It was 1999 that came into force Council Directive 92/27/EEC throughout Europe, that obliges every medicine to have PIL inside the package and also according to this Directive the written PIL needs to be efficient and safe for the population/ patients. There are a set of regulations and several guidance documents that should be followed when drafting the leaflet. The competent regulatory bodies together with the association of pharmaceutical industries continuously make efforts to improve the content and quality of PIL.

The aim of this paper is to give a brief literature review of articles, guidance, available legislation about PIL and the new recommendations of pharmaceutical associations for better patient information leaflet.

*Keywords:* patient information leaflets, legislation, content, quality, recommendation.



# **NEW TRENDS IN GREEN COSMETIC FORMULATIONS AND FUTURE CHALLENGES FOR QUALITY CONTROL**

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## **Abstract**

Background: Recently, it can be said that there has been an expansion of the inclusion of nutritional excipients in green cosmetic products. This is as a result of what followed after the COVID-19 period where new concepts of health and wellness including skin treatments were created. The inclusion of food products in cosmetic products is already a new trend in green cosmetics. Nutricosmetics as a new concept of skin treatment, where the treatment and maintenance of the skin is intended to be achieved through its healthy nutrition, has almost forgotten the previous products that contained more excipients for beautifying and correcting skin problems. The cosmetic and food industries promote a new way of maintenance and health and this has brought a new trend in the market and the orientation of consumer demands. This increased demand for nutricosmetics and the increase in the production of a wide range of cosmetic products with food supplements also presents new challenges for the technological process of their preparation and the increasing demands of quality control of these cosmetic products. This review reviewed the nutritional supplements most commonly used in cosmetic products, their dosage determination, the techniques for determining their

efficacy as well as the application of legal norms and regulations during the process of their production and marketing.

**Methods:** For the collection of data for the compilation of this review, we conducted searches in the database from scientific articles and publications with similar themes. It has also been reviewed by the relevant agencies on the regulations and certification of cosmetic products with nutritional supplements

**Results:** From many reviewed articles we reach clear results about the large number of food products included in cosmetic products. Also, from the data there is a correlation between the use of cosmetic products with food products and their effectiveness. The data of a large number of studies testify to significant results from the treatment of the skin both from the point of view of maintenance and in the treatment of skin problems. In terms of regulations and harmonization of legal acts for the quality control of these products, there are still deficiencies that must be revised and filled in the future

**Conclusion:** Identification of problems related to new cosmetic products can serve as a big step to overcome limitations and take new initiatives by guaranteeing the efficacy of new cosmetic products in green cosmetics. Future challenges remain control over their efficiency, certification according to harmonized legal norms in all markets and accurate product advertising.

**Keywords:** green cosmetic, food supplements, quality control, legal acts.

# **THE ROLE OF NUTRITION IN HUMAN HEALTH**

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## **Abstract**

In fact, nutrition and health are two sides of the same coin. They're therefore inseparable from each other. Health depends to a large extent on nutrition, and nutrition depends on the food intake. So food is the most important factor for health. Nutrition is the biochemical and physiological process by which an organism uses food to support its life. It provides organisms with nutrients, which can be metabolized to create energy and chemical structures, for maintaining health and to prevent disease. Nutritious food can enhance physical and mental potential. Macronutrients and micronutrients are the two main categories of nutrients found in diet. Diet is an important contributor to human health, and public health bodies are issuing guidelines aimed at favoring healthy food choices. Low food intake and infections are the immediate causes of malnutrition. Many countries struggle with malnutrition or caloric deficits, while others encounter difficulties with caloric over-consumption and micronutrient deficiencies. A multitude of factors contribute to this global problem. Considering the health challenges facing our world population, the need is clear for continually improving recommendations and strategies to promote human health.

The purpose of this study was to show information on the functions of different nutrients, the conditions caused by their deficiency, the components of a healthy diet and complications of different types of malnutrition. A lot of research is being done, and new findings published every day to increase our knowledge about food and nutrition, and to find ways to apply this knowledge in choosing the right foods to eat, so that our body is well nourished and healthy.

For maintenance of health, growth and to develop greater resistance against infections must consume balanced food, which contains all the nutrients in the correct proportion.

*Keywords:* nutrition, nutrients, diet, health, malnutrition.

# **THE IMPACT OF THE TRIPLE COMBINATION TRIKAFTA® ON THE QUALITY OF LIFE IN PATIENTS WITH CYSTIC FIBROSIS**

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## **Abstract**

The formulation of Trikafta, a landmark medicine, is a testament to the power of worldwide collaborative efforts among researchers, foundations, and pharmaceutical companies which has the potential to change the way of treating Cystic Fibrosis (CF) as a progressive fatal genetic disease. In this study, we will focus on reviewing data from clinical trials regarding the benefits of CFTR modulator therapy, and how trikafta affects the quality of life in patients with cystic fibrosis. Methods: A cross-sectional survey containing Cystic Fibrosis Questionnaire-Revised (CFQ-R) was utilized to be administered by CF patients from closed and certified groups. The survey divides the participants into two groups; patients who are not administering Trikafta versus patients who are administering Trikafta. Results: 14 adults with CF participated in the research. The average values in all domains for patients taking Trikafta are higher than the average values in the domains for those who do not. A greater difference is observed in the domain of perception of health with 0.8 points, in the domain of role with 0.7 points, in the domain of vitality with 0.5 points. Conclusion: The use of Trikafta for the treatment of cystic fibrosis in patients with F508del CFTR mutation positively

impacts CF patients' quality of life when compared to patients who are not taking Trikafta.

*Keywords:* Cystic fibrosis (CF), trikafta, health-related quality of life (HRQOL), cystic fibrosis questionnaire revised (CFQ-R).

# PROFESSIONAL POISONING

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## **Abstract**

Occupational diseases continue to be one of the major health problems of the able-bodied population worldwide. The reasons for this are numerous, but the main one is of course the nature of these diseases which by definition are chronic, progressive and degenerative, and the period of latency in which the disease does not have to manifest clinically can last for decades. The factors that can contribute to the development of an occupational disease are numerous and range from chemical, physical and biological to psychosocial risks, so there is a need to find new ways to control long-known risks, to observations of the most common workplace pathologies in the last twenty years, such as recurrent traumatic illnesses, immunodeficiency transmitted as a result of biological injuries and violence, and psychological trauma in the workplace. The aim of this paper is to evaluate the effect of noise as a function of its levels and the duration of workplace exposure on workers' health.

New knowledge in occupational health and safety practice is needed to respond to new challenges in this field.

*Keywords:* occupational diseases, occurrence, risk, factors.

# ADOLESCENTS' KNOWLEDGE AND AWARENESS ON THE USE OF COSMETIC AND DERMATOLOGICAL PREPARATIONS IN THE TREATMENT OF ACNE VULGARIS

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## Abstract

Acne vulgaris is a common, chronic, inflammatory disorder of the pilosebaceous unit that affects most teenagers with inflammatory lesions on the face and trunk. They are mainly caused by increased sebum production, hyperkeratinization of the follicle, inflammation, hormonal changes, and misuse of cosmetic and dermatological preparations. This condition is common in adolescents, but it also occurs in patients in their twenties and thirties. These changes sometimes affect the emotional stress and the quality of life.

This study aims to evaluate the awareness of adolescents in relation to the treatment of acne and their knowledge about the use of cosmetic and dermatological preparations.

Based on our results 40% of teenagers didn't consult a dermatologist but used preparations that they see on social media and that their effectiveness was lower than 30%. 38% of the teenagers have used



the therapy and the food regime that the dermatologist recommended which lead to a 75% effectiveness on treatment, 12% have used lotions recommended by their pharmacists and didn't follow the food regime from which they had an effectiveness of only 42%. We also noticed that the patients who followed the instructions of the dermatologist and the pharmacist had more efficiency, while the others had less efficiency. From this we can conclude that any change in the skin for better efficiency should be managed by a dermatologist.

*Keywords:* acne vulgaris, dermatological preparations, cosmetic, adolescents.

# **PREPARATION OF ORGANIC PLANT EXTRACTS AND THE REGULATIONS THAT APPLY DURING THIS PROCESS**

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## **Abstract**

Organic and natural cosmetics have been at the center of interest in recent years, not only for consumers, but also for cosmetics manufacturers, who must follow technological progress and keep pace with sustainable development. Consumers are not familiar enough with the term natural and organic. Only a certification mark on the packaging gives the consumer confidence in the origin of ingredients and processing methods.

In EU countries, organic and natural cosmetic products do not represent a separate product category, but must meet all the requirements of the current Regulation 1223/2009 EC for cosmetic products, and one of the most important requirements is user safety. Present formulations of cosmetic products contain or more often a number of cosmetic active ingredients of different origins. These materials, along with proper application of product, produce physical, chemical, biochemical and / or subjective effects. The most common active cosmetic ingredients are extracts of standardized plants, which are active ingredients isolated from plants. The production of organic and natural cosmetic products whose effect is not fully proven, disharmonious regulations can represent a great risk for both producers and consumers. This is exactly why it is necessary that, in

addition to the existing standards, the volunteers of natural products and organic cosmetics create a new regulation, which will be transparent enough for all interested parties, which will make it impossible to deceive consumers and which will be binding on manufacturers. Also, it is necessary to adopt precise guidelines for the safety assessment of organic and natural cosmetic products.

*Keywords:* organic and natural cosmetic products, COSMOS, NATURE standard, standardized plant extracts, cosmetic active ingredient.

# **THE SCIENTIFIC RESEARCH ON THE RATIONAL AND IRRATIONAL USE OF PARACETAMOL**

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## **Abstract**

The scientific research on the rational and irrational use of paracetamol covers a wide range of different types of drug use, whether with or without a doctor's prescription. The use of paracetamol is a major concern, particularly when taken over a prolonged period or given to children by their mothers, who may not always be aware of the potential side effects of the drug. For this project, samples were taken from the cities of Pristina and Gjilan in the Republic of Kosovo, where 76 mothers were interviewed at random. The results of this scientific study indicate a small percentage of side effects, at only 2.7%, while 97.3% of the participants did not experience any side effects. What is even more positive is that 94.7% of the participants were cured after taking paracetamol. Also during the study of this research, we noticed that a large % of mothers who gave their children paracetamol with a doctor's prescription were educated and employed and were very informed about paracetamol as a medicine and its effects. Its application was given only in cases where the child had more real symptoms.

# COMPARATIVE STUDY OF THE CONTENT OF POTENTIALLY TOXIC ELEMENTS BETWEEN LEAVES AND FLOWERS OF SAMBUCUS NIGRA: ICP- AES AND ICP-MS PROFILE

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## **Abstract**

It is well recognized that natural products offer a rich source of bioactive substances with different pharmacological benefits. *Sambucus nigra* L. is well known for both dietary and therapeutic purposes due to its physiologically active compounds. The bioavailability of metals occurring in soil is the primary reason for its accumulation in plants. The present study determined the content of minerals in the leaves and flowers of wild-grown *Sambucus nigra*. Samples of *Sambucus nigra* were collected from eleven different locations in Kosovo and microwave digestion was performed for the complete digestion of the plant tissues. Inductively coupled plasma-atomic emission spectrometry (ICP-AES) and inductively coupled

plasma–mass spectrometry (ICP-MS) were implemented for the determination of a total of 31 elements (macroelements, microelements, and potentially toxic elements). The leaves of *Sambucus nigra* show significant enrichment in the mineral content compared to the flowers. However, the concentration of heavy metals and toxic elements (As, Cd, Pb, Hg) was within the permissible concentrations according to Ph. Eur and WHO. In conclusion, the mineral accumulation in the medicinal plant species could provide a roadmap for the improvement of conservation, and assurance of better food quality. This plant material can be recommended as promising plant material from this plant species rich in minerals.

*Keywords:* *Sambucus nigra*, minerals content, toxic elements, ICP-AES, ICP-MS.

# **ANTIBIOTIC RESISTANCE BASED ON ANTIBIOGRAMS TAKEN FROM PATIENTS OF TETOVO**

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## **Abstract**

Antimicrobial resistance happens when germs like bacteria and fungi develop the ability to defeat the drugs designed to kill them. That means the germs are not killed and continue to grow. Resistant infections can be difficult, and sometimes impossible, to treat.

Antibiotic resistance is a serious concern throughout the world. It can lead to illnesses that are very hard to treat. Standard antibiotics for treating a disease may no longer work in these cases. Other medicines may also not help. As a result, resistance to antibiotics is becoming more common.

This study was conducted from the patients' antibiograms, and the bacteria that were isolated were taken from different parts of the patients' body (wound, urine, nose, throat, vagina), these bacteria that were found to be resistant to different groups of antibiotics.

This project represents a retrospective analysis of the data between the last three months from December 2023 to the end of February 2024, in the Center for Public Health Tetovo.

The total number of patients is 143, of whom 116 were positive for any of the bacteria, the prevalence of the infection was higher in women (71%) in contrast to men (29%), and 27 patients were sterile

The bacteria that were found were from some groups of gram positive bacteria such as S.aureus with the largest number of patients (19%), of the gram negative bacteria is E.coli with the largest number of all bacteria isolated (29%).

Antibiotics that were resistant to some of the groups of bacteria with higher numbers were Ampicillin, Amoxicillin, Ciprofloxacin, Norfloxacin, Levofloxacin.

*Keywords:* Antibiotics, E.coli, antibiogram, Amoxicillin.



# **SURVEY ABOUT MEDICATION ADHERENCE IN KOSOVO**

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## **Abstract**

Medication adherence, defined by the World Health Organization as the alignment of an individual's behavior with prescribed health recommendations, is a critical factor in ensuring effective healthcare outcomes. However, there remains a dearth of research on medication adherence within the context of Kosovo's healthcare system. Our study aims to address this gap by conducting a comprehensive survey about medication adherence involving both, healthcare professionals and patients.

The study methodology involves the development of the questionnaires and conducting of a survey instrument tailored to capture insights from medication adherence behavior among the two study groups. The survey is distributed in both paper and online formats to maximize participation and inclusivity. Through this survey, we seek to gather data on current practices, challenges, and perceptions surrounding medication adherence in Kosovo.

By engaging both healthcare professionals and patients, this study aims to provide a holistic understanding of the factors influencing medication adherence within the Kosovo context. The findings of this study will not only contribute to the existing knowledge on

medication adherence, but also serve as a foundational step towards designing targeted interventions to improve healthcare outcomes in Kosovo.

Expectation, conclusion and recommendation. The study is still ongoing, and we expect identification of specific practical barriers to medication adherence, identification of the most suitable interventions, and detection of the most effective and cheapest methods for identification of adherence and/or non-adherence.

Recommendations for the future enhancing of the medication adherence will be based on a wide and appropriate theoretical framework including assessment of the final results of the survey.

*Keywords:* health benefits, medication adherence, healthcare professionals, patients, survey.

**6<sup>th</sup> International Conference of Natural Sciences and  
Mathematics**

## **BIOLOGY AND ECOLOGY**

# IDENTIFICATION OF DIFFERENT CANCERS THROUGH SPECIFIC TUMOR MARKERS

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## **Abstract**

Cancer diagnosis cases are increasing globally. Clearly, a strong and well coordinated approach is inevitable in the struggle to control the worldwide scourge of the cancer problem. Tumour markers have demonstrated potential in making early discoveries, of which improving patients' outcomes is largely dependent on. Special attention is paid to the understanding of the molecular mechanisms underlying the specificity of these markers in various malignant diseases. The purpose of the research is to show that tumor markers play an important role in the understanding of molecular and biological characteristics of different cancers. The results shown that In the female gender, the most frequently analyzed tumor markers are CA15-3, with 42.4%, CA19-9 with 27.3% and CA125 with 24.6%, while in the male gender, the most frequently analyzed tumor markers are PSA with 33.3%, CEA with 22.2% and Ca 19-9 with 22.2%. The conclusion of this research is that the analysis of specific tumor markers, for the early detection of cancers, will help society's interest in this type of health problem, to be more proactive and more dynamic.

*Keywords:* Cancer, Tumour markers, Early discoveries.

# **ELEMENTAL ANALYSIS AND ACCUMULATION MODELS OF HEAVY METALS IN MEDICINAL PLANTS: IMPLICATIONS FOR ENVIRONMENTAL HEALTH**

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## **Abstract**

Our study aimed to assess the content of heavy metals and nutritional elements in the reproductive organs of medicinal plants (*Helianthus annuus*, *Matricaria chamomilla*, *Tilia argentea*, *Sambucus nigra*, *Calendula officinalis*, *Crataegus monogyna*, *Juniperus communis*, *Malus sylvestris*, and *Rosa canina*), collected at the groproduct collection point in Kosovo, to evaluate the environment, differences in the accumulative abilities of plants, and the potential risk of their use for human consumption if heavy metal concentrations exceed allowable limits. For this purpose, we conducted several analyses, including metal and mineral concentration, correlation, differences in element concentration abilities among plants; RDA, EDI, THQ, and HI. We found that the highest Ca and Pb content was detected in C.

monogyna (4863.3167 and 3.53, respectively); K in *M. chamomilla* L. (15747.64); Mg in *S. nigra* - fruits (2951.423); Na, Cu, and Zn in *C. officinalis* L. (1751.343, 12.51, and 34.48, respectively); Cr in *S. nigra* - flowers (2.01), and Mn in *T. argentea* (127.3033). *R. canina*, *J. communis*, and *M. sylvestris* did not have the highest values for any of the elements evaluated in this study. Comparisons with the allowable limits by WHO/FAO showed that Cr concentration (2.01) above allowable limits was found in *S. nigra*; Cu in *C. officinalis* L. (12.51); Mn in *T. argentea* (127.30); Pb in *C. officinalis* L. (3.53); Zn in *S. nigra* (31.38), and Ni in *S. nigra* (2.01). The results for risk factors (EDI, THQ, and HI) indicated that values for Cr, Ni, and Pb were less than one (1), indicating that the potential health risk was at an acceptable level for these substances. The content of elements in plant reproductive organs reflects environmental pollution, while their ability to accumulate heavy metals and minerals varies depending on the plant; plant pollution is associated with their origin and growing environment; their consumption can meet nutritional needs but also pose health risks, and analyses show that the risk of heavy metal pollution is at acceptable levels but continuous monitoring is crucial to protect health and the environment.

*Keywords:* Elemental analysis, medicinal plants, accumulation, environmental pollution, dietary intake, risk assessment.

# PREVALENCE OF HYPERTHYROIDISM IN THE TETOVA REGION, NORTH MACEDONIA

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## **Abstract**

Hyperthyroidism is a pathological disorder characterised by increased thyroid hormone synthesis and secretion from the thyroid gland, whereas thyrotoxicosis refers to the clinical syndrome of excess circulating thyroid hormones, irrespective of the source. The most common cause of hyperthyroidism is Graves' disease, followed by toxic nodular goitre. Other important causes of thyrotoxicosis include thyroiditis, iodine-induced and drug-induced thyroid dysfunction, and factitious ingestion of excess thyroid hormones. Unrecognized and untreated hyperthyroidism leads to serious clinical complications with adverse outcomes for patients. Hence, adequate knowledge of the epidemiological features of such condition is desirable to plan effective interventions. The aim of our study was to estimate prevalence of hyperthyroidism in region of Tetovo, in order to have an overview of the frequency of hyperthyroidism. A retrospective cohort study was conducted using the data of individuals of the Tetova region during the period 2020-2023. The tests were performed with the ECLIA method, while the patient samples were analyzed using the electrochemiluminescent immunoassay (ECLIA). Out of a total of 860 individuals checked, 173 of them were positive, so the overall prevalence was 20.1%. The prevalence increased with age and for men were 19.54%, but for women 20.36% (for 0.85% higher



among women than men). This study can serve to monitor the patterns of hyperthyroidism in the researched region.

*Keywords:* Hyperthyroidism, prevalence, thyroid hormone, syndrome.

# MOLECULAR DIAGNOSTICS OF COVID-19 FROM SOME REGIONS IN NORTHERN MACEDONIA

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## Abstract

Coronaviruses are a group of enveloped, non-segmented RNA viruses. The detection of SARS-CoV-2 RNA in nasopharyngeal samples through real-time reverse transcription-polymerase chain reaction (RT-PCR) is considered the standard gold method for the diagnosis of SARS-CoV-2 infection. Antigen detection (AD) tests are more rapid, less laborious, and less expensive alternatives. The main purpose of the research is the retrospective analysis of the results obtained with the RT-PCR technique for SARS Cov-2, in the period from 01.04.2021-31.08.2022 (17 months), from the samples taken at several points in North Macedonia, to analyze the percentage of positive results by month, the growth interval and the reduction of the percentage of positive results in relation to the total number of processed samples throughout the researched period. The reverse transcriptase polymerase chain reaction-RT-PCR method and amplification reagents for its performance were used for sample processing: SARS-CoV-2/SARS-CoV Multiplex PCR REAL-TIME which are intended for routine diagnostics, and may also be used for

research purposes. All samples were taken from patients with acute respiratory symptoms, of different genders and ages (nasopharyngeal). During the research period, the percentage of positive results peaked in time intervals of 3-4 months: in April 2021 it was 38%. This percentage then decreased, and in June it reached 4.8%. In August, half of the processed samples were positive, but this percentage has decreased, not so significantly, and has continued to remain around 27% (October, 2021). In the first and second months of 2022, the percentage of positive results increased again, culminating in February 2022 when the percentage of positive results was higher than that of negative results and reached 62.1%. Then this percentage continued to decrease and in May 2022 it was 23%. From May to the end of the analyzed period, this percentage continued to increase and in July 2022 it reached 66.6%. RT-PCR analysis enables a faster, easier and lower cost identification of SARS-CoV-2. Such research may be necessary to find answers that would benefit the entire human population.

*Keywords:* COVID-19, RT-PCR for SARS-CoV-2 virus, antigen detection, respiratory syndrome.

# NEW LOCALITY OF *CIRSIUM* *CANDELABRUM* GRISEB, (*ASTERACEAE*) IN REPUBLIC OF NORTH MACEDONIA

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## **Abstract**

*Cirsium candelabrum* Griseb, (*Asteraceae*) belongs to the group of Balkan endemic, with a wider distribution on the Balkan Peninsula. It was found for the first time in the territory of the Republic of North Macedonia by Grisebach, in 1839, in Shar Mountain, near Tetovo (Strid, 2000). As a result of continuous research, first by foreign authors and later by local authors, today several localities of the spread of this species are known, primarily in the western part of the country (Debar, Kičevo) (Čarni, et al., 2001) and more sporadically in the eastern part of the country and in the Skopje basin (Matvejeva, 1982), in some localities of the Polog region (Haziri, 2008, 208, 2015), in Vodno (MEPP, 2019), in Osogovo (Melovska, 2015), etc. During my floristic research in the northwestern region of North Macedonia, another new locality of *Cirsium candelabrum* Griseb, was discovered, which represents a new record of the distribution of this species in the flora of Republic of North Macedonia. Examine specimens: near the mountain road, on the right side of the main road, about 1.14 km before the mountain village of Galichnik, on the slopes of Mount Bistra, in the locality known as Bogdanec: 1537 m, 41 ° 35' 24 " N, 20 ° 40' 32 " E, August 2023.

*Keywords:* New locality, *Cirsium candelabrum* Griseb, *Asteraceae*, Galichnik, Republic of North Macedonia.

# STRICTLY PROTECTED, PROTECTED AND INVASIVE ALIEN WILD INSECTS SPECIES OF INSECTS IN NORTH MACEDONIA

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## **Abstract**

After the reviewed literature data and its revision, a valorization of the proposed lists of strictly protected wild insect's species was carried out a total of 55 taxa (49 species and 6 subspecies) in North Macedonian fauna; 24 species belong to Butterflies (Rhopalocera); 1 species of Moths (Heterocera); 5 species of Beetles (Coleoptera); 18 species of Orthopteran (Orthoptera) and 7 species Fly (Diptera).

List of protected wild species in the Macedonian fauna count 490 endangered taxa of insects. 24 species belong to Butterflies (Rhopalocera); 26 species of Moths (Heterocera); 409 species of Beetles (Coleoptera); 13 species of Orthopteran (Orthoptera); 14 species Fly (Diptera); 3 species of true bugs (Hemiptera) and 1 species of sawflies, wasps, bees, and ants (Hymenoptera).

From the available literature data, can be proposed for the list of 38 invasive alien wild insects' species in the Republic of North Macedonia.

*Keywords:* strictly protected, protected, Invasive alien wild species, North Macedonia.

# IDENTIFICATION OF CASES WITH HPV AS THE CAUSE OF UTERUS CANCER IN THE TETOVA REGION

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## Abstract

Among the many types of human papillomavirus (HPV), more than 30 infect the genital tract. The association between certain oncogenic (high-risk) strains of HPV and cervical cancer is well established. Although HPV is essential to the transformation of cervical epithelial cells, it is not sufficient and a variety of cofactors and molecular events influence whether cervical cancer will develop. Early detection and treatment of precancerous lesions can prevent progression to cervical cancer. The purpose of this study is to highlight the cases of HPV in the Tetova Region and conclusions about the situation with this type of virus. This study covers the period from 2019-2022.

The results used in this study were taken from Center of Public Health-Tetovë, North Macedonia. The medical examinations of these parameters on patients were made using HPV-tests which are as similar as a Pap-test (a method based on cells taken from cervix to observe whenever there is a carcinogenic potential on them or not).

The age groups that were the subject of the study ranged from the age of 14 to the age of 75+. The age group between 55 and 64 is mostly affected by uterine cancer.

*Keywords:* HPV (Human Papilloma Virus), cancer, uterus, cervix.

# MICROMORPHOLOGICAL AND HISTOCHEMICAL EVALUATION OF THE GLANDULAR TRICHOMES OF SALVIA FRUTICOSA MILL IN DHERMI AREA, IN SOUTH ALBANIA

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## **Abstract**

The species of the genus *Salvia* are known for their medicinal value due to the presence of chemical compounds or as they are known as secondary metabolites. These compounds are present in the aerial parts of the plant, mainly in their glandular trichomes. The purpose of this study is to evaluate the micromorphological structures of glandular trichomes and identify the secondary metabolites they contain in *Salvia fruticosa* Mill. in Dhermi area, in South Albania.

The histochemical technique used for the identification of secondary metabolites is the classical technique of staining the freehand sections of fresh plant material, which exploits the properties of certain reagents to form with the chemical compounds containing glandular trichomes, stained products visible in the light microscope. Three main types of glandular trichomes were identified: peltate, capitate and digitiforme. Peltate trichomes possess a basal cell, a short unicellular stalk, and a large secretory head with 8 secretory cells. Four types of capitate trichomes and a type of digitiforme trichome have been found in *Salvia fruticosa* Mill. Fenoles were detected in high level at capitate trichomes type I and peltate trichomes. Proteins were detected in high level at capitate trichomes type III. Alcaloides and tanines were detected in high level at capitate trichomes type I,

II, III and digitiforme trichomes. Tanines was detected at peltate trichomes too. Lipides were detected in high level at capitate trichomes type II and III.

Polisacharides were detected in high level at capitate trichomes type II, III, IV, digitiforme and peltate trichomes. Mucilages were detected in high level at capitate trichomes type III and peltate trichomes.

*Keywords:* secondary metabolites, trichomes, peltate trichomes, capitate trichomes, digitiforme trichomes.



# CORRELATION BETWEEN OXIDATIVE STRESS AND DIABETES

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## **Abstract**

The pancreas is a very important gland of the human body, which produces insulin and glucagon, two important hormones that maintain proper blood sugar levels. Diabetes mellitus on the other hand is a chronic medical condition characterized by high levels of glucose (sugar) in the blood due to problems with insulin production, insulin action, or both. Oxidative stress (SO) is a physiological condition that occurs when there is an imbalance between the production of reactive oxygen species (ROS) and the body's ability to detoxify these harmful molecules or repair the resulting damage. Reactive oxygen species are reactive molecules that contain oxygen, such as: superoxide radicals, hydrogen peroxide, and hydroxyl radicals. These molecules are produced as natural byproducts of various cellular processes, but excessive accumulation of ROS can lead to cellular damage and contribute to various diseases. The purpose of this paper is to highlight the cases of diabetes that are related to oxidative stress in the regions of North Macedonia as a growing phenomenon year after year. Also the purpose of the research lies in the deep understanding of this connection which can open the doors to innovative treatments that directly affect the molecular mechanisms of oxidative stress, offering hope for a more effective and personalized approach in the management and treatment of diabetes. As material for this study, were used the statistical data provided by the Institute of Public Health-Skopje. For diabetes statistics, was taken the patients blood as

an analytical sample and it was measured with a glucometer-device which works on the principle of amperometry, where the maximum current obtained during an electrochemical reaction is taken as an indicator of the concentration of the analyte. Oxidative stress is a complex phenomenon and no method gives a real insight into its exact level. The part of measuring oxidative stress was done based on the quantitative method through patient questionnaires, with anamnesis (medical history of the patient) and with the patient survey where we used topics, questions, subjective complaints about their symptoms and professional research about the field of stress as a phenomenon. The study is included in the regions of the Republic of North Macedonia and it covers the period of 2020. In recent years there have been encouraging steps in understanding and studying the pathogenesis of diabetes related to oxidative stress. The epicenter of many researches has been and is finding the key cause for recognizing the deep connection between oxidative stress and diabetes. This research aims to shed light on the need for therapeutic strategies aimed at reducing oxidative stress and preventing its damage to the body.

*Keywords:* pancreas, diabetes mellitus, oxidative stress (OS), reactive oxygen species (ROS).

# ASSESSMENT OF FIN DAMAGE EXTENT IN AQUACULTURE TROUT IN THE LIKOVA REGION

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## **Abstract**

Fisheries and aquaculture have become vital contributors to human existence and progress, so over the last five decades, the supply of fish has outpaced the growth in percentage of the world population, and today fish meat stands as one of the most crucial sources of animal protein. Fin damage in aquaculture trout is a common occurrence in intensive trout production worldwide and our country. The cultivators are aware of its presence, but they don't draw attention and regard it as a “cultivation phenomenon” that cannot be influenced.

This research was conducted at the fish farm in the village Rezhanovtse (Likova region) and analyzed the degree of fin damage in rainbow trout (*Oncorhynchus mykiss*) in several months (February, April, June, and September 2023). In the study, were included two groups of fish (<math>\leq 30\text{ g}</math> and <math>> 100\text{ g}</math>.) Among 430 individuals of fish included in the study, analysis revealed that all fins, totaling 2240 were damaged to different degrees, with a frequency of 100%. Superficial scarring was represented by 53%, breakage by 24%, burning by 9%, bleeding by 7%, and wound close at 5%, additionally, there were instances of fin folding and shedding of fin rays, each occurring at a rate of 1 %. In the group of fish weighing less than 30

g, the damage rates were as follows: 2.30 for the dorsal fin, 1.13 for the caudal fin, 1.29 for the subcaudal fin, 1.72 for the left pectoral fin, 1.71 for the right pectoral fin, 1.39 for the left ventral fin, and 1.42 for the right ventral fin. For fish weighing over 100 g, the damage rates were higher: 3.11 for the dorsal fin, 1.75 for the caudal fin, 1.90 for the subcaudal fin, 2.72 for the left pectoral fin, 2.70 for the right pectoral fin, 2.14 for the left ventral fin, and 2.17 for the right ventral fin. Additionally, in a small number of fishes in the <30 g category, aside from fin damage, were detected deformities (malformations) in their gill cover (operculum). The results of this study revealed that both categories of fish were affected with fin damage and the dorsal and pectoral fins were the most damaged fins. In addition to the visual observations of fins, also were analyzed (May and August 2023) the abiotic parameters of the water that supplies the farm's basins. The values measured in August were higher than those in May, and these changes can be taken as the cause of fin damage in the rainbow trout at this research farm.

We hope that this research will result in proposals for the modification of farming practices and the continuous improvement of the fin profile of cultivated rainbow trout.

*Keywords:* Rainbow trout, farming practices, fish welfare, fin profile.

# IDENTIFICATION OF THE MOST FREQUENT TYPES OF CANCER IN THE POLLOG REGION DURING THE TIME PERIOD 2019-2021

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## **Abstract**

Oncology is a branch of medicine that deals with the study, treatment, diagnosis and prevention of cancer. Cells are the basic units that make up the human body. Cells grow and divide to create new cells as the body needs them. Usually, cells die when they get old or get too damaged. Then, new cells take their place. Cancer begins when genetic changes interfere with this regular process. Cells begin to grow uncontrollably. These cells can form a mass called a tumor. The purpose of this paper is to highlight the most common cases of cancer in the Pollog Region, namely in the cities of Tetovo and Gostivar. This study covers the time period 2019-2021. The purpose of the research is to ascertain the facts about which types of cancer are more frequent in our region, what is the number of these cases based on their type, based on gender and so on; also, diagnostic methods, cancer treatment methods. As material for this study, were used the statistical data provided by the Institute of Public Health-Skopje, for the period 2019-2021, for the Region of Pollog. The computer program Microsoft Excel 2016 was used as a method for statistical data processing. Data on individuals affected by cancer are presented in tabular and graphical form for three calendar years: 2019, 2020 and 2021. In conclusion, my study highlights the prevalence of the most

common cancer cases in the Pollog region during the period time from 2019 to 2021, specifically focusing on the cities of Tetovo and Gostivar. For each year within this timeframe, we have identified the predominant types of cancer in these cities, along with the corresponding number of cases for each type, segmented by gender. Additionally, my research provides valuable insights into the latest preventive and diagnostic methods for cancer. By examining trends in cancer incidence and the effectiveness of various prevention and diagnostic strategies, our study offers important lessons for improving public health interventions and patient care in the Pollog region.

*Keywords:* cancer, tumor, malignancy, neoplasm, oncology, chemotherapy, biomarkers.

# MONITORING OF THE LIVING ENVIRONMENT THROUGH AIR POLLUTANTS IN THE POLOG FIELD PIT OF THE REPUBLIC OF NORTH MACEDONIA

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## Abstract

**Introduction:** The Republic of North Macedonia and especially the field pit of Pollog in terms of geographical position and climatic aspect is considered as a place with different variables such as: temperature, humidity, radioactive exposure, hilly-mountainous relief. The Sharr mountain in the west and the Dry mountain in the north, limit the Polog field pit in all directions, such as north-west and south-east, causing the living environment to deteriorate in the winter period due to air, water and land pollutants. With special emphasis, we highlight the winter season when we have an alarming state of air pollution, such as certain regions of the RMV and especially the region of the field pit of Pollog with the cities of Tetovo and Gostivar and the surrounding area. Recently, the city of Tetova and its surroundings is considered one of the most polluted cities in the country, region and the largest in the world, then this phenomenon of pollution necessarily leads us to unwanted consequences for the population that lives and operates in this region. As a result of

environmental factors such as air pollution and other related factors such as: stress, temperature, food, social genes, mental state and other related factors can lead to disorders in the human body and lead to diseases that attack the nervous and cardiovascular systems, skeletal and thyroid. Many studies talk about the alarming condition of patients who are affected by these diseases, therefore our paper will focus on the effect of these factors above all on the actual state of pollutants in the Pollog region of North Macedonia.

**The purpose of the study:** This paper aims to investigate the potential causes that can affect the health of the population of the Pollog field pit and especially the city of Tetova and its surroundings. As a potential pollutants of the living environment, the following can be considered: carbon monoxide, carbon dioxide, sulfur dioxide, urban combustion from automobiles, combustion of various physical substances, chemical components from factories, smoke from chimneys from burning oil and coal, combustion from wood in the form of pellets, etc.

**Material and working method:** In the study, fertilized chicken eggs were taken and incubated in the incubator for 21 days of incubation. The eggs were treated with air pollutant at certain stages of embryonic development. The eggs hatched on day seven, day fourteen and day twenty one. Using the stereomicroscope with macroscopic and microscopic method were analyzed ontogenetic changes in certain stages of embryonic development.

**Research results:** The results of the research will give a real insight into the situation of the level of pollution of the living environment in the city of Tetovo and its surroundings and in the field pit of Pollog. The monitoring of the living environment can be followed by the treatment of air pollutants in certain doses in the form of ampoule therapy, and the negative effect of the given dose on the hen's eggs will be observed.

**Conclusion:** From the results of the research we can conclude that the potential pollutants from air pollutants can lead to consequences



for the population living in this region but also for the living world in general. These factors can lead to disorders of the nervous system, cardiovascular, and thyroid disorders and other respiratory diseases. This research will give a real insight into the pollution of the living environment and the possible consequences of this at a local, regional and wider level.

*Keywords:* environmental pollutants, dose effect, chicken eggs, stages of embryonic development, health effect.

# NEW LOCALITY OF PLANT SPECIES „VIOLA ALBA” L. IN SAR MOUNTAIN (THE PART OF NORTH MACEDONIAN)

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## **Abstract**

During scientific research 2012-2023 in The flora of Sharr Mountain we encountered a new locality of the plant type *Viola alba* L. Such a conclusion is because through the use of scientific literature “Flora of North Macedonia” *Viola alba* L. has not been recorded as an existing type in the flora of Sharr Mountain and that the ecological importance of *Viola alba* is because there is a very limited distribution in the flora of Sharr Mountain.

Plant type “*Viola alba*” have the flower with white crown and has been found in the alpine area near the village of Gjerma.

*Viola alba* is a type of herb that lives many years, with the stem of 5-15 cm long and a short rhizome,

The plants of *Viola alba* are fragrant, white or purple.

It blooms in May.

It grows in forest glades and thickets.

*Keywords:* *Viola alba*, new locality, rare type, alpine area.

# **MICROBIOLOGICAL AND PHYSIC-CHEMICAL ASSESSMENT OF THE SEA WATER IN ZVËRNECI COAST, VLORË, ALBANIA**

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## **Abstract**

The development of coastal tourism in Albania during the last decade has a huge impact in the sea water quality. As a result, it is showed that the recreative water quality is affected sometimes by the presence of different types of microorganisms, some of them potential pathogens for humans. This study has the main focus in assessment of the seawater in the bathing site of Zvërnec beach in Vlore Albania. The examination of the seawater is based in the evaluation the microbiological indicator such as total coliforms and E coli and also the physical chemical parameter like: pH, temperature, conductivity, DO and salinity. The study was conduct during eight months from June 2022 to January 2023. The samples were collected in six different sites and has been analyzed for both microbial and physic - chemical parameters. The method for the fecal bacteria assessment is the standard technique of MPN. The results show that two stations have e large values of bacterial pollution, and there is a correlation between fecal contamination and temperature. Every station displays the seasonal differences, during summer there is a higher contamination, compared with winter. Therefore, sea water

monitoring of microbiological element must be performed continuously in all the coastal area of Vlora city.

*Keyword:* Fecal contamination, MPN, seawater quality, seasonal variation.

# **DIVERSITY OF BENTHIC MACROMOLLUSCAN COMMUNITIES ON THE ROCKY SHORES OF TRIPORTI, VLORE, ALBANIA**

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## **Abstract**

Over recent decades, numerous experiments have consistently demonstrated that species richness significantly influences ecosystem multifunctionality. These variations within ecosystems arise from natural progressions, as well as from human and natural events. Our study focuses on analyzing both the composition and quantitative characteristics of benthic macroinvertebrate populations along the rocky shores of Triport in Vlora, aiming to assess their ecological conditions.

Our case study involves three observation sites on the rocky shores of Triport in Vlora, where we examine macroinvertebrates. A key objective of our research was to investigate seasonal variations in population traits across different zones, conducting fieldwork during the spring and summer of 2018 (June and August). We calculated both the total and average densities for each species at each site and during each sampling period.

Another critical goal was to evaluate species composition and population quantity traits, comparing these across different seasons and sites, as well as within each site. We also performed statistical analyses to explore changes in species composition and population density, and their interrelationships across different seasons and sites.

The study identified 67 taxa of benthic macroinvertebrates, predominantly gastropods. Our research highlighted the presence of an intriguing and relatively underexplored group, the Macrozoobenthos, within the study areas.

This group's significance is tightly linked to the structure and function of the coastal ecosystem, indicated by a dominance of invertebrate species within the benthic community. Many species within this group serve as indicators of the marine ecosystem's health.

In conclusion, the sparse density and unstable nature of the macrozoobenthic community are strong indicators of the poor ecological conditions and environmental stresses affecting the study areas. Factors significantly influencing the characteristics of the macrozoobenthic population include algal cover, the diversity of microhabitats along the shores, and the degree of exposure to wave action.

*Keywords:* Adriatic Sea, Mediterranean Sea, Triport, Mollusca, Gastropoda, Macrozoobenthos.

# PHYSICO-CHEMICAL AND MICROBIOLOGICAL EVALUATION FOR THE DUKAT STREAM, VLORE, ALBANIA

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## **Abstract**

Over the past few decades, Albania has witnessed significant urban development that has led to substantial environmental challenges. The rapid shift of populations from rural to urban areas has contributed to haphazard urban expansion and associated ecological impacts. The main environmental concerns arising from this transformation include the degradation of natural ecosystems, particularly aquatic ones, which are crucial for maintaining the overall environmental balance. This study focuses on the pollution levels in the Dukat stream, identified as one of the ecosystems significantly impacted by urbanization.

The primary sources of pollution include the disposal of urban and inert waste directly into the environment, the release of untreated wastewater into rivers and seas, deforestation for pasture creation, indiscriminate tree cutting, and the unregulated use of chemical fertilizers and pesticides in agriculture. These activities not only degrade the natural environment but also pose serious risks to water quality, affecting human health and biodiversity.

This research was conducted using modern analytical techniques to assess physical-chemical and microbiological parameters of the Dukat stream's water, based on guidelines set by the World Health Organization and the European Community. From February to September 2021, water samples were collected from eight locations

along the stream for detailed analysis in the Microbiological Laboratory at the Department of Biology, University of Vlora.

The selection of sampling stations was preceded by thorough surveys and sanitary inspections aimed at identifying and understanding the sources and extent of pollution.

The results from the study revealed that the water quality of the Dukat stream is poor, with several pollution indicators exceeding acceptable levels. This highlights the urgent need for strategic interventions aimed at pollution reduction and the prevention of further environmental degradation. The findings underscore the importance of continuous monitoring and the implementation of stringent environmental regulations to protect and restore the health of aquatic ecosystems in the face of ongoing urban pressures. This study serves as a crucial step towards understanding and mitigating the environmental impacts of Albania's rapid urbanization.

*Keywords:* Faecal coliform, Escherichia coli, Dukat stream, water pollution, microbial evaluation.



# **BIOCOENOSIS OF PHOTOPHILIC ALGAE IN THE ROCKY INTERTIDAL AREA OF TRIPORT, VLORE, ALBANIA**

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## **Abstract**

Albanian aquatic ecosystems, characterized by their rich biodiversity and ecological significance, are undergoing significant changes due to anthropogenic pressures and environmental transformations. Among the key biological components affected are the algal biocoenoses, which play a crucial role in aquatic ecosystems by contributing to primary production and providing the foundational support for food webs. The study of algal communities in these waters not only helps in understanding ecological dynamics but also in assessing the health and sustainability of aquatic environments. Given the escalating environmental challenges, such as pollution and climate change, impacting these ecosystems, there is a pressing need for comprehensive studies focused on algal biocoenoses.

Despite the considerable number of studies conducted, the understanding of algae in Albania remains insufficient. As we delve deeper into our investigations, the extent of our knowledge gaps becomes more evident, emphasizing the necessity for a thorough and comprehensive approach to addressing them. Algae, whether exerting a direct or indirect influence, occupy a pivotal role in our ecosystem. We owe them not only for the oxygen we respire, but also for the absorption of carbon dioxide, thus mitigating its accumulation in the

atmosphere. Moreover, they gift us a rich tapestry of biodiversity, serving as crucial habitat-forming organisms.

This research aims to analyze the composition, distribution, and health of algal communities across Triporti rocky shore, employing both traditional and advanced scientific methods to provide a detailed insight into their ecological status and responses to environmental stressors. Such studies are essential for informing conservation strategies and ensuring the long-term viability of Albania's aquatic resources. Along the rocky shores of the Triport area, where biodiversity flourishes, our research endeavors have uncovered a diverse array of species spanning multiple phyla, including Ochrophyta, Rhodophyta, and Chlorophyta. Within this ecologically significant area, we have documented the presence of nine Ochrophyta species, ten Rhodophyta species, four Chlorophyta species, and two species of seagrasses. Notably, the majority of these species exhibit a consistent presence across both spring and autumn seasons. While these species contribute significantly to biodiversity maintenance, the emergence of invasive species, such as *Caulerpa cylindracea*, poses a great threat to indigenous flora and fauna by invading their habitats. Thus, a comprehensive understanding of algae in Albania is important to maintain ecological equilibrium and biodiversity preservation.

*Keywords:* Algae, Ochrophyta, Rhodophyta, Chlorophyta, Adriatic Sea, Mediterranean Sea, Triport.

# WATER QUALITY ASSESSMENT OF THE SHUSHIC RIVER USING BENTHIC MACROINVERTEBRATES

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## **Abstract**

The study of river waters and water flows of their tributaries is very important and necessary for the protection, use and improvement of their condition. According to the Water Framework Directive (WFD, 2000) the use of benthic macroinvertebrates in river water quality monitoring is considered an efficient method.

This study was conducted during 2019 in the Shushicë river, where its purpose was to assess the quality of river waters using the biotic index ASPT (BMWP) and the biotic index - SWRC.

The sampling method used was based on the Kick net technique with a mesh size of 500 microns. From the sampling taken in four stations, 481 individuals belonging to two types (Arthropoda and Annelida), one class (Insecta) and one subclass (N/K Oligocheta) were collected.

The unidentified species belong to 8 orders (Ephemeroptera, Plecoptera, Trichoptera, Diptera, Coleoptera, Haplontaxid, Odonata, Hoplonemertea) and 28 families. Based on the results obtained from the calculation of the ASPT (BMWP) biotic index, station I and III result in a “Clean” bioclassification, station II and IV result in a “Partially clean” bioclassification. From the SWRC Biotic index calculations, the first station and the fourth station result in a bioclassification of “Good”, the second station results in a

bioclassification of “Clean”, and the third station results in a bioclassification of “Excellent”

Based on the Biotic index ASPT (BMWP) and SWRC we can say that the Shushicë river results in water with a good quality, and partially with a slight organic pollution.

*Keywords:* Biotic Index, Bioclassification, Macroinvertebrate, SWRC.

## **COMPUTER SCIENCE**

# **IMPLEMENTATION AND PERFORMANCE ANALYSIS OF A PRACTICAL SYSTEM FOR DIPLOMA VERIFICATION BASED ON BLOCKCHAIN AND AI TECHNOLOGIES**

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## **Abstract**

The development of artificial intelligence in combination with blockchain features is marking a technological revolution in terms of the creation of different intelligent robots, softbots, and more and more attempts are being made to create an artificial human who will be able to help, understand both the speech and the feelings of the real man. Regarding the implementation of decentralized artificial intelligence in institutions of higher education, there are delays in the implementation of blockchain systems for managing large and variable data. This is mainly due to some unique characteristics of the blockchain, which limit the possibility of data variability, and their updating in real time. However, we are witnessing the implementation of intelligent softbots that are helping students in various fields. The purpose of creating intelligent robots, and in particular decentralized artificial intelligence, is not to replace humans, but to use human intelligence to create intelligent devices that, above all, will facilitate their lives and way of working. Through

the paper, we will try to describe the synergy of cooperation between blockchain technology and artificial intelligence in the creation of decentralized big data management systems. We will give the greatest importance to the implementation of these two technologies in the verification of diplomas, as very important documents that are generated by the institutions of higher education. Through predictive techniques, multiple regression, we describe an analysis of the verification of diplomas for a higher education institution within a year, taking simulations as examples.

*Keywords:* decentralized artificial intelligence, blockchain technology, diploma verification, intelligent devices.

# METHOD OF ARTIFICIAL INTELLIGENCE IN IDENTIFICATION OF PLANT DISEASES

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## Abstract

In this paper we give an explanation to the influence of modern technology in the identification of plant diseases. The best way nowadays to solve this problem is some artificial intelligence methodologies, but in particular we will train Machine Learning as a field that deals with the detection of plant diseases. In this paper, we will talk about the basic principles of how artificial intelligence can be practical in agriculture, to select some problems that were once not possible due to the lack of development of technology or the lack of scientific knowledge. Through this work, a software developer can get basic knowledge to develop a software or application that will be able to identify plant diseases. The work includes the methodology of how plant diseases can be identified through any application. Our contribution is for all developers who are interested in developing technology in the field of agriculture, for this reason we have explained the concepts of artificial intelligence and software development methodologies. Readers can have a clear overview of the development of technology in the agricultural sector.

*Keywords:* Artificial intelligence, Software in agriculture, Transfer-learning, CNN architecture, optimizing weights.



# DESIGNING USE CASE DIAGRAMS AND SCENARIOS FOR CREATING THE BLOCKCHAIN SYSTEM FOR BIG DATA MANAGEMENT

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## Abstract

Smart contracts programming plays an important role nowadays in creating blockchain systems. Blockchain technology is one of the technologies that offer hope for overcoming problems related to the preservation of identity, privacy, transparency, and, above all, the immutability of data.

The creation of blockchain systems is a challenge that researchers are facing, especially with big data management, due to the high maintenance costs. Currently, however, blockchain technology is finding a lot of use when combined with centralized databases, effectively replicating a blockchain database and network. Through the paper, we will try to clarify the main challenges in blockchain programming, and the reasons for not implementing blockchain programming for big data management. We will present examples of smart contract programming in the Solidity programming language, and we will make analyses and comparisons with centralized object-oriented systems.

Part of the work will also be the design of use case diagrams and scenarios for the implementation of blockchain systems in big data management. The main purpose of this paper is to arouse some

interest among young developers, to deal with programming in Solidity and the creation of blockchain systems for big data management.

*Keywords:* smart contract, blockchain technology, Solidity programming language, data immutability.

# **FOSTERING INCLUSIVE EDUCATION: EXPLORING THE INTERPLAY OF TEACHER SELF-EFFICACY AND ATTITUDES**

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## **Abstract**

Self-efficacy, a concept rooted in Bandura's social cognitive theory, refers to an individual's belief in their ability to accomplish specific tasks and achieve goals. In the context of teaching, self-efficacy reflects a teacher's confidence in their capacity to effectively manage classroom activities, engage students of diverse abilities, and navigate challenges inherent in inclusive education settings.

Inclusive education, as a philosophy and practice, aims to provide all students, regardless of their background or ability, with equitable access to education. It emphasizes creating learning environments that celebrate diversity, promote respect, and foster a sense of belonging for every student. In this context, teachers' attitudes towards inclusion are crucial, as they influence their approach to teaching and their interactions with students.

Understanding the relationship between teachers' attitudes towards inclusive education and their self-efficacy is vital for enhancing the quality of inclusive education practices. By identifying factors that influence teachers' self-efficacy, such as training, support systems, and school culture, educators and policymakers can develop strategies to bolster teacher confidence and promote inclusive practices that benefit all students.

Research has shown that teachers with higher levels of self-efficacy are more likely to adopt inclusive practices and exhibit greater resilience in addressing the diverse needs of their students. They are also more inclined to collaborate with colleagues, engage in professional development, and seek innovative solutions to enhance student learning outcomes.

*Keywords:* self-efficacy, inclusive education, teacher attitudes, student inclusion, classroom management, diverse learners, teaching practices, professional development, educational equity, social cognitive theory.

# **PLAYFUL BEGINNINGS: THE IMPACT OF PLAY-BASED LEARNING ON EARLY CHILDHOOD DEVELOPMENT IN PRESCHOOLS**

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## **Abstract**

Play is a cornerstone of childhood, offering a myriad of benefits that extend far beyond simple amusement. It is through play that children learn to navigate the complexities of the world around them, developing a wide array of skills that form the foundation of their growth and development.

One of the most significant aspects of play is its role in fostering social skills. Through play, children learn how to interact with others, share, cooperate, and communicate effectively. They learn to understand social cues, develop empathy, and build relationships. These skills are not only crucial in childhood but also lay the groundwork for success in adulthood.

Play also plays a vital role in the development of emotional skills. It provides a safe space for children to express and understand their emotions, learn to manage them, and develop resilience. This emotional intelligence is invaluable in navigating life's challenges and forming healthy relationships.

Furthermore, play is essential for physical development. It helps children develop motor skills, coordination, and strength. Whether it's running, jumping, or climbing, active play is crucial for healthy physical development and overall well-being.

Creativity is another area where play shines. It allows children to explore their imagination, think outside the box, and solve problems creatively. This ability to think creatively is not only beneficial in childhood but also in later life, fostering innovation and adaptability. In essence, play is a powerful tool for learning and development, touching every aspect of a child's growth. Its importance cannot be overstated, as it lays the foundation for a happy, healthy, and successful life.

The purpose of this research is to understand how children learn through play and activities, how both are integrated in a way that children can develop cognitive, social, emotional, physical and creative skills that form the basis of their development in general.

*Keywords:* play-based learning, early childhood development, preschool, educational strategies, cognitive development, learning through play.

# **THE NEED FOR DIGITAL SERVICES IN THE SECTOR OF URBANISM AND LAND MANAGEMENT IN THE MUNICIPALITY OF TETOVO**

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## **Abstract**

The modernization in the urban planning and construction land management sector describes a new level of efficiency and transparency in public administration in the Municipality of Tetovo. This paper provides an in-depth look at recommendations for improvement and the proposed model to utilize technology and innovation to enhance existing processes and address old challenges.

The process begins with the submission of requests for certificates and extracts through a dedicated application for this purpose. Users fill out forms and upload necessary documentation, then track the progress of their request through the application's status.

In the urban planning and construction land management sector, the application assists in the processing and handling of building permit requests. The key component of the construction land management unit relies on specialized databases and algorithms for data analysis and management, ensuring a sustainable data foundation for decision-making processes and urban planning efficiency analysis.

This digitization and modernization initiative ensures a model of transparent and accountable governance, providing citizens and stakeholders real-time access to processes and information related to urban planning and construction land management in Tetovo.

The administration and municipality will have the potential to be the fastest, simplest, and most essential source of information, processes, and services that impact the lives of citizens. This hybrid of technology and local administration transforms into a space more prepared for sustainable urban development and a more advanced future for Tetovo.

*Keywords:* Urban Planning, Digital Services, Building Land Management, Municipal Administration, Efficiency, Citizen Participation



# FACE RECOGNITION: A NEW WAY TO MANAGE YOUR PERSONAL DATA

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## **Abstract**

Our daily lives are becoming increasingly intertwined with facial recognition technology, which presents a new approach to managing personal data. This paper explores the evolution of this technology as it has moved from futuristic concept to practical tool in domains like attendance management and security systems. Our proposed system aims to simplify accessing and updating personal data by utilizing either facial recognition or identification numbers on an innovative platform that serves diverse user needs across devices while emphasizing simplicity and efficiency. We outline the development process using C# programming language, including features such as registration, document requests and automated administrative tasks that improve accessibility while reducing bureaucratic barriers commonly associated with traditional documentation processes. Finally, we discuss prospects for widespread adoption of this emerging technology across various sectors related to enhanced security surveillance in the future. In summary, our contribution exemplifies technological innovation combined with user-centric design aimed at advancing practices for managing personal data toward streamlined operations focused on efficacy-oriented solutions.

*Keywords:* face, recognition, personal, data, personal data, face recognition

# **EXPLORING THE OPPORTUNITIES: BLOCKCHAIN INTEGRATION IN IoT AND ADDRESSING CHALLENGES IN NORTH MACEDONIA**

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## **Abstract**

The convergence of Blockchain technology and the Internet of Things (IoT) presents unprecedented opportunities for innovation in a time marked by rapid technological advancement. This article explores how integrating Blockchain into IoT systems can benefit North Macedonia, focusing on both challenges and solutions specific to this context. The paper begins with explanations of Blockchain and IoT concepts before analyzing the current situation regarding regulations, technology limitations, cybersecurity concerns, which contribute to impeding adoption. Drawing upon best practices from around the world as well as local research studies conducted within North Macedonia itself; multiple strategies tailored uniquely-to-this-context are proposed- such regulatory reforms like stakeholder collaboration drives aimed at raising awareness campaigns & other techno advancements that could drive success through times ahead! Additionally, discussed is just what kind socio-economic impacts may arise out these developments - yet again pointing towards an urgent need governmental guidance so everyone benefits equally without any one individual taking undue advantage over anybody else via policy frameworks designed specifically keeping all possibilities intact.

*Keywords:* IoT, North Macedonia, Blockchain, exploring.

# THE USE OF AI IN SOLVING PROBLEMS IN AGRICULTURE

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## **Abstract**

With the global population surpassing 8 billion and projected to escalate to 9.7 billion by 2050, the imperative to enhance food production efficiency becomes ever more critical. In this context, leveraging artificial intelligence (AI) technologies emerges as a pivotal strategy to optimize agricultural resources and boost productivity. By leveraging AI-powered solutions, farmers can predict optimal planting times, select the most suitable seeds for varying weather conditions, and improve crop yields. AI also provides valuable weather forecasts, allowing farmers to plan and utilize resources effectively. Additionally, AI facilitates soil analysis, suggesting nutrient improvements for enhanced soil quality.

This paper dives into the growing role of AI in agriculture, exploring how it's revolutionizing farming practices and improving efficiency while minimizing waste and environmental impact, particularly in the context of soil moisture detection using Arduino technology. By integrating AI with Arduino, farmers can revolutionize their approach to soil management, enabling real-time monitoring of moisture levels and facilitating more precise irrigation practices. The synergy between AI and Arduino offers a promising avenue for sustainable agriculture, empowering farmers to make data-driven decisions for optimal crop growth.

Through this study, we hope to emphasize the importance of AI in agriculture and demonstrate its numerous uses in optimizing farming operations and ensuring food security for a growing global

population. By showcasing the practical application of AI in soil moisture detection, we aim to inspire further innovation and adoption of AI technologies in agriculture for a more sustainable future.

*Keywords:* AI, agriculture, Arduino, Irrigation, monitoring.

# **A COMPARATIVE STUDY OF IDENTITY ASSURANCE: KANTARA, EIDAS, AND REFEDS PERSPECTIVES ON LOA**

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## **Abstract**

In the contemporary era marked by the pervasive use of digital devices, safeguarding electronic identity has become indispensable for ensuring secure and dependable interactions within federated systems. This paper undertakes a comparative analysis of identity assurance frameworks, with a specific focus on the perspectives provided by Kantara, eIDAS, and REFEDS systems concerning Levels of Assurance (LoA), involves examining various aspects of their identity assurance frameworks, standards, and implementations.

Although Kantara, eIDAS and REFEDS share a common goal of increasing identity assurance and trust in federated systems, they differ in their scope, regulatory mandates, LoA frameworks and approaches to adoption and implementation. Understanding these differences is essential for organizations looking to navigate the complex landscape of identity management and choose the most appropriate frameworks for their specific needs.

Through a meticulous review of each framework, this study delves into the foundational principles, methodologies, and implementations underpinning identity assurance within federated systems. By scrutinizing the perspectives of Kantara, eIDAS, and REFEDS, this analysis elucidates the similarities, distinctions, strengths, and

limitations of each framework in tackling identity assurance challenges.

Furthermore, this study explores the implications for future research and development in federated identity management, providing higher security of the electronic identities of users of federated systems. By fostering a deeper understanding of identity assurance frameworks, this comparative analysis contributes to the advancement of secure and trusted digital interactions in various organizational systems.

*Keywords:* Electronic identity, Federation systems, Level of Assurance (LoA), Kantara, EIDAS, REFEDS.

# WEB-BASED MANAGEMENT SYSTEM IN TEXTUAL FORMAT FOR OFFERS, CONTRACT AND PAYMENT FOR CONSTRUCTION COMPANY

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## **Abstract**

Construction companies do not differ much in methods of effective management and organization of work, in the evidence of services, how they control processes optimized through clear rules. Therefore, a well-organized digital management system is needed.

OCP is a web application for the realization of work services for construction companies, in the System of Managing Offers, Agreements and Payments, uses template in textual form clauses in order to act systematically to standardize their own workflow in a central place, automates until their execution.

The web application is in Albanian language, while documents are printed in Albanian and Macedonian languages, helps to consistently realize the services of the construction company to the client in three phases:

The Offer created and is only issued by the company and given to the client, has written containments for the services it offers, such as cost and other details.

The Agreement contains a lot of information is the second phase when client and construction company agree on the way of project implementation such as cost, term of realization, payment deadline, third intermediary etc.

Payment is the document that includes the deadline and the payment of the project implementation, additional payments for works carried out of the agreement.

The three completed documents have a unique identification number, title and containment of the document, with clear attributes to which client they belong, the employees who are issuing the document and the data of the company that carries out the project.

- A summary of reports in the form of a table for all processes carried out from the beginning to the end of the process, as well as the printing of reports by filtering them by client, periods between dates.

- System users have two privileges, Admin having access to the entire system while the user limited access can only create offers but not contracts and payments. Any data created is identified with user data.

The OCP system can be installed in Webserver or Cloud, used technologies, PHP MySQL and JavaScript, implemented in the Web-PWA (Progressive Web App) platform and responsive design for use on PC, laptop, tablet, cellular phones, depending on the country and time it operates.

In terms of security, soft-delete techniques are used for deletion of data, this allows you to mark some records as deleted without actual deletion from the database, Effectively, you prevent the selection of a soft-delete record, while all old records can still be referred to.

Therefore, this particular menu article has systemic management of bids, Offers, Contracts and Payments because they contain periods of time between them from the beginning of projects to the realization. They are created and support safely and clearly for selecting and adapting to constantly changing conditions. Digitizes and stores all



three documents in a central location in the database and system; Automates the workflow focusing on the creation and execution of the offer, contract and payment, expands in volume with the addition of new data.

*Keywords:* Construction Company, Online Management, Offers-Contracts-Payments, Documents.

# A COMPARATIVE ANALYSIS OF OFFLINE WALLETS AND THEIR INTEGRATION WITH NFC FOR PRACTICAL OFFLINE PAYMENTS

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## **Abstract**

In this paper, we conduct a comparative examination of offline (cold) wallets that are designed for storing cryptocurrency. Our analysis focuses on security, usability, and accessibility, with specific attention given to popular solutions like Ledger and Trezor. We evaluate these wallets on the basis of how practical they are to use without compromising security and efficiency.

Furthermore, we explore the integration of Near Field Communication (NFC) technology into offline wallets. This approach aims to make cryptocurrency transactions more secure, convenient, and user-friendly, especially in Electric Vehicle (EV) charging stations. By envisioning a future where transportation infrastructure and cryptocurrency security intersect, our research seeks to advance technologies that balance security with the demands of modern payment systems.

Through this effort, we aim to provide valuable insights to stakeholders in the cryptocurrency ecosystem, informing strategic decisions and driving the development of secure, user-centric financial technologies. By shortening the gap between theoretical security concepts and real-world operational needs, our work aims to

help other researchers and stakeholders to create a future where blockchain-based currencies can be just as practical as efficient.

*Keywords:* blockchain, NFC, electric vehicles, Ledger, Trezor, EV charging.

# NAVIGATING ETHICAL TERRAIN: ARTIFICIAL INTELLIGENCE AND HUMAN RIGHTS IN THE DIGITAL AGE

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## **Abstract**

This study conducts a thorough analysis of the ethical dimensions arising from the convergence of artificial intelligence (AI) and human rights concerns. Delving into existing literature, it scrutinizes the potential risks and advantages inherent in artificial intelligence technologies concerning fundamental human rights. The examination extends beyond mere technological advancements to encompass the intricate ethical, legal, and social ramifications emerging in tandem with AI progress.

Through synthesizing insights from diverse sources, this article endeavors to elucidate the multifaceted relationship between technology and human rights in the contemporary digital landscape. By critically evaluating the ethical implications, it seeks to deepen our comprehension of the challenges posed by AI deployment and its impact on human rights paradigms.

This comprehensive review underscores the imperative to navigate the intricate terrain of artificial intelligence ethics, considering its implications for fundamental human rights. By shedding light on the complexities inherent in this intersection, the study contributes to a nuanced understanding of the ethical imperatives guiding AI development and deployment in the digital age.

Additionally, it emphasizes the need for proactive measures to safeguard human rights in the face of advancing AI technologies, advocating for robust ethical frameworks and regulatory mechanisms to uphold fundamental rights in AI-driven societies.

*Keywords:* digital landscape, human rights, ethical implications, technological advancements, AI.

# **AN OPTIMIZATION MODEL FOR WASTE COLLECTION PATHS THAT AIMS TO CONNECT COST REDUCTION AND EMISSION MITIGATION IN ORDER TO ATTAIN SUSTAINABLE DEVELOPMENT OBJECTIVES**

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## **Abstract**

In the contemporary era, population growth and urban expansion are driving the necessity for creating a capable waste management system (WMS) that is based on recent advances and emerging models. Within these systems, waste collection appears as a key function alongside various procedures. A new approach presented in this research suggests the implementation of a two-level WMS to reduce operational costs and environmental implications through the incorporation of Industry 4.0 ideology. Both frameworks use the latest IoT-based traceability devices to compare real-time data on waste levels in containers and sorting facilities against a Threshold Waste Level (TWL) parameter. The primary model focuses on optimizing the operating costs and carbon dioxide emissions associated with transporting waste from containers to sorting facilities, integrating considerations for time constraints. Then, a capacity-constrained vehicle routing problem is formulated as a follow-up model to reduce the costs associated with transporting waste to recycling facilities. To determine the most effective solution,

modern meta-heuristic algorithms are deployed, along with the development of various innovative heuristics that are tailored to the specific requirements of the problem. Furthermore, these newly generated heuristic approaches are used to generate preliminary feasible solutions within the meta-heuristic domain, which are then compared to randomly generated solutions. An evaluation of the efficiency of the proposed algorithms is performed, applying the best-worst method (BWM) to rank the algorithms based on criteria such as relative percentage deviation, relative deviation index and hit time.

*Keywords:* IoT, Smart Waste Management, Smart Bin, Heuristic

# THE LEVEL OF AWARENESS AND RECYCLING HABITS OF UT-COMPUTER SCIENCES STUDENTS ON E-WASTE MANAGEMENT

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## **Abstract**

Anything with electricity or electronic components is considered electronic waste, often known as Waste from Electrical and Electronic Equipment (WEEE). The rapid demand for technology has led to the continuous production of new electronic devices. According to statistics, e-waste production reached a record 62 million tonnes (Mt) in 2022, up 82% from 2010. This paper aims to investigate the knowledge of first cycle computer science students at the University of Tetova regarding electronic waste, recycling, and environmental harm that these devices can cause. Our findings are critical in helping IT businesses and legislators implement financial incentives, secure disposal facilities, and corrective measures to raise the amount of e-waste disposed of. The study's conclusions demonstrate that, despite the fact that most Computer Sciences students knew not much about e-waste recycling, they had a marked increase in awareness and knowledge of this topic. Furthermore, it was noted that there was a considerable direct impact of the educational intervention on the students' intention to recycle e-waste.

*Keywords:* E-waste, WEEE, computer sciences students, recycling.



## **CHEMISTRY**

# INCREASING THE EXTRACTION COEFFICIENT FOR THE RAW MATERIAL CENTELA HERBA ASIATICA BY OPTIMIZING THE SIZE OF THE GRANULES OF THE RAW MATERIAL

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## Abstract

Preparation of pharmaceutical plant raw material Centela Herba asiatica is one of the main factors of the extraction coefficient, and also in the optimization of the extraction process.

Regardless of which extraction method is used, the size of the granules must be optimal for realization of this process, and first it has to do with the increase of the active surface of the

raw material when the same is in contact with the solvent. This is a golden rule for the extraction process, but it cannot be said that this rule also applies to the pharmaceutical raw

material Centela Herba asiatica, since this makes the technological process not realizable in practice, by creating separate focol which link with one another and they stop the extraction process, with this the extraction coefficient also decreases, therefore it is required an optimal size of the granules in one hand to carry out the extraction process till the end, and on the other hand, to reach the maximum extraction coefficient by extracting the useful main substances of the

plant raw material, by preventing the extraction of undesirable accompanying substances that are accompanying to the raw material such as sugars, chlorophyll and others, which hinder further technological process.

*Keywords:* extract, granules size, Extraction coefficient.

# GRANULOMETRIC OPTIMIZATION AND SOLVENT CONCENTRATION FOR THE EXTRACTION OF PHARMACEUTICAL RAW MATERIAL ECHINACEA PURPUREA

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## Abstract

The amount of the extract and the extraction of the main substances of the raw material Echinacea is closely related to the degree of refinement of the raw material as well as the concentration of the solvent used for extraction. The optimal size of granules of the raw material first affects the extraction coefficient as well as development of maceration and filtration process, this is because this raw material has a high extraction capacity, which is also accompanied by impurities of the extract after the maceration process, which complicates the filtration process. In order not to have this property of the plant raw material and to make possible to have a linear extraction, the raw material must have an optimal size of refinement.

The concentration of the solvent is also the main factor in the course of the maceration process and the increase of extraction coefficient. For low concentrations of the solvent, a proper process of maceration cannot even be carried out, and the high concentration of the solvent also causes withdrawing undesirable substances during maceration,

and at the same time elimination of a quantity of main substances of the raw material *Echinacea pur.* Therefore, it is required an adequate concentration for the maceration to be carried out without any difficulty and also not compromise elimination of the main constituent substances, and on the other hand not to extract unwanted substances such as sugars and chlorophyll which make the extract impure and make difficult the technological process for obtaining the extract. It is required to choose a level of concentration of the solvent which creates good extraction capacities during maceration and during filtration. The solvent must have an optimal density to withdraw the filtered solution.

*Keywords:* Maceration, filtration, grain size.

# DESIGN AND SYNTHESIS OF SOME NOVEL COMPOUNDS DERIVED FROM HYBRID COUMARIN-THIAZOLE STRUCTURES

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## **Abstract**

Coumarins are molecules that belongs to a special family of compounds which, due to the conjugated double bond become interesting molecules for many fields of study. Their structure and physical properties make them a privileged scaffold in medicinal chemistry. Also, they exhibit a wide range of biological activity including free radical scavenging. Recent research has focused attention on the anticancer activity of coumarin and coumarin-derived compounds due to their high level of cytotoxicity. Thiazole rings, on the other hand, had also showed remarkable anticancer activity on various cancer cells. Based on this, the idea was to combine those two heterocyclic units in one hybrid unique molecular structure with high anticancer potential. The synthetic strategy was simple, applying the reaction of diazotation of 2-aminothiazoles and using the corresponding diazonium salts as good electrophiles to attack the 4-hydroxycoumarin at position 3. Furthermore, it was revealed by previous investigation that the alkylsubstituent at the thiazole ring is playing key role. Namely, by increasing of the

nonpolar tail at that part of the molecule, the biological activity is also increased. Based on this, some 4-substituted-2-aminothiazoles were synthesized by optimization of the Hantzsch reaction, prior to diazotation and coupling with the coumarin core. All of the newly synthesized compounds were purified by crystallization and the melting

point was determined. Finally, the obtained compounds were characterized by spectroscopic means.

*Keywords:* synthesis, coumarin, thiazole, Hantzsch reaction, diazotation, copulation, spectroscopy.

# ANTICOAGULANT ACTIVITY OF SYNTHETIC COUMARIN DERIVATIVES: A COMPREHENSIVE STUDY

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## **Abstract**

The primary objective of this study was to document the synthesis of several coumarin-type derivatives. The structural confirmation of these synthesized compounds relied on a combination of literature data and spectroscopic analyses, including NMR, MS, and IR techniques. Additionally, the study aimed to achieve two specific goals: firstly, to evaluate the *in vivo* anticoagulant effects of these synthetic derivatives in laboratory male mice (*Mus musculus swiss albino*); and secondly, to compare their efficacy with that of warfarin (CAS 81-81-2), a widely used anticoagulant.

Prothrombin time (PT) served as the benchmark for assessing the anticoagulant properties of the synthesized compounds in comparison to warfarin. Our findings revealed that among the synthesized derivatives, compound 5 exhibited the most potent anticoagulant activity, with a PT value of 19.60, surpassing that of warfarin, which had a PT value of 14.60. However, it's noteworthy that the observed anticoagulant activity of the synthesized compounds was accompanied by toxicity. Consequently, further investigations are warranted to comprehensively assess the safety profile of these compounds, particularly compounds 4 and 5. Despite this, the synthesized coumarins hold promise as potential candidates for the development of antithrombotic drugs, warranting further exploration and elaboration in future research endeavours.

*Keywords:* Coumarine derivatives, Hydroxycoumarin, Warfarin, Anticoagulant activity.



# REMOVAL OF Cr(VI) FROM AQUEOUS SOLUTIONS BY OPALIZED TUFF

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## Abstract

In the modern society, the management of the water resources is very important for the environment protection. The water pollution with heavy metals is one of the biggest environmental problems because of their toxicity. Chromium is ranked as most toxic pollutant of wastewaters. Chromium is carcinogenic and mutagenic in very low concentration values (sub-ppm). The removal of Cr(VI) from wastewaters is a necessity especially because of its toxicity for the living beings and the environment. In this work, the adsorptive properties of opalized tuff from Republic of North Macedonia for Cr(VI) removal were studied. The adsorption capacity is analyzed using spectrophotometric method (UV/VIS Spectrophotometer). Results from the spectrophotometric analysis gave us insight for the starting concentration of Cr(VI) before adsorption and concentration after adsorption. The physical, chemical and mineralogical characteristics of adsorbent is studied. The following experimental techniques were used for opalized tuff: XRD, TGA-DTA, FT-IR and gravimetric method for specific surface area determination. The adsorption experiment was performed at laboratory batch reactor, at constant room temperature, different initial Cr(VI) ions concentrations and at different pH of the solution. It was

observed that the adsorption capacity of the adsorbent was highly dependent on the pH of the solution.

*Keywords:* Cr(VI) ions, adsorption, water resources, opalized tuff, heavy metal, wastewater.

# INFLUENCE OF DEPOSITION CONDITIONS DURING PRECIPITATION OF $\text{NH}_4\text{VO}_3$ WITH DIETHYL SULPHATE

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## Abstract

The vanadium(V) oxide xerogels are synthesized by chemical bath deposition using aqueous solutions of  $\text{NH}_4\text{VO}_3$  and diethyl sulfate. XRD and IR have been used for characterization of composition of the prepared precipitates. The concentration, temperature and the precipitation speed influence were analyzed. Large number of experiments have been made with the powders obtained at different ammonium metavanadate concentrations solutions, with same volume of diethyl sulphate, at two working temperatures, 80 and 90 °C. The obtained results showed that at higher concentrations of ammonium metavanadate, as well as at higher temperatures, faster precipitation occurs. According XRD and IR results synthesized precipitates are pure  $\text{V}_2\text{O}_5$  xerogels, but at higher concentrations of the solutions the second phase is obtained. Also, the influence of ethyl alcohol on the composition and time of precipitation of the synthesized precipitates was investigated in metavanadate system with different concentrations of ammonium metavanadate and diethyl sulfate. It was found that the presence of alcohol in the chemical bath does not affect the composition of the xerogel at higher concentrations, but it has an influence on the speed of the precipitation. The results of precipitates prepared at lower concentrations with ethanol showed presence of second phase in the composition, which can not be seen in the composition of the sample

prepared without of ethanol at same concentration of ammonium metavanadate.

*Keywords:*  $V_2O_5$ , gels, conditions, diethyl sulphate, ethanol.

# MONITORING THE WATER QUALITY OF THE VARDAR RIVER IN THE VELES REGION

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## Abstract

Water is a vital resource for biodiversity and ecosystems, while only a small portion of it is suitable for human use. Disruption and pollution of water sources have a significant impact on ecosystems and public health. This study aimed to document the quality of the Vardar River waters through chemical analysis, including the levels of nitrates, nitrites, dissolved oxygen, and heavy metals. Through this research, pollution sources and their impact on the ecosystem's fauna and flora were identified, providing information for improving water quality measures. The methods used were suitable for chemical water analysis and were employed to determine chemical pollutant concentrations. Results obtained during the months of February, March, and April indicated that water was most polluted in March. Parameters such as dissolved oxygen, BOD, ammonia, nitrites, nitrates, chlorides, and heavy metals reached relatively high values exceeding maximum allowable standards according to international norms. In February, copper had the highest values among metals, while in March, iron, copper, and zinc were predominant, and in April, iron, copper, and zinc were the highest. The findings of this study can serve as a basis for formulating water resource protection policies and biodiversity conservation in the study area.

*Keywords:* Vardar river, water quality, heavy metals, pollutants, Atomic Absorption Spectroscopy.

# SEPARATION OF Cr(VI) FROM AQUEOUS SOLUTIONS BY DIATOMITE

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## Abstract

The heavy metals pollution is a serious environmental problem, especially the presence of the hexavalent chromium ions in the water resources. The removal of Cr(VI) from wastewaters is a necessity especially because of its toxicity for the living beings and the environment. When it accumulates in living organisms can cause major health problems. Among viable options, natural inorganic materials are considered as possible sorbents for the heavy metal ions elimination. The aim of this work is to investigate the adsorption ability of diatomite to remove chromium (VI) ions from aqueous solutions. The adsorption experiment was performed at constant room temperature, different initial Cr(VI) ions concentrations and at different pH of the solution. In this study, adsorption capacity is analyzed using spectrophotometric method (UV/VIS Spectrophotometer). The following experimental techniques were used for diatomite characterization: XRD, TGA-DTA and FT-IR. The surface area of the sorbent was measured by BET method. With aim to the dermine the optimum pH value for maximal removal of Cr(VI) ions, the point of zero charge, pH PZC , for investigated material was obtained. The results confirm the possibility of applying the natural

material, diatomite, as effective and economic sorbent for heavy metals removal from water resources.

*Keywords:* Cr(VI), heavy metal, adsorption, diatomite, point of zero charge.

## **GEOGRAPHY**



# THE EXTENT OF AGRICULTURE IN THE REGIONS OF NORTHERN MACEDONIA

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## **Abstract**

The agricultural sector displays distinct characteristics compared to other sectors of the economy. While market competition determines the fate of businesses in most sectors by favoring the best solutions, agriculture experiences exceptions due to state support in the form of subsidies. The primary rationale behind direct state support in agriculture is the essential nature of food for human survival. Agriculture encompasses a broad range of economic activities, including land cultivation, plant cultivation, animal breeding, and their utilization for human needs.

Although agriculture is closely associated with natural conditions, it is crucial not to overlook the significant role played by social factors in its development. Natural factors for analysis include topography, climate, water resources, soil composition, flora and fauna, and the geological and petrographic characteristics of the soil. Social factors to be considered include land improvement, mechanization, chemical inputs, seed selection, animal breeding, and the establishment of vocational schools.

In North Macedonia, there are six agricultural regions: Golemozerski Region, Western Region, Skopje and Kumanovo Region, Eastern Region, Mediterranean Region, and Pelagonia Region. As a developing country, North Macedonia is undergoing a transition towards transforming its agriculture sector from a semi-open sector in international trade to a more open and liberalized one

with support from both internal and external sources. This paper aims to critically assess the progress and prospects of North Macedonia in these processes and draw conclusions regarding the best alternatives for agricultural development.

*Keywords:* Agriculture, regions, crops, soils, meadows, perspectives.

# **THE DEVELOPMENT OF TOURISM IN THE THERMAL-MINERAL BATHS OF THE MUNICIPALITY OF DEBAR**

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## **Abstract**

This paper deals with the thermal-mineral baths of Dibra, their potential and their role in tourism, as well as the number of visitors who frequent these baths during the year. These baths are located in the western part of the Republic of North Macedonia and are located in the rural settlements of Banjisht and Kosovrast, at an altitude of 880m (in Banjisht) and 590m (in Kosovrast).

The thermal-mineral baths “Capa”, in the villages of Banjisht and Kosovrast, are among the tourist attractions with the greatest potential in the municipality of Debar, playing a primary role in economic development, increasing financial income, employment and improving the living conditions of society.

Some of the methods used in this paper are descriptive methods, analytical methods, comparative and statistical methods, graphic and cartographic methods, taking into account the official data of the State Population Statistics Agency of the Republic of North Macedonia, as well as the data of taken in the field.

This paper aims to present the values of these thermal localities, which at the same time represent an important natural resource in terms of attracting local and foreign tourists, as well as to provide analysis on the factors that influence tourist movement, the dynamics

of the number of tourists throughout the years, the benefits, etc. The high healing quality of thermo-mineral waters is the most important recreational and therapeutic element in these baths, which in combination with elements such as climate, landscape and biogeographical qualities enable to fulfill the healing ability that is determined to cure various diseases.

*Keywords:* thermal-mineral baths, attractions, tourists, economic development.

# **THE NATURAL MOVEMENT OF THE POPULATION IN REPUBLIC OF NORTH MACEDONIA 2014-2022**

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## **Abstract**

The subject of this paper is the natural movement of the population in NMK for the period 2014-2022. The aim is to analyze the demographic components of natural population growth such as natality, fertility and mortality.

The population in NMK plays an important role in the development of the country, depending on natural, economic and social factors. In the last decade in the geographical space of the NMK, significant changes have occurred in the socio-economic plan and especially in the demographic of its population. Special attention is paid to the natural movement of the population, as it affects the movement of the general population in the NMK.

The methods used in this paper are: descriptive, analytical, comparative, statistical, graphic and cartographic methods, taking into account the official data of the State Statistics Agency for the Population of NMK.

The natality has generally decreased from 2014-2022 from 11.4 ‰ to 9.9 ‰. But mortality has increased in 2014-2022 from 9.5‰ to 12.3‰ (as a result of Covid-19). Regarding these rates, we found that natural growth has decreased from 1.9‰ to -2.4‰. If we analyze the fertility rate, we will notice that there are changes over the years, from

1.52‰ (2014) there is a decrease to 1.31‰ (2020) and then there is an increase to 1.6‰ (2022).

This paper pays particular attention to the aforementioned demographic features at the state level. In our opinion, in order to change the values in the natural rate of population growth and in the general population, specific policies should be undertaken, which would increase the birth rate and help stimulate families by first providing secure jobs for parents, additional financial resources and creating a perspective for the future, which would help increase births and decrease migration.

*Keywords:* population, natality, mortality, natural growth, NMK.

# **MARRIAGES AND DIVORCES ACCORDING TO AGE IN NORTH MACEDONIA (2010, 2015, 2020, 2022)**

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## **Abstract**

The subject of this paper is marriages and divorces according to age in the Republic of North Macedonia. The main goal is to analyze these components throughout the years 2010, 2015, 2020 and 2022, to see mainly the age of marriage of couples and also the age which marks a higher number of divorces.

Marriage is the legal union of a woman and a man, in spouses, family and society and as such it represents a very important demographic process for society, which, in case of dysfunction leads to divorce as another social process. Divorce is a civil act that separates spouses from their marriage, usually involving the annulment or reorganization of the legal duties and responsibilities of marriage.

The methods used in this paper are: descriptive, analytical, statistical, graphic and cartographic, where the data obtained from the state statistics agency of North Macedonia were analyzed.

Based on these parameters, we note that the age of entry into marriage is mainly from 25 to 29 years, while the age most affected by divorces is from 40 to 49 years of marriage according to age groups. The number of marriages in the age group up to 20 years is higher in the female gender compared to the male one, while the opposite happens

in the age group over 55 years. This result is also presented to us in divorces.

From the analysis we can conclude that young people enter into marriage at a later age, mainly 25-29 years old, we also see a high number of divorces, therefore we recommend that young people be provided with the basic conditions for life, work and safety and to be stimulated to continue their growth in the family.

*Keywords:* marriage, divorce, age group, Republic of North Macedonia.



# DYNAMICS AND CAPACITIES OF EDUCATIONAL FACILITIES IN POLLOG REGION

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## **Abstract**

The dynamics of educational institutions in the Pollog region in recent years have seen efforts to improve educational infrastructure by investing in new schools and providing more opportunities for education. At the same time, there have been challenges affecting the dynamics of education, such as lack of resources and infrastructure, high unemployment rates, and a decrease in the number of students.

However, efforts to improve this situation continue, including enhancing the quality of education and increasing opportunities for skill development and professional growth. The capacities of educational institutions in the Pollog region depend on the number of schools, universities, and other educational institutions in this area. These capacities include classrooms, laboratories, libraries, and other necessary infrastructure.

Education in the Pollog region is one of the main components of its development. Considering that Pollog is located in North Macedonia, North Macedonia and the Pollog region have a developed education system, offering primary, secondary, and higher education schools.

In the Pollog region, there are a total of 9 municipalities: Bogovina Municipality, Bervenica Municipality, Zhelina Municipality, Vrapcishti Municipality, Jegunovce Municipality, Gostivar

Municipality, Mavrovo and Rostuša Municipality, Tearce Municipality, and Tetovo Municipality.

In the Pollog region, we have 147 primary schools, 17 secondary schools, a total of 1066 graduated students, while in North Macedonia we have a total of 976 primary schools, 129 secondary schools, and a total of 6926 graduated students.

*Keywords:* educational institutions, Pollog region, investment in school, professional growth.

# DEVELOPMENT TRENDS OF SPA TOURISM IN THE REPUBLIC OF NORTH MACEDONIA

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## **Abstract**

This paper analyzes the development of spa tourism in North Macedonia. Spa tourism as the use of thermal, mineral, and thermal-mineral waters, for treatment, rehabilitation, and recreation where numerous recreational, sports, and cultural activities are held. This type of tourism is one of the oldest organized forms of tourism in the present-day area of North Macedonia, since ancient times. The Republic of North Macedonia as a state that the possibility of having a developed tourism economy should be based on its alternative forms, with the proper utilization of mineral and thermal-mineral resources, the country will have great benefits from curative and spa tourism.

The focus of the paper will be the thermal mineral spas: Katllanova Spa, Koçani Spa, Spas of Dibra: Kosovrast and Banjishte, Kezhovica Spa, Bansko Spa, Negorci Spa, Kumanovo Spa. In addition to these thermal mineral baths that are already used by tourists, less well-known sources that have the potential to turn into new tourist destinations will be mentioned, such as: thermomineral resources close to river Shkumbim near Tetovo, Dobrevo in Zletovo, Istibanja in Vinica, Uji i së shtunës (Sabota Voda) in Veles, Tople in Dojran, Volkova in Skopje and others.

Following is the data on the number of tourists, the number of domestic and foreign tourists and the nights spent by them in spa

resorts for the period 2018-2022. And the accommodation capacities found near the thermal mineral baths.

*Keywords:* Spa tourism, thermomineral baths, thermomineral spring, tourists, North Macedonia, etc.

# THE ROLE OF ALTERNATIVE FORMS OF TOURISM IN THE PROMOTION OF THE TOURIST LOCATIONS OF SHARR MOUNTAIN

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## **Abstract**

The basis for the development of alternative forms of tourism is founded on the attractions of natural and anthropogenic origin that the landscape contains.

Sharr Mountain is a set of natural rarities and beauties, each of which represents separate rarities.

A significant place in the paper is occupied by the section dealing with the most important characteristics and values that affect the development of alternative forms of tourism such as geographical and tourist position and traffic connection, geomorphological characteristics, climate characteristics, hydrographic characteristics, flora and fauna, where special emphasis will be placed on the tourist sites of Sharr Mountain such as Brustovec, Leshnica, Popova Sapka, Ljuboten which have greater potential in the development of alternative forms of tourism in Sharr Mountain.

The natural beauties that these tourist sites contain are quite interesting and represent a great tourist offer.

Given the growing involvement of tourists in various alternative tourism activities, it can be seen that this sector of alternative tourism, as part of the tourism industry, is gaining importance.

That is why this issue is being addressed, and the possibilities for development of alternative forms of tourism in the Southwest region of the Republic of North Macedonia are being explored.

The Popova Shapka site is the only site that has a tourist infrastructure, which from a historical point of view it can be concluded that this site was closer to the road and had the advantage of being the first to develop as a tourist center.

*Keywords:* Sharr Mountain, natural features, tourist sites, alternative tourism.

# **MATHEMATICS**

# CONNECTEDNESS WITH F-OPEN SETS

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## **Abstract**

An F-open set is an open set with a finite boundary. Here it is defined the F-connectedness of a topological space as a space which cannot be expressed as a union of two non-empty disjoint F-open sets. It is shown that connectedness and F- connectedness are equivalent notions.

*Keywords:* Connectedness, F-open sets, Components, Quasicomponents.



# ON DYNAMIC OF HENON MAP. HOW TO CONTROL IT!

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## **Abstract**

Most of the dynamics displayed by highly complicated nonlinear systems also appear for simple nonlinear systems. The purpose of the a two-dimensional map with a strange attractor was for it to be a simple mapping that possesses similar properties to the Lorenz system and its Poincare map. Henon map is investigated, periodic points are found, and chaotic attractors are produced.

In this paper we will demonstrate an orbit of the Henon map with 10000 points, with vary on initial conditions of the orbit and the values of the two parameters of the system. Known that the chaotic attractors in the Henon map are neither area filling (dimension 2) nor a simple curve (of dimension 1), the dimensions of these complicated geometries must be non-integer values between 1 and 2, and the chaotic attractors are then called fractals or strange attractors. The capacity or box-counting dimension  $d_{box}$  is the simplest possible way to measure such pathologies. We use The OGY (Ott, Grebogi, and Yorke) Method with the idea to make small time-dependent linear perturbations to the control parameter  $p$  in order to nudge the state towards the stable manifold of the desired fixed point.

Acting on 500 equally spaced initial points  $(x_0, y_0)$  on a circle or a square, represent an numerical experiment which may give us some hints about why Jupiter's red spot and Saturn's hexagon-shaped hurricane seem to exist forever without contracting.

*Keywords:* Discrete nonlinear systems, Henon map, chaotic attractor, box-counting dimension, fixed point, OGY method.

# THRIAD GEODESIC COMPOSITION IN FOUR DIMENSIONAL SPACE WITH AN AFFINE CONNECTEDNESS WITHOUT A TORSION

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## **Abstract**

Let be an affinely connected space without torsion. Following [7] we introduce the affinors and which define the composition and , respectively. The first two composition are conjugate. The composition generated by the affinor is considered too. We have found necessary and sufficient condition for any of the above composition to be of the kind . Characteristics of the space that contain such composition are obtained, Connections between Richi's tensor and fundamental density of are establish when the space is equiaffine and the composition are simultaneously of the kind .

*Keywords:* affinely connected space, space of composition, affinors od Composition, geodesic composition.

*Subject Classification Index:* 53A40, 53A55.

# AFFINE AND PROJECTIVE PLANES CONSTRUCTED FROM RINGS

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## **Abstract**

In this paper, firstly, we show that there can be constructed an affine plane from ternary ring in natural way. Firstly we present the basic properties of affine and projective planes including their completion with each other, respectively, then we continue with their definition over a skew-field. Considering that not all affine planes are of the form, we use the Desargues properties to characterize them. Mathematically projective geometry is even more natural than its affine version. The work continues by obtaining the projective planes by “completing” the plane constructed from ternary system,  $\mathbb{FR}$ , by means of projective completion and then constructing affine planes from projective planes by means of affine restriction. One should add a new point “at infinity” for each direction, there will also be a line “at infinity”. Affine lines are too short, we must force the projective line to contain the direction. The concepts are equivalent, if you have got one, you have got the other. In the end we show the process of affinization and projectivization of the projective and affine plane. Affinization of projectivization of an affine plane may depend on the choice of line removed from, and need not be isomorphic to.

*Keywords:* ternary ring, affine plane, projective plane.

# **DYNAMIC APPROACHES TO MATHEMATICAL PROBLEM MODELING: THE USE OF GEOGEBRA AND WOLFRAM MATHEMATICA FOR ENHANCED SOLUTION**

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## **Abstract**

This paper presents the modeling of mathematical tasks which includes their mathematical expression (their mathematical form) and then the usage of mathematical tools to analyze and solve those tasks. To do this, first we will try to understand the problem (task) which involves the identification of all its important elements and the selection of parameters associated with them. Then we will present mathematical expressions that describe various relations. We will choose the model depending on the nature of the problem and its complexity. In tasks that involve geometry, we will use the GeoGebra application. With this application, we have the opportunity to visualize, explore and analyze the given model interactively. While, for models that involve analysis and algebra, we will use Wolfram Mathematica, which includes Wolfram Language as its programming language. After using these applications for different kind of tasks, we will analyze and compare their solution by also solving them in other forms (classical forms for solving mathematical tasks). The purpose of using different applications, is to improve the process of mathematical modeling, providing an interactive way to solve tasks,

and often allowing faster and more advanced methods that lead to our tasks solution.

*Keywords:* Mathematical modeling, Problem-solving, GeoGebra, Wolfram Mathematica, Interactive visualization, Application.

# APPLICATION OF CONIC SECTIONS IN PHYSICS AND ASTRONOMY

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## **Abstract**

In this paper, we present the equations of some conic sections and explore their applications in physics and astronomy. We investigate ellipses, parabolas, circles and hyperbolas that are essential in modeling a range of phenomena, from planetary orbits and satellite trajectories to projectile motion and optical systems. By discussing these geometric forms and their relationships with key concepts in physics, we examine how conic sections contribute to our understanding of celestial mechanics, gravitational forces and light reflection. This paper aims to provide a foundation for further research on the significance of conic sections in scientific exploration.

*Keywords:* Conic sections, physic applications, astronomy applications.

# EXPLORING CHARACTERISTICS AND APPLICATIONS OF FOUR IMPORTANT CONTINUOUS DISTRIBUTIONS

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## Abstract

This study explores the characteristics and applications of four important continuous distributions: the Normal distribution, the lognormal distribution, the Inverse Gaussian distribution, and the Logistic distribution. Through a comprehensive analysis, we aim to provide an encompassing understanding of these distributions. Starting with a summary, we delve into probability density functions, cumulative distribution functions, moments, and variance. We also discuss their applications and practical significance in various fields. Furthermore, we examine statistical inference techniques for parameter estimation and hypothesis testing within the context of these distributions. By integrating theoretical knowledge with practical examples, this study serves as a valuable resource for researchers, practitioners, and students seeking to understand and effectively utilize these fundamental continuous distributions. Through this exploration, readers will gain insights into the fundamental properties and extensive applications of these distributions in various fields, aiding them in making informed decisions and conducting rigorous analyses.

*Keywords:* Normal distribution, Lognormal distribution, Inverse Gaussian distribution, Logistic distribution, variance, cumulative distribution function.



# MATHEMATICS EDUCATION AND QUALITY EDUCATION PART OF THE SUSTAINABLE DEVELOPMENT AGENDA

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## **Abstract**

In the 21st century, the term “sustainable development” is increasingly relevant due to pressing global challenges such as global warming, air pollution, water, and soil, as well as the misuse of technology and other technological resources. Integrating sustainable development into mathematics teaching involves considering its impact on the world—the natural environment, society, economy, and technology. This paper aims to explore how well the concept of sustainable development is understood and integrated into the daily lives of high school seniors.

The data, processed using SPSS, was collected from online questionnaires completed by 197 senior students from vocational and general high schools. The results show that 40% of the students have insufficient knowledge about sustainable development. Additionally, this study confirms the hypotheses that early childhood education (preschool) correlates with better preparation for school start ( $211.275, 0.004p$ ) and that mathematical literacy correlates with linguistic literacy ( $220.774, 0.000p$ ), both of which are components of sustainable development. The findings suggest that mathematics education at all levels should incorporate these objectives into its curriculum to achieve sustainable development goals. This approach will help future generations understand their role and responsibility

in advancing the concept of sustainable development, thus securing their future.

*Keywords:* mathematics education, sustainable development, quality education.

# NUMERICAL INTEGRATION OF 1-D VAWE EQUATION AS AN EXAMPLE OF A HYPERBOLIC PDE'S USING MATHEMATICA

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## **Abstract**

Hyperbolic partial differential equations (PDEs) are a distinct class of equations that manifest wave-like behaviors, characterized by solutions that propagate along defined characteristics.

These equations are pivotal in the exploration of dynamic phenomena across various fields such as physics and engineering, particularly in the analysis of waves and vibrations.

General form of second order linear PDEs in two variables with constant coefficients:

Here , and are function of and only- they do not depend on . If , the equation is said to be homogeneous is called discriminant.

If then the equation (1) is called hyperbolic.

Among the hyperbolic PDEs, the wave equation is renowned for describing the propagation characteristics of various types of waves, such as sound and electromagnetic waves. The one-dimensional wave equation is expressed as:

Here,  $c$  signifies the speed of wave propagation.

The numerical solution of the wave equation, being a central hyperbolic PDE, is typically approached via finite difference methods. This technique discretizes the continuous domain into a

computational grid and employs finite difference approximations for the derivatives.

Utilizing Mathematica, one can leverage its robust built-in functions, such as `NDSolve`, to tackle initial-boundary value problems for PDEs effectively. Alternatively, for those preferring a more hands-on approach, implementing a finite difference method directly within Mathematica offers a comprehensive understanding and customization of the numerical solution process.

*Keywords:* hyperbolic PDE, one-dimensional wave equation, finite difference methods, Mathematica, `NDSolve`, numerical solution.

*Mathematics subject classification:* 65M06, 65M12, 65S05.

## **PHYSICS**

# **SPECTRA OF SECONDARY NEUTRONS, ALPHA, BETHA AND GAMMA PARTICLES EMERGING ACROSS RADIATION PROTECTION SHIELDING OF A PARTICLE THERAPY CENTER**

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## **Abstract**

This study presents a comparative analysis of secondary particle spectra emerging from the radiation protection shielding of a particle therapy center. Utilizing an innovative shielding approach, concrete-soil sandwich walls with three different thicknesses of the soil layer (150, 200, 250, 300 and 350 cm), inspired by the design principles of the MedAustron facility. Monte Carlo simulations with the FLUKA were employed to simulate the transport of a therapeutic proton or C-ion beam upon targeting an average human body phantom (AHUBO), using 108 primaries with maximum energy utilized for therapeutic purposes (250 MeV for protons and 430 for C-ions) and explore the secondary flux of neutrons, alpha, beta particles and gammas. The analysis is conducted within a simplified geometry representing a segment of the treatment room wall subjected to a horizontal beam, enabling a detailed examination of the spectral characteristics. The research contributes to advancing radiation protection methodologies by prioritizing sustainability and optimizing performance for modern particle therapy centers. Through the exploration of primary particles' influence on parameters such as neutron flux, dose equivalent, and

alpha particle neutron spectra, alongside beta and gamma particles, the study aims to develop a “green” shielding solution tailored to the needs of the South East European International Institute for Sustainable Technologies (SEEIIST). Additionally, the proposed use of concrete sandwich walls filled with excavated soil on-site is investigated for its potential to reduce concrete usage and minimize soil removal during foundation laying, contributing to overall environmental sustainability.

*Keywords:* Radiation Protection shielding, Particle therapy centers, Secondary particle spectra, Neutrons, Alpha, Beta Concrete-soil sandwich walls, Monte Carlo simulations, Environmental consciousness.

# THE STUDY OF THE HOT-DIP GALVANIZING PROCESS OF STEEL

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## **Abstract**

Steel is one of the most commonly used materials for household purposes and industrial applications due to its excellent properties. One of the weaknesses of steel is corrosion and its susceptibility to weakening. Because of these disadvantages, many protection methods have been adopted to improve the service life of steel against corrosion and deterioration. Among these methods, hot-dip galvanizing with thin metallic layers according to various interests is one of the most commonly used. Interest in zinc coatings for protecting steel is significant in engineering projects and industries. Studying the stability of these coatings and their surface properties is crucial for their use in environmental applications. Zinc is widely used as a metallic coating on the surface of steel to protect it from corrosion, and zinc layering can be obtained through various processes. Many studies have been conducted to understand the characteristics of the zinc deposition process. It has been found that the characteristics of the deposited layer depend on the deposition time and temperature, bath composition, and additives. The phase and microstructure of the deposited zinc layer surface are another important characteristic that controls corrosion resistance and other mechanical properties.

*Keywords:* Steel, Zinc, HDG, Zinc layer, Corrosion.



# PHOTOACTIVITY OF TiO<sub>2</sub>

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## **Abstract**

TiO<sub>2</sub> has received a great deal of attention due to its chemical stability, non-toxicity, low cost, and other advantageous properties. Because of its high refractive index, it is used as anti-reflection coating in silicon solar cells and in many thin-film optical devices. Due to its hemocompatibility with the human body, TiO<sub>2</sub> is used as a biomaterial (as bone substituent and reinforcing mechanical support). TiO<sub>2</sub> is also used in catalytic reactions acting as a promoter, a carrier for metals and metal oxides, an additive, or as a catalyst.

The photoactivity of TiO<sub>2</sub> is one of its technological most attractive properties. The creation of electron-hole pairs through irradiation of light, either in TiO<sub>2</sub> itself, or in adsorbed molecules, and the following chemical or electron transfer reactions are at the heart of TiO<sub>2</sub> based photodevices applied in a range of areas. All photoinduced phenomena are activated by an input of super-band gap energy to the semiconductor TiO<sub>2</sub>. Absorption of a photon with enough energy leads to a charge separation due to an electron promotion to the conduction band and a generation of a hole (h<sup>+</sup>) in the valence band. The subsequent mode of action of the photogenerated electron-hole pair (e<sup>-</sup>-h<sup>+</sup>), determines which of the phenomena is the dominant process, because even if they are intrinsically different processes, they can and in fact take place concomitantly on the same TiO<sub>2</sub> surface. Photocatalysis is a well-known process and is mostly employed to degrade or transform (into less harmful substances) organic and inorganic compounds and even microorganisms.

*Keywords:* TiO<sub>2</sub>, Anatase, Rutile, Photoactivity, Photocatalysis.

# SEA - TEACHING METHODOLOGY IN NATURAL SCIENCES AND MATHEMATICS

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## **Abstract**

Teaching science based on student experience is not a new idea. SEA is based on the teaching/learning strategy of the German pedagogue Martin Wagenschein. Some other well-known names (predecessors of thought) were: Jean Piaget, Neil Bruner and Dieter Nachtigall, and more recently Juergen Schoenherr and Ingo Mueller. Juergen Schoenherr is regarded as the man who introduced SEA and practiced it in many countries of the world, and for this reason he is also known as Papa SEA. Through Starter Experiment, a comprehensive approach to teaching science and mathematics is provided. According to this approach, special attention is paid to the internal motivation of more students, especially girls who usually suffer from the “natural dominance” of boys during natural sciences and mathematics learning

The constituent elements of the SEA are:

- At the beginning of each chapter of the course, the lesson begins with observations in the environment or with an experiment which is called initial or starter.
- Individualization of important steps such as: observations, construction of hypotheses and formulation of concepts.
- Working in groups for planning and carrying out verification experiments.
- Communicating to the whole class about the idea, strategy, concept and their application.

- Elaboration of the new knowledge anticipated to be understood.
- Redefining the role of the teacher as a stimulator and organizer of the learning process.
- Motivation of students and teachers for natural sciences and mathematics.

*Keywords:* teaching, natural sciences, mathematics, starter experiment, hypothesis, verification experiment.

# THE INFLUENCE OF VIRTUAL EXPERIMENTS ON THE UNDERSTANDING OF GEOMETRIC OPTICS AT HIGH SCHOOL STUDENTS

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## **Abstract**

This study investigates the influence of virtual experiments on the comprehension of geometrical optics among twelfth-grade students at Gymnasium “Kuvendi i Arbërit” in Ferizaj, Republic of Kosova. A total of 133 students, comprising 61 males and 72 females, distributed across four classes, participated in the research. Through random selection, two classes were designated as control groups, while the other two were designated as experimental groups. Traditional teaching methods were employed in the control classes, involving 65 students, whereas computer simulations (PhET simulations) were utilized to teach the experimental classes, comprising 68 students.

The research aims to compare the effectiveness of traditional teaching methods with those integrating virtual experiments in enhancing students’ understanding of geometrical optics. Preliminary findings suggest that virtual experiments significantly contribute to students’ conceptual understanding and engagement in the subject. Moreover, students exhibit heightened engagement and enthusiasm towards learning when exposed to virtual experiments. This research contributes to the discourse on education technology integration and underscores the potential of virtual experiments in enriching high

school science education. This study provides valuable insights for educators and policymakers seeking to integrate innovative teaching methods, such as virtual experiments, into high school curricula to enhance students' learning outcomes in geometrical optics and beyond.

*Keywords:* Virtual experiments, Geometrical optics, Education technology, Innovative teaching strategies.

# **DOSIMETRIC COMPARISON OF THREE DIFFERENT EXTERNAL BEAM PARTICLES USING TREATMENT PLANNING SYSTEM MATRAD**

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## **Abstract**

In recent decades, valuable clinical experience in particle therapy has been gained worldwide. Along with the development of new technologies, especially for the application of radiation and technologies related to treatment planning, every day there is a wider use of heavy particle and ion radiotherapy in clinical settings in order to make optimal use of physical and biological properties of protons and heavy ions.

Dose conformation is called the possibility to concentrate the radiation dose to the tumor while sparing the surrounding normal tissue, which is the aim of the radiotherapy. Before the irradiation of each patient, different complex models for treatment planning are used in Radiotherapy. One of these system is matRad, an open-source TPS - Treatment Planning System based on Matlab programming language where optimal plans are calculated in advance, following the prescribed dose to cover tumor volume, while keeping constrains to limit dose for the irradiation of Organs at risk – healthy cell. The software has a dual education and research purpose with possibility

to create treatment plans, calculate and optimize dose for different modalities as for photons, protons and carbon ions.

Different treatment plans are created for the TG119 phantom and an exemplary prostate patient case. The treatment plans are compared for three different modalities of radiations: photons, protons and carbon ions. From the present study has been concluded that the main advantage of proton and carbon ions compared to photons is reduction of the integral dose in healthy tissues and the delivery of higher dose in the tumor side.

*Keywords:* Treatment planning system, particle RT, cancer treatment simulation, matRad, Prostate cancer.

# DISTRIBUTION OF SOME RADIOACTIVE ISOTOPES (AROUND THE OSLOMEJ POWER PLANT

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## **Abstract**

In this paper, the radioactive activity of four isotopes around the Oslomej thermal power plant was determined using the gamma spectrometry method. The examined isotopes are K-40, Ra-226, Th-232 and Cs-137. Samples were collected in 36 points located in the North-South and East-West directions. The points represent the intersections of the three circles with the mentioned directions. The first circle was taken in a radius of around 0.5 km from the center of the power plant, the second circle in a radius of 2.5 km from the center and the third circle in a radius of 4.5 km from the center of the power plant. At each location, samples were taken from three points at different depths. The first sample of each point was taken from the surface, the second at a depth of 20 cm and the third at a depth of 40 cm from the surface. The activity of radioactive isotopes in two samples of coal and one sample of fly ash in a location near the power plant was also determined.

The measurement of the activity of these four radioactive isotopes was done with the Canberra Packard HPGeP gamma spectrometer, which is located in the laboratory of the Public Health Institute of North Macedonia in Skopje. The analysis of the activity of radioactive isotopes showed an irregular distribution of radioisotopes depending on the distance from the power plant and the depth. This



is probably due to the direction of the winds blowing at the Oslomej power plant site which do not follow a preferred direction. The analysis also showed a greater concentration of radioactive isotopes present in the fly ash compared to their presence in the samples of coal.

*Keywords:* Radioactive element, contamination, Oslomej Thermal Power Plant.

# INVESTIGATING THE VISCOSITY- TEMPERATURE RELATION OF ENGINE OILS USING A ROTATIONAL VISCOSIMETER

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## **Abstract**

In this paper, we utilized the rotational-spindle viscosimeter (the Brookfield viscosimeter) to determine the dynamic viscosity variation with temperature of three engine oil samples. Our results confirm the exponential law of temperature-dependent viscosity (Arrhenius law). Additionally we observed a converging viscosity value at a critical temperature for all samples. To this end, we calculated and discussed the activation energy for each sample and compared theoretical and experimental viscosity values at specific temperatures. Finally, we conducted UV spectroscopy analysis on our samples. The UV spectroscopic analyses revealed no molecular degradation due to thermal processing up to 120 degrees Celsius.

*Keywords:* Viscosity; Temperature; Arrhenius law; Activation Energy.

# ANALYSIS OF MEAN GLANDULAR DOSE IN ONE DIGITAL MAMMOGRAPHY UNIT IN NORTH MACEDONIA

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## **Abstract**

Mean glandular dose (MGD) represents a metric for quantifying the absorbed X-ray radiation by the breast glandular tissue during mammography procedures. The average glandular tissue dose is evaluated from the mean dose divided by the glandular tissue volume. Optimization in digital mammography ensures that the patients receive the lowest radiation dose feasible without deteriorating the diagnostic image quality. Despite the significance of this optimization, up to our knowledge, no studies have yet assessed the actual MGD of the Fuji Amulet S mammography system.

This study aims to estimate incident kerma for the Fuji Amulet S mammography system. The study aims at developing effective methods for reducing MGD without sacrificing digital image quality. The study presents findings from 400 patients undergoing mammography, a total number of 1600 mammograms at a North Macedonian facility, utilizing dose monitoring software (DOSE, QAELUM), both image data and survey responses were collected.

Median MGD, along with minimum and maximum values, were evaluated to be 1.73 mGy, 0.77 mGy, and 7.01 mGy, respectively. For the breast thickness range between 45 mm and 65 mm, the 25th and 75th percentiles for median MGD were evaluated to be 1.44 mGy

and 2.04 mGy. These results suggest that the MGD values (in mGy) are somewhat lower than those outlined in European guidelines.

*Keywords:* DRLs, Mean Glandular Dose (MGD), Compressed Breast Thickness, Screening.

# CZTS/CdS PHOTOVOLTAIC CELLS BASED ON SPIN COATED SOL-GEL SYNTHESIZED $\text{Cu}_2\text{ZnSnS}_4$ THIN FILM

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## **Abstract**

Photovoltaics (PV) cells have been designed from CZTS as p-type semiconductor and CdS as n-type semiconductor. The CZTS absorber layer was synthesized from spin coating sol-gel method onto Mo-coated glass substrates, from fluorides precursor of the corresponding metals. CdS layer was deposited by chemical bath deposition. The back electrodes were designed from Ag grid using DC sputtering. I-V were recorded upon normal illumination of the PV cells with AM1.5 solar spectrum simulator. The best results were achieved with the sol-gel method synthesized cell, showing:  $V_{oc} = 0.33$  V,  $I_{sc} = 1.59$  mA,  $FF = 0.37$  and  $\eta = 0.85$  %. These results were compared to a PV cell designed from sputtered CZTS. It appeared that the PV cell based on spin coated CZTS shows higher power efficiency than the one based sputtered CZTS (0.52 %).

*Keywords:* CZTS, PV cell, sol-gel, spin coated, power efficiency.

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# TRITICALE - UNDERESTIMATED RAW MATERIAL FOR FOOD PRODUCTION

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## **Abstract**

Triticale (X Triticosecale Wittmack) is a synthetic intergeneric hybrid formed as a result of the crossing of wheat (*Triticum*) and rye (*Secale*). This cereal combines the features of both parent species. The low soil requirements, resistance to abiotic stresses, drought, and relatively low production inputs inherited from rye and high fertility inherited from wheat explain the great interest of farmers in this cereal. Despite the big interest in triticale, this cereal is still little known and consequently is not used in the food industry.

Triticale varieties cultivated in the 1980s were characterized by high amylolytic activity and low stability. These features discriminated triticale as a food raw material. Therefore, it was used mainly as feed. Over several decades, great progress has been made in new varieties of triticale breeding. The technological features of currently cultivated triticale varieties are very diverse. The protein-proteolytic system of the flours is similar to the system of weak wheat flours, while the starch-amylolytic system is more differentiated. Despite the differences in technological properties between the triticale and wheat flour traits, refined triticale flours can be the raw material for bread, cookies, sponge cakes, or gingerbread production. The chemical composition of the grain of currently cultivated triticale varieties - protein content, dietary fiber, and other bioactive substances, indicates that wholegrain triticale flour may be a valuable raw material for wholegrain extruded goods production. The use of the

extrusion process for triticale processing allows the full use of its pro-health potential and its nutritional value.

*Keywords:* triticale, bread, cookies, wafers, extrudates, nutritional value, technological value.



# FORMATION OF ADVANCED GLYCATION END-PRODUCTS IN CEREAL-BASED MATRICES

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## **Abstract**

Maillard reaction is a non-enzymatic reaction between amino groups and reducing sugars that results from the thermal processing of foods. Maillard reaction products have great influences on food quality attributes, including color, texture, and flavor. Apart from sensory modifications, the Maillard reaction can also result in the production of potentially hazardous compounds (AGEs) during high-temperature processing. The formation of AGEs elevates levels of oxidative stress and active carbonyl stress, prompting an upregulation in the expression of inflammatory factors, thereby contributing to the onset of various diseases. Currently, an increasing number of studies are directed towards finding ways to inhibit Maillard reaction products to mitigate their potential harm to the human body. AGEs generation and contents in bakery products can be influenced by many factors, including temperature, length of the period of heating, pH, concentrations and reactivity of the components present, water content, and the presence of inhibitory compounds. They can be suppressed by optimizing product formulation and processing parameters. Food source AGEs inhibitors can be also added to act on dicarbonyl compounds, free radicals, metal ions and proteins. Since the diet is a major source of exogenously formed AGEs, research on

efficient and low-cost dietary antiglycation agent and exploration new baking technology is urgently needed. It is also necessary to be aware of the toxic risks of AGEs, understand the importance of healthy diet and habits, and minimize the risk of diabetes, cardiovascular complications, and other glycation-related diseases.

*Keywords:* Maillard-type products, bread, dicarbonyl compounds, advanced glycation end-products, CML, polyphenols.

# USING THE FIVE-PARAMETER LOGISTIC FUNCTION AND RESPONSE SURFACE METHODOLOGY TO OPTIMIZE THE FERMENTATION PROCESS

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## Abstract

The use of microorganisms in various industries requires monitoring the growth of strains under various conditions to optimize their efficiency. Furthermore, microorganisms under various experimental conditions manifest different attributes. Absorbance microplate reader can be used to measure microbial growth curves in standard 96-well microplates. The long term automatic and parallel kinetic assays result in hundreds or thousands records. The sigmoidal shaped curves recorded in 96-well microplates by measuring absorbance can be easily described using a limited number of interesting parameters (lag phase,  $\lambda$ , specific growth rate,  $\mu_m$  and stationary phase,  $A$ ). Although, the Gompertz model and its re-parameterized forms are the most frequently used sigmoid models to describe growth curves in the life sciences, they do not fit the data perfectly. Furthermore, functions with less than five parameters do not have enough resilience to deal with asymmetric sigmoidal data.

Therefore, the usefulness of the five-parameter logistic (5PL) function to describe the data recorded during fermentation in 96-well

microplates was tested. Unfortunately, this function contains mathematical coefficients instead of parameters with biological meaning. Moreover, it is difficult to calculate the 95% confidence intervals for the biological parameters since they are calculated indirectly, using the mathematical coefficients. Accordingly, the 5PL function was rewritten to obtain re-parameterized model with the parameters  $\lambda$ ,  $\mu$  m and A.

The re-parametrized 5PL was tested during fermentation of the light honey wort which is more difficult to ferment compared with wort containing dark honey. Additionally, the response surface methodology was used to identify significant factors which influence fermentability of honey.

*Keywords:* five-parameter logistic (5PL) function, re-parametrization, honey wort.

# **SENSORY QUALITY AND COMPARISON OF SOME COMMERCIAL SET YOGHURT BRANDS FROM NORTH MACEDONIA AND KOSOVO**

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## **Abstract**

This study aimed to compare the effects of the physical-chemical properties of set-type yoghurt on the sensory and water-holding properties of yoghurt made from cow milk from North Macedonia (S2, S4) and Kosovo (S1, S3). Total solid content was higher (12.34g/100g) in S1 (sample 1), and fat content was higher (4.00g/100g) in S3 (sample 3). The acidity found ranged from 0.11% to 0.44%, the pH obtained ranged between 4.2 to 4.5 and water holding capacity retained between 0.41 to 0.55 for all samples. The sensory characteristics of the yoghurts were determined, using a taste panel consisting of 9 judges. The panelists were asked to evaluate the products for syneresis, firmness, spreadable, sweetness, sourness, mouth thickness, mouth coating, and overall acceptability using a five-point hedonic scale (1 and 5 represent dislike extremely and like extremely, respectively). Correlations between the chemical and physical properties using the Pearson correlation method and one-way analysis of variance (ANOVA), with significance levels of  $p < 0.05$  were determined with SPSS 16, (2007). In terms of total solids and fat content, all samples differ significantly  $p < 0.05$ . Also,

significant differences were found between samples regarding syneresis, spreadability, sourness, and mouth coating. The highest positive significant correlation was found between spreadability and mouth coating, fat, and pH with coefficients of 0.982 and 0.977, respectively. Also, a high positive correlation with a coefficient of 0.972 was found between total solid and sweetness. Finally, the highest acceptability score of the set yoghurt sample was (18.8) in S1 (Kosovo sample) during the study period and the result indicated that water holding capacity has an important effect on sensory quality characteristics.

*Keywords:* syneresis, water holding capacity, pearson correlation, sensory analysis, mouth thickness.

# PHYSICO-CHEMICAL AND RHEOLOGICAL QUALITIES OF SOME WHEAT CULTIVARS FOR PASTA PRODUCTION

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## **Abstract**

Pasta is a widely consumed food all over the world. Usually, semolina obtained from durum wheat and water are the main ingredients for pasta production, but flour from different wheat cultivars or any created combination can also be used. In our study, we used Triticum durum wheat and Adelaide, Bisanzio, and AGB-28 wheat cultivars and analyzed their physicochemical and rheological qualities.

The results obtained showed that Triticum durum wheat had better physicochemical qualities with the best protein, gluten, and ash content, but Adelaide and Bisanzio wheat also had good qualities. The flour obtained from these wheats also had similar qualities. Regarding the rheological qualities of the dough with the Brabender apparatus, the results from Farinograph showed that Triticum durum had the best degree of softening and qualitative number, while Bisanzio had the best dough development time but also a good degree of softening, and Adelaide had the best stability. Better qualities with Extensograph had Adelaide with higher extensibility and energy, Bisanzio also had approximate results. Regarding the amylograph dough viscosity,

Triticum durum had 700 AU, while Bisanzio had the maximum. These results show that for the production of pasta next to the wheat Triticum durum, the cultivars Adelaide and Bisanzio can be used, but not AGB-28.

*Keywords:* Triticum durum, Bisanzio, gluten, farinograph.



# STATISTICAL RESEARCH ON THE CORRELATION BETWEEN BMI AND GLYCOSYRED HEMOGLOBIN IN PATIENTS WITH DIABETES

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## Abstract

Diabetes is a significant global challenge to the health and well-being of people, families and countries. The main objectives of this research are: to statistically determine the correlation between BMI and the value of glycated hemoglobin (HbA1c) and to analyze the eating habits and lifestyle of the 109 subjects who were included in this study. The research was conducted in the period from 01.06.2023-30.06.2023. by the Faculty of Food Technology and Nutrition at the University of Tetovo and VT Diet Club - Bitola. The data from the 109 respondents (35 men and 74 women) aged from 5 to 81 years. were collected by an online questionnaire. Information about minors was obtained from their parents - guardians. The following statistical methods were used: Pearson's correlation coefficient and relative numbers. 68% of the respondents suffer from diabetes type 2, and 32% of the respondents suffer from diabetes type 1. Most of the patients with diabetes (29.4%) are aged 45-54 years. The value of the correlation coefficient  $r = 0.04$  indicates that there is a very weak correlation between BMI and the value of glycated hemoglobin. This means that the value of glycated hemoglobin is influenced by other factors such as: diet, physical activity, use of therapy with oral

antidiabetics and/or insulin, etc. 41.3% of respondents are overweight (BMI = 25-29.9 kg/m<sup>2</sup>), and the same percentage of respondents are obese (BMI = 30 and more kg/m<sup>2</sup>). Crucial negative food habits practiced by the respondents are: 69% of the respondents indicated that they have 3-4 meals a day (diabetics should have 3 main meals and 2 snacks) and the same % of respondents indicated that they consume food with a high glycemic index. From this study, it can be concluded that a healthy and balanced diet and physical activity are crucial for leveling glycemia in diabetics, as well as for the prevention of complications caused by diabetes.

*Keywords:* diabetes, glucose, hemoglobin, nutrition, activity, BMI.

# **EXAMINATION OF THE DYNAMICS OF ANALYZES PERFORMED FOR THE PRESENCE OF RADIONUCLEIDE RESIDUES IN FOOD IN THE PERIOD 2019-2023 IN THE REPUBLIC OF NORTH MACEDONIA**

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## **Abstract**

The main focus of this research is to determine the extent of analyzes performed for the presence of radionuclides in food, their dynamics, which radionuclides are present in food and how much their radioactivity was in the period 2019-2023. The research covers the period from 01.01.2019 until 31.12.2023. The data we used to conduct this research were obtained from the Public Health Institute of R. N. Macedonia. The tests were carried out with accredited methods and in accordance with the Regulation on maximum allowed amounts of radionuclides in food, water, air, land, products and raw materials of animal and plant origin and objects for general use. Relative numbers and trend are used as statistical methods of work. According to the results, in the period 2019-2023, radionuclides were analyzed in 6065 samples (2711 samples from imports, and 3354 samples from domestic production). The largest amount of radioactivity analyzes were performed in the group of mushrooms

(51%) and the group of grain and flour (44%). The scope of analyzes performed for the presence of radionuclide residues in food in Republic of North Macedonia shows a downward trend. In the analyzed products, no radioactivity above the limit values was detected (except in 2020 when only in 1 product from the mushroom group - dry morel) was detected a value for Cs-137 = 662.8 Bq/kg, and the maximum allowed value is 600 Bq/kg ). It can be concluded from the study that food is safe in terms of the presence of radionuclides residues, but work should be done to increase the volume of analyzes performed for the presence of radionuclides in food, as well as to increase the coverage of different groups of products (fruit , vegetables, coffee, tea, etc.) in which such analyzes would be performed.

*Keywords:* radioactivity, radionuclides, food, analyses, trend, dynamics.

# **RHEOLOGICAL, NUTRITIONAL, AND SENSORY QUALITIES OF BREAD ENRICHED WITH PUMPKIN FLOUR**

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## **Abstract**

Consumers' interest in having food products and bread with good sensory and nutritional quality on their tables has pushed the baking industry to produce a wide range of bread to satisfy consumer needs. This study precisely aimed to evaluate the partial replacement of wheat flour with pumpkin flour (5%, 10%, 15% and 25%) and its effect on the rheological, nutritional, and sensory qualities of the produced bread.

The results obtained for the rheological properties determined with the Brabender farinograph and extensograph showed that water absorption, development time, stability, resistance, and energy of dough increased as the content of pumpkin flour increased, indicating that the content was high in dietary fiber.

The content of nutrients in the bread, such as fat, cellulose and ash increased as the content of pumpkin flour increased, while the protein content decreased. Control bread and bread with 5% pumpkin flour had better sensory qualities such as volume, exterior appearance, appearance of the crumb, aroma and taste of the crust and crumb, but

bread with 10% pumpkin flour also had good sensory qualities. From these results, we can recommend up to 10% pumpkin flour for bread production.

*Keywords:* pumpkin flour, farinograph, sensory qualities, cellulose.

# PI&KI BISCUIT PREPARATION AND PRODUCTION PROCESS IN EGI GROUP ZAHAQ – PEJE

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## **Abstract**

The aim of the paper was to determine the influence of temperature and different amounts of sodium hydrogen carbonate on the texture and color of tea cakes obtained under laboratory conditions. Each mix varied according to the amount of sodium bicarbonate added, the granulation of the sugar, or the baking temperature. Product texture was analyzed daily using a texture analyzer and color was measured using a Minolta Chroma meter. After baking the tested samples, measurements were made of the length and height of the tea cakes, as well as the dynamics of changes in water activity and moisture content during baking. The results of texture analysis showed that an increased percentage of sodium bicarbonate decreases the strength of tea cakes, while at higher temperatures, strength and brittleness increase. In terms of color, the results showed that comparing the total color change of tea paste obtained from different blends and roasted at different temperatures, the least color change in most cases was the blend with the lowest percentage of sodium hydrogen carbonate.

*Keywords:* tea paste, texture, color, temperature, sodium bicarbonate.

# EVALUATION OF PHYSICAL CHEMICAL AND SENSORY PROPERTIES OF A TRADITIONAL SOFT FRESH WHEY AND CREAM CHEESE

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## **Abstract**

Traditional Albanians soft fresh cheese named “Gjizë” is important for its biological (nutritional) values, as well as for the protection of geographical origin, preservation of technology and standardization. Three types of fresh cheeses are examined for their production technology, chemical composition, and sensory properties during 20 days of storage. Fresh cheese production was done in triplicate from the Beaten (B), Kashkaval (K) cheese whey, and yogurt (Y) in the traditional way. Significant changes are shown in the chemical composition of the samples. It was found that the dry matter content of (B) Fresh cheese was 40.00% which was higher than other types. Also the fat and protein content of Beaten cheese whey cheese was  $12.50 \pm 0.01$  and  $32.37 \pm 0.01$  which was significantly ( $P < 0.05$ ) higher than other types. An increase in the values of some properties was with the prolongation of the storage time, counting the dry matter in (K) and (B) samples, while there was a decrease in the values of pH and protein percentage at all samples ( $P < 0.05$ ). Correlations between physicochemical compounds and sensory properties determined by bivariate correlation showed that increasing the dry matter content did not result in desirable sensory properties such as aroma and taste. It can be concluded that Kashkaval whey fresh



cheese received the highest score from sensory panelists for the overall properties. It is generally considered very nutritious and represents an effective way of handling whey.

*Keywords:* whey cheese, standardization, correlation, cream cheese, sensory characterization.

# MICROWAVE HEATING EFFECT ON THE OXIDATION AND QUALITY OF COLD PRESS SUNFLOWER OIL

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## **Abstract**

Sunflower oil is widely used in the human diet, primarily due to its constituent components and its applications in producing functional products. Consequently, it becomes crucial to monitor the oil's quality by assessing defining parameters. The use of microwave ovens in food preparation has become widespread in recent years due to certain advantages that include saving time, energy and convenience. As a result of heat treatment of oils, various chemical reactions can occur, leading to the formation of products that may indicate deterioration or a reduction in quality. For this purpose, untreated oil (not subjected to heating) and oil heated in a microwave oven for varying durations (ranging from 4 to 20 minutes) were analyzed in this study. The quality assessment of cold-pressed sunflower oil was conducted using standard official methods to measure peroxide, acid, and iodine values. The progression of oil oxidation was tracked by analyzing conjugated dienes and conjugated trienes through UV-spectroscopy (method AOCS Ch 5-91).

Additionally, considering the theoretical link between microwave heating and changes in fatty acid composition, the fatty acid profile of the oil was determined following the guidelines outlined in MKC EN ISO 12966-4:2015. The results indicate a notable shift in the

peroxide value (Pbr). Specifically, after heating the oil for 4 minutes, the Pbr value exceeds the permitted limits. Furthermore, a decrease in the iodine value is observed with increasing heating time, while no significant changes are noted in the acid value. Additionally, changes in the content of unsaturated and saturated fatty acids are observed in cold-pressed sunflower oil. At specific wavelengths (232 and 268 nm), conjugated dienes and trienes were detected as oxidation products, i.e. the extinction coefficients (K232) and (K268) fell within the ranges of 3.72-4.16 and 1.25-2.56, respectively. These findings lead to the conclusion that microwave heating induces changes in the quality of cold-pressed sunflower oil. To maintain its quality, an appropriate choice of heat treatment is required.

*Keywords:* food quality, cold press sunflower oil, microwave heating, products of oxidation.

# CREATING DIFFERENT FORMULATIONS FOR IMPROVING THE RHEOLOGICAL, NUTRITIONAL, QUALITATIVE, AND SENSORY QUALITIES OF GLUTEN-FREE BREAD

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## **Abstract**

In recent years, the demand for gluten-free products has been constantly increasing due to the increase in the number of people suffering from celiac disease. However, gluten-free bread usually does not satisfy the needs of consumers with its characteristics, and in addition, there is a lack of dietary fiber, minerals, and vitamins.

Therefore, the purpose of this work was to improve the rheological properties of dough, nutritional value, and qualitative and sensory qualities of gluten-free bread by creating different mixtures from raw materials such as rice flour, buckwheat flour, bean flour, corn flour, soy flour, millet flour, corn starch, and egg powder.

The results showed that rheological properties with Mixolab such as dough development (C1), amylase activity (C4) and starch retrogradation (C5) had the best bread from the M2 mixture. From the nutritional values, bread from M2 and M5 mixtures had higher

protein and fat contents, while bread from M5 and M6 mixtures had higher total dietary fiber and mineral content. Control bread M1 and bread from mixture M2 had better volume, while control bread M1 and bread from mixture M3 had better specific volume. Control bread M1 and bread from mixture M4 generally had better sensory qualities, while bread from mixture M2 had average sensory qualities. Based on the results obtained, we recommend that gluten-free bread from the M2 mixture be used for wider consumption, which in its composition has 75% rice flour, 5% bean flour, 5% soy flour, 5% egg powder, 5% starch, 2.5% millet flour and 2.5% buckwheat flour.

*Keywords:* rice flour, gluten-free bread, Mixolab, sensory quality, nutritional values.

# QUALITY AND SAFETY PARAMETERS BEFORE AND AFTER PASTEURIZATION OF APPLE JUICE

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## **Abstract**

The research was carried out during the month of September (2023) in the premises of the “Kosovo Agricultural Institute” in the city of Peja. The purpose of this research was to show the influence of pasteurization on the physical, chemical and organoleptic characteristics of apple juice. During the study, several analyzes of the physical, chemical and sensory parameters of apple juice were carried out. The parameters that have been realized include: Brix value, Total acidity, Vitamin C, pH and SO<sub>2</sub>, sensory parameters: aroma, color, taste and clarity-turbidity. The purpose of this research is the importance of knowing the influence of some parameters on apple juice before and after pasteurization. Pasteurization of apple juice is of great importance due to various factors related to food safety, storage and consumer health. In the analyzes of sensory parameters, the juice before pasteurization had a milder and lighter aroma, had a lighter yellow color, tasted less sweet, less fresh and had low acidity. Clarity was present but contained some turbidity. In the analyzes of sensory parameters, the evaluation of physicochemical parameters and sensory parameters should contribute to valuable knowledge on the physicochemical transformations caused by pasteurization in apple juice. Understanding these changes is very important for maintaining product quality and ensuring customer

satisfaction. The study provides a basis for optimizing pasteurization processes to minimize unwanted changes in juice characteristics.

*Keywords:* Apple juice, pasteurization, physical, chemical parameters, sensory parameters, pH. Brix, SO 2.

# THE BENEFITS OF INCORPORATING VEGETABLES AND FRUITS FLOURS INTO GRAIN-BASED FOODS

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## **Abstract**

A study of food losses (flours) from vegetables and fruits obtained from production of juices from purple carrot, purple yams and red apple was conducted. The vegetables and fruits are with very good quality and good price. They are dried in a heat pump dryer, at an initial temperature of 45 °C and circulating air with an initial moisture content of 20% at constant (5.6 m/s) and variable speed, in a thin layer, with transversely oriented air flow relative to the product layer. The dried food losses are ground in a stone mill in the form of vegetable and fruit flours, intended for use in food products in order to give a specific taste and increase biological value. Analyzes were performed on physicochemical indicators - dry matter (by weight), %; moisture, %; antioxidant activity determined by DPPH method and content of total polyphenols. Vegetable and fruit flours obtained from food losses of the processing industry are a rich source of biologically active substances and can be used in the development of food products with added nutritional and biological value. The pronounced antioxidant activity is high in the vegetable and fruit beetroot flour. The addition of vegetable and fruit flours with 20 % from purple carrot, purple yams and red apple to whole grain rye flour leads to products of high biological value.

*Keywords:* food loss, vegetables, fruits purple carrot, purple yams, red apple, good quality, biotechnologies.



# SEASONAL VARIATIONS IN SOMATIC CELL COUNT AND THEIR IMPACT ON THE PHYSICOCHEMICAL COMPOSITION OF RAW COW MILK

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## **Abstract**

Understanding milk quality is essential for ensuring dairy products meet required standards. Somatic cell count (SCC) serves as a commonly used measure of milk quality within the dairy sector. While it offers valuable insights into the udder health of dairy cows, its reliability is influenced by various non-infectious factors, notably seasonal variations. This study aimed to investigate the impact of seasonal variations on SCC in raw cow milk, and subsequently, how these variations may lead to changes in its physicochemical composition. Over a year, 4,287 samples were collected from three dairies in Bitola, Macedonia. Standard accredited methodologies were employed, adhering to ISO 21187:2011 for total bacteria count (TBC), ISO 13366-2:2010 for SCC determination, ISO 9622:201 for analyzing fat, protein, and lactose content, and ISO 5764:2010 for determining freezing point. Statistical analysis using SPSS 15.0 was conducted on the acquired data. Significant differences were observed in the lactose content ( $p > 0.05$ ), but not in the milk fat content ( $p > 0.05$ ), while for the other parameters (proteins, freezing

point and solids-non fat) seasonal variations were observed with the increase in SCC in summer and autumn. TBC in summer is the highest ( $1,992 \times 10^3$  CFU/ml) while in winter is the lowest ( $1,168 \times 10^3$  CFU/ml), which is not the case for SCC where the highest values are also in summer ( $537 \times 10^3$  SCC/ml), but the lowest values were determined in spring ( $449 \times 10^3$  SCC/ml). These findings underscore the importance of considering seasonal variations when evaluating milk quality and suggest potential implications for dairy industry practices and regulations.

*Keywords:* somatic cell count, physicochemical composition, milk quality, seasonal variation.

# **ANALYSIS OF PH VALUE AND WATER ACTIVITY AS KEY SAFETY PARAMETERS FOR KULEN SAUSAGE**

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## **Abstract**

Active acidity (pH) and water activity ( $a_w$ ) were analysed in 14 samples (K01-K14) of kulen available in markets in the Republic of North Macedonia. These samples were produced under industrial conditions by various manufacturers from R.N. Macedonia and neighbouring countries in the region. The obtained pH values ranged from 4.24 to 4.97, while the  $a_w$  values of the kulen sausages ranged from 0.789 to 0.903. The pH and  $a_w$  values are critical parameters for assessing the stability and safety of fermented products. According to European regulations, fermented sausages do not support the growth of *L. monocytogenes* under conditions of  $\text{pH} \leq 5.0$  and  $a_w \leq 0.94$ . All analysed samples of kulen sausages (K01-K14) fall within this range that does not support the growth of *L. monocytogenes*, indicating a well-controlled technological process

*Keywords:* kulen, pH value, water activity ( $a_w$ ), microbiological stability.

# FRUIT CONSUMPTION AND ITS INFLUENCE ON THE DEGREE OF INSULIN RESISTANCE

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## **Abstract**

Fruit is rich in fiber, antioxidants and phytochemicals that can have beneficial health effects. Its consumption is recommended for the primary prevention of many chronic diseases, but opinions are divided regarding its preventive role in the development of hyperinsulinemia and diabetes.

The purpose of this research is to assess the influence of the frequency and quantity of fruit consumed on the degree of insulin resistance (expressed through HOMA-IR), in people who have hyperinsulinemia and increased body mass. Through a survey questionnaire, a group of 104 women and 71 men answered questions related to the representation of fruit in their diet. All 175 subjects were older than 25 years, had an increased body mass index (BMI>25 kg/m<sup>2</sup>) and diagnosed hyperinsulinemia. Most of the respondents, 95 (55.23%) consume fruit in a quantity less than 250g, the most common frequency of intake in 57 (32.57%) is from three to five times a week. There is a statistical dependence between the HOMA - IR index and the frequency of eating fruit on a weekly basis, among respondents aged between 41 and 55 years. Women consume a larger quantity of fruit on a weekly basis, and it was notable that those with

a lower HOMA - IR index consume a smaller quantity than those with a higher value on this index.

Fruit is recommended as part of diet for people with insulin resistance, but it should be represented in adequate quantities, to take advantage of its benefits.

*Keywords:* insulin resistance, HOMA-IR, nutrition, fruit.

# **AN INNOVATIVE APPROACH TO THE APPLICATION OF OHMIC HEATING IN THE FOOD INDUSTRY AND HOW IT AFFECTS FOOD COMPONENTS**

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## **Abstract**

The application of thermal processes in the food industry causes a decrease in the quality of the final product, such as nutritional value and organoleptic characteristics. Alternative methods of uniform and rapid heating are needed to achieve the desired microbial lethality without reducing overall product quality.

Ohmic heating is an emerging technique for food processing that has been used in recent decades as an alternative to conventional heating. It is a rapid heating method and has wide application and potential in the food industry. Ohmic heating of food is used for microbial inactivation, blanching, fermentation, gelatinization, peeling, evaporation, drying, extraction, pasteurization and sterilization. This literature review summarizes the application of ohmic heating to different types of food products, the impact of food components, the synergistic effect of ohmic heating with other non-thermal preservation techniques and ohmic heating of packaged food. Optimizing the ohmic heating process reduces the duration of the process, achieves microbial and enzyme stability, increases the yield and preserves the organoleptic and bioactive components in food. The application of ohmic heating in combination with other non-thermal

food preservation techniques such as UV-C radiation, pulsed electric field, high pressure, ultrasound, vacuum and the addition of preservatives contributes to reducing the intensity of the applied electric field, the temperature, and the duration of the treatment. This innovative approach contributes to extending the shelf life as well as preserving the nutritional and organoleptic properties of food.

*Keywords:* ohmic heating, food processing, conductivity, synergism.

# THE EFFECT OF ASCORBIC ACID IN THE RHEOLOGICAL PROPERTIES OF DOUGHS IN PASTA FROM AGIMI AND DAJTI WHEAT

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## Abstract

The purpose of our research is to determine the ascorbic acid impact in the pasta quality, produced in the industries, which use semola and different semolats by high “glassness” and soft wheats with different drying systems, generally the method with high temperature. In cereal chemistry and technology, ascorbic acid has been used for many years as an addition to improve physical properties and technological mixture of different flour products. In this study, was used the ascorbic acid in different quantities in semola and semolats with wheat flour. Ascorbic acid is the only additive that helps the drying process in rototherm. Its added quantity varies from 120 to 180 ppm. Pasta quality has had changes and adding ascorbic acid in this technology is carefully studied. This study, which is a result of an experimental work and analysis, opens new fields of ascorbic acid applications in the actual pasta production. All experiments are done in factory. Here a mixture of flour by soft wheats with extra ascorbic acid and wheats only with high “glassness” are used for the pasta



production. These systems facilitate the use of processing techniques using high temperature drying systems. Pasta quality depends on too many factors like water temperature, dough, product itself, added methods of LAA, the first material and working conditions. From this experiment clearly results that adding mixture of different quantities of ascorbic acid has improved the quality of cooking pasta which requires the high temperature drying system technology. As a result, production of pasta is different in comparison with traditional technologies.

*Keywords:* dough, pasta, glassness, semola, ascorbic acid.

# **BIOCONCENTRATION OF CU AND CO IN LEAFY AND FRUIT VEGETABLES FROM THE AREA OF KOSOVO'S MITROVICA**

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## **Abstract**

Contamination of vegetables with heavy metals is one of the basic environmental problems, especially in developing cities, primarily due to the uncontrolled level of pollution caused by industrial growth and the increase in the number of vehicles using petroleum fuels. The aim of this paper is to determine the bioconcentration of heavy metals Cu and Co in leafy and fruit vegetables grown in the vicinity of Kosovska Mitrovica (Kosovo Province). In three different places in the vicinity of Kosovska Mitrovica (Zvečan, Frasher and Polski) are grown: parsley, spinach, lettuce, peppers, eggplant and cucumber. All analyzed crops are from the 2022 harvest. In the same period, an analysis was made of the soil on which the crops are grown. The bioconversion factor of the selected leafy and fruit vegetables was also determined. ICP-MS technique was used to determine the concentration of Cu and Co in soil and leafy and fruit vegetables. From the obtained analyzes it was determined that the soil in Frasher contains the highest amount of Cu and Co – 58.4 mg/kg and 11.6 mg/kg respectively. The amount of Cu in the investigated leafy and

fruit vegetables ranges from 8.05 mg/kg to 18.47 mg/kg, and Co from 0.38 mg/kg to 1.79 mg/kg.

The bioconcentration factor of the investigated leafy and fruit vegetables of Cu and Co is in the range of 0.04 to 0.16 and 0.19 to 0.46 respectively.

*Keywords:* bioconcentration, vegetables, heavy metals, Cu, Co.

# ACCUMULATION OF METALS IN APPLES AND PEARS FROM THE AREA OF THE KOSOVO'S MITROVICA

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## Abstract

The intake of heavy metals through food is a food safety problem that seriously affects the health of consumers, and therefore information on the intake of food contaminated with heavy metals and their concentrations is needed in order to assess the potential risk to human health. The aim of this paper is to determine the accumulation of metals in apples and pears grown in the vicinity of Kosovska Mitrovica (Kosovo Province) and the bioconcentration factor. With the help of ICP-MS technique, the amounts of Cu, Fe, Co, Mn, Ni and Cr in apples and pears grown in three regions - Zvečan, Frasher and Polski were determined. From the tests, it was observed that the highest concentrations in apples and pears were determined for iron ( $100.67 \pm 8.55$  mg/kg and  $107.40 \pm 2.01$  mg/kg, respectively) and the lowest for cobalt ( $0.13 \pm 0.01$  mg/kg and  $0.18 \pm 0.02$  mg/kg, respectively). The lowest bioconcentration factor in apples is 0.01 (for Fe, Co and Mn), and the highest is 0.32 (for Cr in Zvečan). When determining the bioconcentration factor in pears, the highest was determined for iron (in all three regions) and manganese (in Zvečan and Frasher region), and the highest bioconcentration factor was determined for copper – 0.46 (Polski region).

*Keywords:* heavy metals, apples, pears, bioconcentration.

# UNDERSTANDING THE RELATIONSHIP BETWEEN NUTS AND SEED INTAKE, LIFESTYLE HABITS, AND BMI: A CROSS-SECTIONAL ANALYSIS

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## **Abstract**

This paper presents a statistical analysis of dietary habits based on responses gathered from a questionnaire surveying seed and bread consumption patterns. The study investigates the frequency and quantity of nuts and seed consumption, daily bread intake, types of bread commonly consumed, and preferred cooking oils among participants. Through statistical analysis, correlations between dietary habits and demographic factors are explored. The findings offer insights into contemporary dietary preferences and provide valuable information for nutritional education and public health initiatives.

This type of analysis allows for scientifically examining relationships between variables (such as nuts and seed intake, lifestyle habits, and BMI) at a specific moment in time, providing insights into associations or correlations without implying causality. It's a common approach in cross-sectional studies to explore relationships between variables within a population.

*Keywords:* Dietary habits, lifestyle, BMI, cross-sectional analysis, questionnaire survey, nutrition.

# PRODUCTION OF FRUIT AND VEGETABLE PRODUCTS AND THEIR CONTROL

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## **Abstract**

Fruits and vegetables are food products, which have great importance from a nutritional point of view. These products cannot maintain their stability for a long time after harvest due to their high water content. Fruits and vegetables can be made more stable by drying, freezing or processing them into different products so that they can be consumed for a long time outside the harvest season. For this research, four types of products were produced in laboratory conditions, such as: apple jam, cherry marmalade, cucumber pickle and ketchup. Some physico-chemical parameters were analyzed in these products such as: pH value, titratable acidity, °Brix, dry matter content, ash content and salt content. The purpose of this research is to compare the results of the above-mentioned parameters obtained from the products produced in laboratory conditions and the data found in the literature for the products in question. Also, evaluate whether the products are of the right quality and in accordance with market products and legislation or not. The highest pH value had ketchup about  $4.0 \pm 0.07$  and the lowest was noted at cherry marmalade  $3.3 \pm 0.07$ , titratable acidity was highest at ketchup with a value  $2.57 \pm 0.08\%$  and lowest at apple jam with value  $0.45 \pm 0.02\%$ , °Brix was highest at cherry marmalade with value  $80.5 \pm 0^\circ$ Brix and lowest was at pickles with  $5.2 \pm 0^\circ$ Brix. As for the ash content highest content was noted at ketchup with value  $3.5 \pm 0.08\%$  and lowest at cherry marmalade with value  $0.2 \pm 0.07\%$ ,

dry matter was highest at cherry marmalade with  $81.4\pm 0.11\%$  and lowest  $5.5\pm 0.07\%$  at pickles. Salt content was analyzed at ketchup with the result  $1.25\pm 0.01\%$  and pickles with result  $2.81\pm 0.01\%$ . The results of all analyzed methods were within and close to the stated limits, from all the results we see that the products meet the quality characteristics and are suitable for consumption.

*Keywords:* Fruits, Vegetables, physico-chemical analysis, Jam, Marmalade, Pickle, Ketchup.

# **NUTRITIONAL VALUES, MICROBIOLOGICAL ANALYSIS, AND TECHNOLOGICAL PROCESS OF THE PRODUCTION OF PRIZREN SAUSAGE**

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## **Abstract**

Meat and its products are almost an integral part of our diet. Sausage on the other hand is one of the most popular meat products in our country and the Balkans. In this paper, we will explain the technological process of production of Prizren sausage, both industrially and in a traditional domestic way. Pulp meat is the most important ingredient used for sausage because it has a high water holding capacity that preserves the fatty components in the mixture and determines the adhesive ability in joining the components. The higher the quantity of pulp meat, the higher the quality of the final product and the smaller the problems during the production process. The research was conducted through laboratory analysis, and based on them we have concluded that Prizren traditionally produced sausage is better for consumption for shorter storage periods, while industrially sausage has a longer shelf life due to the content of preservatives and control over the production chain for microbiological content and minimization of problems at different stages of the technological process. The purpose of this research was to know the technological process of sausage production and the comparison between industrial and traditional production, knowledge of its nutritional value and how much is consumable in our country and in the world.

*Keywords:* Prizren sausage, traditional production, industrial production, technological process, nutritional values.



# **AWARENESS OF USAGE THE ARTIFICIAL SWEETENERS IN FOOD BY DIFFERENT POPULATION IN NORTH MACEDONIA**

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## **Abstract**

The artificial sweeteners (AS) are popular low-calorie substances used as sugar substitutes, providing strong sweetening effects without adding sugar and energy to the diet. The most popular AS are aspartame, saccharin, and acesulfame K.

The aim of this study is to investigate the awareness and knowledge on the usage and health effects of the artificial sweeteners in food products in North Macedonia. Therefore, an online survey was conducted, distributed through Forms media platform on different age population, completed by 392 participants aged 12 years and above, where 69 % were at the age of 30–64 old. According to the obtained results, 6 % of respondents do not know what AS are, while 23 % are partially familiar with them. Moreover, 19 % of the respondents do not know how to recognize the additives on the product declarations at all. On the question if the respondents could list which artificial sweeteners they know, 43 % did not know how to answer, and 28 % gave a partially correct or incorrect answer. Also, 35 % of respondents answered that they use artificial sweeteners in order to reduce the

calorie intake. Regarding the risk of consuming large amounts of AS in the diet, 15 % of respondents are not aware, and 36 % are partially aware.

The results suggest that it is necessary to develop effective strategies for greater education, information and awareness of consumers, about the usage of AS in their diet, as well as about the advantages and risks of their intake.

*Keywords:* artificial sweeteners, awareness, usage, food products.

# THE POLLUTION OF THE FIFTH CANAL ON CRNA REKA IN THE REGION OF BITOLA

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## **Abstract**

Water is an irreplaceable natural resource. The main goal of this research is to see the pollution of the fifth canal on Crna Reka in the region of Bitola. As measuring points for sampling for this analysis are: measuring point 1 (Crna Reka near the village of Novaci), measuring point 2 (fifth canal exit of Bitola), measuring point 3 (fifth canal near the village of Kravari) measuring point 4 (fifth canal before flowing into the Crna Reka), measuring point 5 (Crna Reka before being mixed with water from the fifth canal), measuring point 6 (Crna Reka after mixing with water from the fifth canal) and measuring point 7 (Crna Reka near the village of Skocivir). Water samples were taken in May and November. To determine the water quality, the following physico-chemical parameters were made: turbidity (by turbidimeter), suspended solids, total organic carbon, biological oxygen demand and dissolved oxygen (determined with UV PASTEL).

From the results, it has come to conclusion that the highest pollution is in the fifth channel, measuring point 2 for the following parameters in the month of May: turbidity (35.3 mg/L), total organic carbon (210.8 mg/L), suspended solids (77.5 mg/L and in November 164.0

mg/L). Of the measuring points of Crna Reka, the highest pollution is in measuring point 6 in November: biological oxygen demand (14.5 mg/L), total organic carbon (13.7 mg/L).

That is why it is suggested to purify the waste water before it is released into the rivers.

*Keywords:* Crna Reka, fifth channel, pollution.

# **MONITORING OF THE MICROBIOLOGICAL QUALITY OF DRINKING WATER IN SOME SETTLEMENTS IN THE POLLOG REGION**

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## **Abstract**

The purpose of this study was to analyze the microbiological quality of drinking water in different settlements in Pollog, during the time period from December 4 “2023 to December 21” 2023. The samples were taken from the fields that are near the taps of the respective settlements. The analyzes were carried out at the Faculty of Food Technology and Nutrition. The applied methods are compatible to the guidelines of ISO standards (method with filter member). Among the microbiological criteria in this study, enterococci and coliforms were included in the above-mentioned settlements: Kamjani, from the two samples analyzed, coliforms were present in both samples and enterococci only in the second sample. In the Dobridoll settlement, from the three samples analyzed, in the second sample we have the presence of coliforms, while in the third there is development of enterococci and coliforms. In Gradec, from the five samples analyzed, the third sample has only coliforms, while in the fourth sample, only enterococci. From the five analyzed samples of the Pallatica settlement, only the fifth sample has a very high load of coliforms, while there is no development in the other samples. In the settlement

Reçica e Vogël, none of the five samples analyzed has developed colonies in the respective areas. Like Reçica e Vogël and the last settlement Tetova has no development of colonies, it should be noted that both settlements are covered by the same water supply system. The obtained results show that drinking water does not meet the microbiological criteria in most of the settlements, the exception being Tetova and Reçica e Vogël, where no growth of typical colonies was observed.

*Keywords:* Coloforms, Enterococci, Filter member method, drinking water, Pollog region.

**2<sup>nd</sup> International Conference on Sustainable  
Agriculture Farming System**

# THE STUDY OF SOME POTATO CULTIVARS (SOLANUM TUBEROSUM L.) IN NORTH MACEDONIA

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## **Abstract**

Potatoes in North Macedonia are cultivated on an area of 13,000 ha. Its cultivation extends to plain, hilly, sub-mountainous and mountainous areas. Cultivation technology is adapted according to the areas and soils. Cultivars that are planted in North Macedonia are imported from Holland, France and Germany. They are tested and the most suitable cultivars are selected according to the areas. After spending several years in cultivation, they reduce the yield and replace it with a newly created cultivar and enter production gradually and step by step after a good agronomic review, testing and adapting the cultivation technology according to the soil areas. The comparative study of cultivars is the first step to determine the most suitable cultivar according to soil areas. Twelve cultivars that were planted in the Pollog region were included in the study. The sowing was done according to the randomized block scheme with twelve variants in four replications. The sowing was done on the same day and the same cultivation technology was applied. During the vegetation period, biometric measurements were made according to the methodology and the data were processed to derive the average



values of yield data and other biometric indicators. Starch analysis was done on all cultivars.

*Keywords:* Potato, cultivar, yield, randomized, dry matter, starch.

# TESTING OF WHEAT CULTIVARS (TRITICUM AESTIVUM L.) IN THE AREA OF POLLOG - NORTH MACEDONIA

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## **Abstract**

Wheat is the most important field crop in the world. Two types of wheat are known: soft wheat (*Triticum aestivum* L.) used for flour production and hard wheat (*Triticum durum* L.) used for pasta production. The world area planted with wheat is 220 000 000 ha, varying over the years by 10% according to world price trends. The world production is 784 000 000 tons providing the basic food for the population of the world. Over 350 food items are produced from wheat, which are widely used in the world. The creation of new cultivars and their testing in different ecological zones has influenced the increase in wheat yields in the world.

Even in North Macedonia, wheat is a basic crop in the agriculture of this country and is planted on an area of 80,000 ha and with an average yield of 35 kv/ha, providing over 40% of the population's needs with the production of this crop which is very important in the Balkans. The cultivar testing is and remains the subject of ongoing scientific research and trials to determine the best cultivar according to specific ecological zones and soil conditions. Four cultivars were included in this study, specifically: Pobeda,

Apache, Amazon and Orovçanka. As seen from the name, the cultivars are from different areas and with different genetic origins. Their testing is necessary to determine their suitability and to select the best cultivar.

The experiment was set up according to the classical methodology and the randomized block scheme with four variants and four replications. The dimensions of the variant are 5 x 4 m, thus with an area of 20 m<sup>2</sup> of each variant. Biometric measurements and production indicators were made according to the methodology. The data were subjected to statistical processing to increase the accuracy of drawing conclusions and provide accurate advice.

*Keywords:* test, cultivar, variant, nutrition, indicators, yield and morphological.

# THE PRE-EM USE OF SOME HERBICIDES IN THE CONTROL OF WEEDS IN POTATOES AND THEIR INFLUENCE ON THE YIELD

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## **Abstract**

In order to mitigate the problem with weeds in the potato crop in the 2017 growing season in the Bogovinë-Tetovë locality (Pollog region), a field experiment was established according to the randomized block system with three replications with experimental plot sizes of 21 m<sup>2</sup>. In the experiment, we investigated the structure of weeds, the degree of appearance, the efficacy of herbicides and the eventual phytotoxicity of the herbicides used.

The potato planted was the cultivar “Silvana” and the following treatment variants were included: pendimetalin 5 l/ha, linuron 2.5 l/ha, metobromuron 3 l/ha, metobromuron 4 l/ha, metribuzin 0.75 kg/ha PRE-em, metribuzin 1 kg/h PRE-em, mechanical controls and absolute controls.

From the obtained results, it was found that the structure of weeds consists of 9 types of weeds, of which 3 species from the group of monocotyledonous weeds and 6 species from the group of dicotyledonous weeds. The number of weeds was 126 plants/m<sup>2</sup>. The dominant weeds were *Echinochloa crus-galli* with 93.7 plants/m<sup>2</sup>,

*Polygonum lapathifolium* with 10.0 plants/m<sup>2</sup> and *Polygonum aviculare* with 9.3 plants/m<sup>2</sup>. The efficiency of herbicides in the fight against dicotyledonous weeds has been from 97.7-100%, monocotyledonous weeds from 95.8-98.2%, while the overall efficiency without geophytes has been from 96.8-98.4%. Regarding phytotoxicity in the potato culture, no signs of phytotoxicity were observed in any variant of the treatment.

*Keywords:* dicotyledons, geophytes, efficacy, phytotoxicity.

# **RECORDING, PRESERVATION, IMPROVEMENT AND USE OF AUTOCHTHONOUS GENETIC RESOURCES OF PLANTS IN THE REGION OF KORÇA**

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## **Abstract**

Korça, although a small area on the surface, stands out for its climatic, land and orthographic diversity. This has made the genetic diversity, both in spontaneous and cultivated plants per area unit, to be quite wide. After the industrial revolution, there has been exploitation on a large scale which has led to the narrowing of this biodiversity and in some cases, to their disappearance. Collection is the first step in conservation of genetic resources. This includes a series of activities from germplasm exploration, collection of field materials, processing, documentation, to submission for storage. Plant exploration was carried out at the time of flowering. At this stage was also determined, the most suitable deadline for the second visit during which the materials will be collected. Most germplasm collections were based on seed collection.

Through the study, we identified resources with important genetic values of cultivars and autochthonous populations of the Korça region, such as corn, beans, tomatoes, peppers, onions, cabbage, leeks, watermelons, melons, fodder peas, apples, pears, walnuts, chestnut etc.

The next important step is the introduction into the schemes of genetic improvement of seed production of plant forms, especially those that are of interest to farmers.

From an economic point of view, this project made a contribution to the reduction of genetic erosion.

*Keywords:* genetic diversity, autochthonous genetic resources, cultivar, plant population, genetic erosion, Korça region.

# LIVESTOCK AND BEEKEEPING SUSTAINABILITY IN THE BALKANS: CURRENT STATE AND FUTURE PROSPECTS

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## **Abstract**

Livestock production and beekeeping play crucial roles in global agriculture, supporting food security, rural economies, and ecological balance. Despite their significance, these sectors encounter numerous challenges such as environmental degradation and socio-economic pressures. This paper focuses on evaluating the state and sustainability of livestock production and beekeeping in the Balkans, with a specific emphasis on North Macedonia. Drawing on data from FAOSTAT and MakStat, the study examines key issues, identifies emerging trends, and suggests potential solutions. The findings underscore the importance of adopting sustainable practices, strengthening regulatory frameworks, and fostering innovation to ensure the long-term viability of these sectors. By contributing to agricultural sustainability and resilience, this research aims to address the challenges confronting livestock farming and beekeeping in the region.

*Keywords:* Livestock, Beekeeping, Sustainability, Balkans, Environmental Impact.



# **A STUDY ON SEMEN PRODUCTION AND CRYOPRESERVATION OF SPERMATOZOA IN BULGARIAN BLACK AND WHITE BULLS**

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## **Abstract**

Bulgarian Black and White cattle are a native breed in Bulgaria's domestic resources of cow genetic materials that need to be developed and conserved. The aim of this study was to evaluate the semen production and cryopreservation of spermatozoa in Bulgarian Black and White bulls. Four bulls were included in this study, and a total of 226 ejaculates were analyzed. The semen volume, spermatozoa concentration, mass motility of fresh semen, and mass motility and viability of spermatozoa at +39°C after the post-thaw procedure were evaluated. The volume of ejaculate is lower during the winter months (December/January) with a tendency to increase in autumn (September/November). As for the spermatozoa concentration ( $\times 10^9 / \text{cm}^3$ ) of the fresh semen, there is an opposite trend - the lowest values were found in September/October, and the highest values in December/January, respectively.

Mass motility in fresh semen showed its lowest values in the spring months (March-April-May), while the highest values were recorded in October-December-January. The values of post-thaw spermatozoa (mass motility and thermal resistance at 39°C) follow the established dependencies in fresh semen. The highest values of these parameters were recorded in the autumn-winter season, and the lowest values occurred in the other months of the year. In the present study, the age

of the bulls has a significant influence ( $p < 0.0001$ ) on semen parameters. The fertilizing ability of deep-frozen semen in this study ranged from 49.60% to 56.50% (conception rate from first insemination) and from 69.30% to 86.00% (total conception rate) depending on the bulls.

*Keywords:* bull, semen, production, cryopreservation.

# OCCURRENCE OF LAMPROGLENNA PULCHELLA (NORDMANN, 1832) (COPEPODA: LERNAEIDAE) IN SOME CYPRINID FISH FROM LAKE OHRID (MACEDONIA)

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## **Abstract**

The representatives of the class Copepoda are of great importance in fish pathology. *Lamproglenna pulchella* (Nordmann, 1832) (Copepoda: Lernaeidae) is an ectoparasite of many cyprinid fish, widespread in Europe up to the Aral Sea. During the long-term investigations of 12 species of cyprinid fish from the Lake Ohrid, a total of 7 specimens of *Lamproglenna pulchella* was found in 5 fish from 4 fish species: *Rutilus ohridanus*, *Squalius squalus*, *Scardinius knezevici* and *Chondrostoma ohridanus*.

Only fresh fish were subjected to routine parasitological examinations, dissection, and observation methods. Parasite identification was performed morphologically, based on the character of their maxilla, maxilliped, antennae, legs and uropods, using a referent key for determination. The 3 parasite specimens were found in two samples of *Rutilus ohridanus*, followed by 2 parasite specimens in *Squalius squalus* and one specimen in *Scardinius knezevici* and *Chondrostoma ohridanus*, each.

These parasites attach to gills and general body surfaces by their maxilla and maxilliped, causing wounds that become the spots of secondary infection by microbes. The damage caused by this parasite is more pronounced in aquaculture systems.

We did not find many parasites, but considering the potential danger that *Lamproglena pulchella* poses to the fish health, we point out the need to monitor infestations with this parasite and take preventive measures so that the parasite does not spread massively among fish in Lake Ohrid and to prevent its introduction into other waters in Macedonia.

The record of *Lamproglena pulchella* in all four cyprinid fish in the present study is considered as the first from Lake Ohrid. At the same time, *Rutilus ohridanus*, *Scardinius knezevici* and *Chondrostoma ohridanus* represent new hosts for this parasite, worldwide.

*Keywords:* *Lamproglena pulchella*, cyprinid fish, Lake Ohrid, first record.

# THE USE OF SELF-ORGANIZING MAPS FOR THE ASSESSMENT OF SOIL CHEMISTRY COMPONENTS QUALITY

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## **Abstract**

The primary function of soil in relation to its chemical quality for crop production is to provide nutrients for crop growth. Self-organizing maps (SOMs) are indeed a fascinating tool for analyzing complex data, including soil chemistry components. Soil chemistry components datasets can be vast and multidimensional, including parameters like pH, organic matter content, nutrient levels, and heavy metal concentrations. SOMs can condense this high-dimensional data into a two-dimensional map, making it easier to visualize and interpret. By clustering similar samples together on the map, they can reveal spatial and chemical similarities or differences between soil samples. Once the SOM has been trained on a dataset of soil chemistry components measurements, it can be used to assess the quality of soil samples. This assessment can involve comparing new soil samples to the existing map to determine how closely they align with samples of known quality. SOMs can also be used to identify outliers or anomalies in soil chemistry components. These outliers may indicate areas of concern, such as contamination or nutrient deficiencies, that require further investigation.

Overall, the use of SOMs for the assessment of Soil chemistry components quality offers a powerful tool for understanding complex

soil systems and guiding land management practices towards sustainable outcomes.

*Keywords:* Soil, Self-organizing maps (SOMs).

# QUANTITATIVE-PHYSICAL TRAITS OF SEMI-ORIENTAL TOBACCO VARIETIES AND LINES

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## **Abstract**

Through continuous scientific work and a tradition of 100 years, Scientific Tobacco Institute-Prilep has preserved and developed a large number of oriental, semi-oriental and large-leaf tobacco varieties. In the Department of genetics, selection and seed control, semi-oriental tobacco varieties have been created and preserved, and they remain promising despite the fact that the purchase of this tobacco type is not legally regulated.

In 2018 harvest, a trial was set up using the Randomized block system method in 4 repetitions with 3 semi-oriental varieties: Ø 9-18/2 (Ø), O-110-88/3 and O-Zlatovrv, and 3 newly created lines: Maya-96, Maya-94 and Maya-CMS.

Examined semi-oriental tobacco varieties and lines belong to the group of additional types of tobacco characterized by good quantitative and characteristic physical properties. The leaves of the newly created varieties are characterized by a lower percentage of ribs, with the lowest percentage found in line Maya-94 (20.09%). They also have a characteristic leaf thickness for this tobacco type. Our goal was to present certain quantitative and physical properties of the tested semi-oriental tobacco varieties and lines that could successfully be included in cigarette blends.

The obtained results show a convincing dominance of variety O-Zlatovrv and lines Maya-96 and Maya-94 over the other varieties included in the study.

*Keywords:* tobacco, variety, semi - oriental, characteristic.



# THE STUDY OF MAIZE HYBRIDS (ZEA MAYS SPECIES L.) IN DIMAL MUNICIPALITY, BERAT

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## **Abstract**

Maize is one of the most important crops in world agriculture and has a very important place in the planted area. It is cultivated for various purposes: Bread, Livestock (silage), the beer industry, the oil industry and for bioenergy. More than five hundred different food items, dishes and drinks are produced from the maize plant. The production of hybrid seed has greatly influenced the increase in the yield of maize, both for grain and forage mass. For the conditions of Albania, the study of maize hybrids is very important, since the hybrid seed is imported and not produced in the country. The experiment involved eleven hybrids imported by the companies: ARLI International and Huqi, which respectively import from Zemun Polje and from Dekalb and KWS. Eleven hybrids were included in the study, namely: 477, 6263, 388, 735, 606, 555, 5601, 707, 666,553 B from Zemun Polje and Kulmos from KWS, Germany. The experiment was set up according to a randomized block design with eleven variants and four replications. Ten plants were determined for each replicate and variant on which biometric measurements and production indicators were made. The data was subjected to mathematical data processing to determine the best hybrid, which is adapted to the conditions of the area and gives the highest yield.

*Keywords:* Maize, hybrid, plant height, leaf, cob, rows, grain and yield.

# EVALUATION OF MORPHOBIOLOGICAL AND PRODUCTIVE INDICATORS OF POTATO CULTIVARS (*SOLANUM TUBEROSUM* L.) IN THE AREA OF MYZEQE, LUSHNJE

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## **Abstract**

The potato is spread all over the world, being planted in plain, hilly, sub-mountain and mountain areas. In Albania, 10,000 to 14,000 ha of early, medium and late potatoes are planted.

In recent years, the yield of potatoes in large scale production has increased for two reasons: First, it is planted in more productive soils and under irrigated conditions, so there are improvements in cultivation. Secondly, new cultivars with higher biological productive capacity have been introduced into cultivation. The study of morphobiological and productive indicators of potato cultivars is ongoing to achieve high and sustainable yields.

This also includes the study carried out in Zhama, Lushnje, in which eleven cultivars were included, specifically: La Perla, Valencia, Aleksjo, Gaya 1, Amora, Gaya 2, Juveli, Fidel, Solo, Zisi and Melene 2. The experiment was set up on light soils according to a randomized block design with eleven variants and four replications. Planting was

done with workforce and in two days, on February 8 and 9, 2023. During the vegetation, ten plants for each variant and repetition were determined on which biometric and production measurements were made, such as: Plant height, number of shoots per plant, production per plant, number of grains per plant, production in percentage by weight; up to 30 g, 31 - 80 g, 81 - 120 g and over 120 g. The data was processed to determine the best cultivar.

*Keywords:* Potato, shoot, cultivar, plant, yield, experiment, variant.

# EVALUATION OF MORPHOBIOLOGICAL INDICATORS AND PRODUCTION OF SWEET POTATO (IPOMEA BATATAS POIR) IN THE AREA OF MYZEQE, LUSHNJE

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## **Abstract**

The sweet potato (*Ipomea batatas* Poir) is one of the plants with a special chemical composition that is more complete with nutritional values for different ages, mainly for the ages of childhood and old age. It is very good food for people who have stomach problems and who have poor metabolism. Sweet potato is rich in starch, sugars, proteins, vitamins and chemical elements such as potassium, iron, magnesium, etc. Two sweet potato cultivars were included in the study: Convingation and O&#39;Henry. Seedlings were obtained in Ioannina, Greece, and planted in Divjaka, in sandy soils suitable for sweet potato cultivation. In both cultivars, measurements were made for morphological and productive indicators: number of shoots/plant, length of shoots/plant (sum), longest shoot, shortest shoot, number of leaves/plant, leaf color, flower color, leaf shape, tuber shape, tuber skin color, tuber pulp color, tuber placement, yield/plant (kg/plant), number of tubers/plant, weight average tuber kg, weight of the largest tuber (kg), weight of the smallest tuber kg, The yield kv/ha.

*Keywords:* Sweet potato, shoots, leaves, shape, production, tuber, yield.

# EVALUATION OF THE MORPHOBIOLOGICAL AND PRODUCTIVE INDICATORS OF CAYOTE (SECHUIM SCHEDULE L) IN THE AREA OF MYZEQE, LIBOFSHË, FIER

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## **Abstract**

Prickly potato - Kayote (Sechuim schedule L) is an exotic plant that grows and is cultivated in Costa Rica. It has been brought to Albania since 2004 and has been studied for several times in different areas, mainly in the warm zone. It is a plant that has many synonyms and uses. Sometimes it is called prickly eggplant or prickly gourd and in some places it is called Kayota. The fruit grows above the ground and the plant develops as a pergola with long shoots. The fruit is used cooked in different forms: fried, dish and or casserole. The leaves are used to make various pies and it is very tasty, especially when cooked with milk. The fruits are planted in March by placing them in the soil and covering them with 5-8 cm. During the vegetation, measurements of biometric and productive indicators were made: Number of shoots/plant, length of shoots/plant (sum), longest shoot, shortest shoot, number of leaves/plant, leaf color, flower color, the shape of the leaf, the shape of the tuber, the color of the skin of the tuber, the color of the tuber pulp, the placement of the buds on the tuber, yield/plant (kg/plant), number of tubers/plant, average tuber weight

(kg), weight of the largest tuber (kg), weight of the smallest tuber (kg), yield kv/ha. The fruits were chemically analyzed to determine the main chemical indicators: the content of starch and the most important chemical elements.

*Keywords:* Prickly potato - Kayote, shoot, leaf, starch, element, chemistry, and yield.

# THE STUDY OF THE IMPACT OF SOIL LIMING ON THE MORPHOLOGICAL AND PRODUCTIVE INDICATORS OF SAGE (*SALVIA OFFICINALIS* L) IN THE SECOND YEAR OF THE EXPERIMENT AND THE CORRELATIONS BETWEEN THEM

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## **Abstract**

Sage (*Salvia officinalis* L) is the most widespread medicinal plant in Albania and which ranks first for export among aromatic and medicinal plants. It extends almost across the entire Albanian territory, being represented by morpho-biological and chemical variations depending on the soil and the areas of extension. For the economic interest it has had and continues to have, it is cultivated in some areas of Albania and mainly in the stony soils of Koplík. The chemical composition of the herb depends greatly on the chemical composition of the soil and the climatic and soil conditions. The essence content varies depending on the climatic and soil conditions and ranges from 2.6% contained in the sages of the southern part of Albania to 3.8% and rarely 4.1% of the sages in the northern part of Albania. The content of calcium carbonate (CaCO<sub>3</sub>) affects the

morphological indicators, production, and chemical composition of sage herb. Precisely, to determine this influence, a field study was undertaken on sage development rate and essence content. The experiment was set up with four variants and four repetitions. The variants are V1= no liming, V2= 40 kv/ha lime, V3= 80 kv/ha lime, and V4 = 120 kv/ha lime.

*Keywords:* Variant, sage, indicator, lime, essence and yield.



# **GENETIC DIVERSITY OF SOME LOCAL POTATO (SOLANUM TUBEROSUM L.) POPULATIONS FOR PHYSIOLOGICAL PARAMETERS**

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## **Abstract**

Crop breeding plays a crucial role in producing high-quality food and, therefore, in improving global food security. In this regard, increasing genetic diversity is essential to provide opportunities for further improvement of plant species and to maintain the functioning of agro-ecosystems. To achieve sustainable crop production in the face of future challenges, it is also of great interest to monitor fluctuations in crop genetic diversity over time, caused by biotic and abiotic constraints and anthropogenic breeding practices.

The main objective of this study was the description of physiological parameters such as chlorophyll “a”, “b”, total chlorophyll “a+b” and carotenoids of potato landraces. 18 potato accessions were included in the experiment. The accessions were obtained from the gene bank of Kosovo (GBK). The plant material was based on a randomized complete block design (RCBD) with three replications. The results showed that the presence of the amount of synthesizing pigments in this case, chlorophyll “a”, chlorophyll “b” and carotenoids, were in values with high genetic variation, depending on the treatments that were under investigation, which actually give us preliminary data that some populations differ from other genotypes in the content of the amount of pigments for chlorophyll “a” (accession 9, 3, 7) and

chlorophyll “b” (14, 12 and 20). Our research with potato populations (accessions) for chlorophyll pigment content shows that these potato accessions, even though they were cultivated in the same laboratory conditions, show genetic variability for physiological parameters, because they were of different origins (localities).

*Keywords:* Genetic diversity; potato landraces; chlorophyll content; carotenoids.

# DIGITAL PRACTICES IN SUSTAINABLE AGRICULTURE

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## **Abstract**

The concept of good agricultural practice has developed due to rapid changes and globalization in agriculture and the food industry. These changes occur as a result of the responsibility and work for the production of healthy and safe food, as well as the implementation of stable and safe sustainable agriculture, taking care to preserve the environment. The practices that are related to the quality of the soil include the maintenance and improvement of its organic ingredients, with the application of appropriate crop rotation and the application of the digital revolution. The digital revolution in agriculture represents the transformation of standard agriculture into digital agriculture through the installation and implementation of digital machines, sensors, systems, application of information and communication technologies. One of the most used technologies in the agricultural industry is the use of the Internet of Things (IoT). The Internet of Things (IoT) enables the automatic monitoring, control and management of devices that contain hardware, software and sensors, which can be controlled remotely using a smart device, and the data obtained from input devices such as sensors can be recorded in a database for further processing, selection and generation of reports. By applying IoT, a sufficient level of protection of natural resources from pollution and damage is enabled, which, in addition

to soil, includes water and air as resources, which will contribute to the reduction of global warming.

*Keywords:* IoT, Digital tools, Sustainable Agriculture, Soil.

# EVALUATION OF MORPHOBIOLOGICAL AND PRODUCTIVE INDICATORS OF MAIZE HYBRIDS (ZEA MAYS SP. L) IN TOSHKËZ, LUSHNJE

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## **Abstract**

Maize hybrids are adapted according to the areas in accordance with their biological characteristics and meeting the climatic and soil requirements, as well as the cultivation technology that is constantly improving. In the area of Lushnje, there are very good conditions for the cultivation of maize, especially hybrids with a long growing season and high production capacity. In conditions where Albania does not produce its own seed but imports it from different countries, it is very important to evaluate and study hybrids with the aim of determining the most suitable hybrid for different areas. The study of maize hybrids imported from three main sources that dominate the area sown with maize in Albania, and mainly in the coastal lowlands, remains a continuous work that is repeated almost every year.

The hybrids included in this study: 5685, 5182 and 6092 from DKS, Bulgaria, Contigos, Intelligence, Kalxon, Kulmos and Kabriles from KËS, Germany, 707, 666 and 553 B from ZP (Zemun Polje, Serbia). The experiment was set up according to the randomized block scheme

with eleven variants and four replications. Ten plants were determined for each replicate and variant on which biometric measurements and production indicators were made.

The data was subjected to mathematical data processing to determine the best hybrid, which is adapted to the conditions of the area and gives the highest yield.

*Keywords:* Maize, hybrid, variant, yield, import, demand, climate and soil.

# **CURRENT CONDITIONS WITH TOBACCO PRODUCTION IN MACEDONIA - ANALYSIS OF SUSTAINABILITY, THE POSSIBILITY OF DEVELOPMENT AND FUTURE PERSPECTIVES**

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## **Abstract**

The Republic of North Macedonia is recognized as a producer of high-quality aromatic oriental tobacco both regionally and globally, on world stock exchanges and markets. It is a country in which quality types of oriental tobacco are traditionally grown, in addition to the famous regions in Turkey, Izmir and the Sea of Marmara area, where there are ecological conditions for the production of high quality oriental types of tobacco. As a small continental country in the Balkans, Macedonia represents a "golden triangle" in the process of producing oriental tobacco and a long-term relatively stable traditional producer compared to the countries that surround it, which are producers of this type of tobacco.

Starting from the requirements of the world market, the scientific and technological achievements in the world and the available natural, production and human potentials, it can be concluded that, today, and even more so in the future, the need to raise the quality of tobacco production will be expressed in many higher level, taking into account the demands of the buyers and the need for efficient and effective production.

Seen in perspective, tobacco production, with certain oscillations, has a stable trend of movements, with slight upward trends in world production, and our country must follow these trends and adapt to them. The future of tobacco production will mostly depend on a good agrarian and export policy, but also on a good subsidy policy from the state, all in order to encourage and direct the young able-bodied population to tobacco production, in which they will see not only an opportunity for livelihood but also a space for development, expansion and of course making a profit.

*Keywords:* sustainability, quality, subsidies, continuity, development.



# **THE ROLE OF THE ENTREPRENEUR IN MODERN AGRIBUSINESS AND CHOOSING THE MOST FAVORABLE ENTREPRENEURIAL STRATEGY**

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## **Abstract**

Modern agribusiness as a permanent process of reallocation of financial, physical and human resources from the places of social reproduction where they are insufficiently and irrationally used, to the places where they will give far greater effects, always requires a positive optimistic attitude.

The entrepreneur, in accordance with the analyzes of the management philosophy of self- development, needs to impartially and objectively assess his strengths, weaknesses, available opportunities, but also threats in the operation, while the most important thing is to believe in his abilities and in the products or the services it offers.

Agribusiness as a part of production is characterized by low mobility of assets in time and space. The land as a factor of production also has a limiting effect on the agro-entrepreneurial activity. The natural factor together with the biological character of the means and objects of work are a prerequisite for the conditional nature of the functioning of agribusiness.

An entrepreneur in agribusiness is a person who possesses creativity, knows how to manage and deal with all challenges and risks in the work process. He is brave enough to take a risk to turn his idea into

reality. Entrepreneurs are one of the world's most untapped sources of creativity and growth, thus their role in modern agribusiness is becoming increasingly relevant in both developed and transition countries.

Using his entrepreneurial abilities and qualities, the entrepreneur should apply the best entrepreneurial strategies for the benefit of the company, not allowing uncertainty and potential failure to discourage him in future steps, but rather seeing challenges and risks as opportunities, not problems.

*Keywords:* entrepreneurship, contemporary agribusiness, entrepreneur, entrepreneurial strategies.

# IMPLEMENTATION OF DIGITAL TECHNOLOGIES FOR ELECTRONIC ORDERING IN MEAT INDUSTRY

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## **Abstract**

With the rapid growth and development of information and communication technology on the one hand, and considering the meat industry on the other hand, there is an opportunity for greater implementation of ICT in the meat industry, that is, the introduction of innovation - electronic ordering of meat and meat products. To meet the demand, timely availability and ordering of meat in the domestic market especially for holidays, a pilot web application for electronic meat ordering with basic features has been developed.

Java is the programming language used to develop the application, and the Enclips platform is used as the development environment. The order part needs to be recorded in a database. The SQL database will be used as the database in which the data will be recorded. The application is divided into two parts. The first part refers to the users where they will be able to make and confirm an order by filling in the mandatory fields of the application, while the second part refers to the part of generating orders where the suppliers from the meat industry will be able to process the order to contact the buyers and to make a proper delivery on the spot.

*Keywords:* ICT, Data base, Meet Industry, e-order.

# THE EFFECTS OF FEED FORM ON BROILER CHICKEN GROWTH PERFORMANCE

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## **Abstract**

Feed costs represent a substantial portion of farmers' expenses and are a pivotal factor shaping the economics of livestock production. The physical form of diet is one of the main drivers for better digestibility of feed and improved growth performance of farm animals. This study was conducted to investigate the effect of feed particle size and feed form (ground feed mixtures and pelleted feed mixtures) on the growth performance of broiler chickens. Two hundred and forty ROSS 308 FF one-day-old broilers were randomly allocated into two treatment groups, each group comprising 120 broilers or 8 iterations with 15 broilers. The experiment spanned five weeks. Both pelleted and ground feed forms were identical in ingredient and chemical composition. Initially, the broilers in the test group exhibited lower average live body weight and daily gain compared to those in the control group. However, by the end of the trial, the broilers fed with pelleted feed mixtures displayed higher average live body weight and improved daily gain. Analysis of variance (ANOVA) revealed statistically significant differences ( $p < 0.001$ ) between the test and control groups during the 2nd and 3rd weeks of the trial, with significance persisting at  $p < 0.01$  by the trial's end. These findings suggest that utilizing pelleted feeds in the intensive fattening of broiler chickens can enhance growth

performance, increase average daily gain, and shorten the fattening period.

*Keywords:* broiler chickens, pelleted feed, growth performance.

# **THE SIGNIFICANCE AND ROLE OF LIVESTOCK FARMING AS PART OF THE AGRICULTURAL SECTOR IN PELAGONIA REGION**

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## **Abstract**

Livestock farming is one of the most important economic sectors in our country, directly influencing the overall progress of the agricultural sector. Its continuous development significantly impacts economic stability, food supply, rural development, and societal well-being. In the research, the objectives are clearly defined to provide a comprehensive description and classification of the conditions, current status, and possibilities for the development of livestock production. The main goal of the research is to identify the components of the reproduction process in the agricultural and food industry and their influence on macroeconomic movements. Various scientific methods were used in the preparation of the thesis, including analytical, synthetic, inductive, deductive, descriptive, and statistical methods. The most relevant conclusions obtained through the analysis of the results from the "Questionnaire" encompass aspects such as identifying agriculture as a primary source of income for many farmers, particularly in crop farming and livestock husbandry. Additionally, challenges like a lack of workforce, delayed subsidy payments, and issues with water supply for livestock hydration are identified. The significance of a strategy to protect clean water is emphasized as a response to the water scarcity challenge. The

future of the agricultural sector depends on factors such as product placement, subsidies, timely payment for finished products, and ensuring the workforce, highlighting them as key aspects for the sector's future development. The research provides significant data contributing to the improvement of the current state in livestock farming, both in the Pelagonian region and in our country.

*Keywords:* agricultural sector, animal husbandry, Pelagonia region, economic contribution, food supply.

# THE EFFECT OF GRAFTING ON THE PLANT GROWTH DYNAMICS IN TWO BELL PEPPER VARIETIES

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## Abstract

The aim of this study was to evaluate the growth dynamics of two bell pepper hybrids grafted onto three commercial rootstocks, in open field and in greenhouses. The experiment was conducted in Kosovo on Gelby F1 and Vedrana F1 as rootstocks and Sm Tant, Vital Paprika and ‘6210’ as scions in randomized block design over period of three years. The plant growth dynamics was measured, starting 15 days after transplanting and every 10 days until the beginning of full harvest, as well as the stem diameter that was measured below the first bifurcation. A two-way ANOVA with repeated measures was performed to analyze the effect of Grafting status and Environment in five consecutive growth stages. The analyses revealed that there were statistically significant differences within subjects and between subjects regarding the Grafting status and Environment. Grafting significantly and consistently improved plant growth dynamics, although final plant height showed divergence. This variability was evident across different growth stages and was not solely attributed to grafting or production conditions. A significant disruption in the



balance between vegetative and reproductive growth was noticed at the onset of fruit setting, an alteration that posed substantial implications for the broader growth dynamics of the plants.

*Keywords:* grafting, bell peppers, plant growth, stem diameter.

# ECONOMICALLY IMPORTANT INSECTS FROM FAM. GELECHIIDAE AND TORTRICIDAE (LEPIDOPTERA) ON STONE FRUIT IN NORTH MACEDONIA

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## Abstract

The species *Anarsia lineatella* Zeller (fam. Gelechiidae, Lepidoptera), *Grapholita molesta* Busck and *Grapholita funebrana* Treitschke (fam. Tortricidae, Lepidoptera) are economically significant pests on stone fruit (peach, apricot, plum) in North Macedonia. Researches were conducted in mixed plantations with stone fruits during 2021 at two locations, village Chelopek, Municipality of Staro Nagoricane, North-East region and village Sirkovo, Municipality of Rosoman, Vardar region. The studied insects were tracked with pheromone lures. The researches confirmed the presence of all three species in the mixed stone fruit plantations in both regions. Research results were based on a total of 3645 caught individuals of all three species. Total number of caught individuals on both locations of *A. lineatella* was 1000, 1712 of *G. molesta* and 934 of *G. funebrana*. The flight of *A. lineatella* lasted 206 days in the village Chelopek (30.03-21.10.2021) and 214 days in the village Sirkovo (02.04-01.11.2021). *G. molesta* had total flight period of 178 days (09.04-03.10.2021) in

the village Chelopek and 222 days (29.03-05.11.2021) in the village Sirkovo. *G. funebrana* had total flight period of 188 days (30.03-03.10.2021) in the village Chelopek and 208 days (31.03-24.10.2021) in the village Sirkovo. The dynamics of the population of *A. lineatella* showed 2 generations in the Northeast region and 3 generations in the Vardar region. *G. molesta* and *G. funebrana* developed 3 generations in both regions.

Concerning the locations there are statistically significant differences for *A. lineatella* and *G. molesta* ( $p < .01$ ), but no statistically significant differences for *G. funebrana*.

*Keywords:* *A. lineatella*, *G. molesta*, *G. funebrana*, stone fruits, North Macedonia.

# A REVIEW OF WILD MUSHROOMS WITH ANTIBACTERIAL ACTIVITY IN THE REPUBLIC OF NORTHERN MACEDONIA

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## **Abstract**

In the Republic of Northern Macedonia, according to the latest official data from the mycological research of macromycetes, close to 2000 species are registered. The largest number belongs to basidiomycetes with 1735 species and the rest belongs to ascomycetes with 255 species. These mushrooms are used in nutrition, biotechnology, medicine and pharmacy. A large number of these wild mushrooms also have antibacterial, antifungal and antiviral effect. In this paper we will mention only the types of fungi that have antibacterial effects and actions which have been recorded in the research so far in the Republic of Northern Macedonia. The paper presents 77 types of wild macromycete fungi that have antibacterial activity and 21 types of pathogenic bacteria. The most popular species with antibacterial effect are: *Agaricus bisporus*, *A. bitorquis*, *Boletus edulis*, *Cantharellus cibarius*, *Coprinus comatus*, *Ganoderma lucidum*, *G. applanatum*, *Gripholia frondosa*, *Hericium erinaceus*, *Lactarius deliciosus*, *Lactarius deterrimus*, *Lentinus edodes*, *Pleurotus ostreatus*, *P. eryngii*, *Trametes versicolor*, *Tremella mesenterica*, *Tricholoma matsutake* etc. These fungi with antibacterial activity are affecting certain bacteria such as: *Bacillus*

cereus, Escherichia coli, Listeria monocytogenes, Salmonella enteroditis, Staphylococcus aureus, S. epidermitis etc. These species cause serious bacterial diseases. Of the total number of macromycetes fungi, a certain number of them, according to numerous analyzes and notes by various european and world authors, are also registered in the Republic of Northern Macedonia.

*Keywords:* wild mushrooms, macromycetes, antibacterial, Republic of Northern Macedonia.

# **DETERMINATION OF PROTEINS PERCENTAGE BY THE KJELDAHL METHOD IN CEREALS OF THE MARKETS IN KORÇA CITY**

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## **Abstract**

Proteins are organic substances, macromolecules which mainly consist of the elements of carbon, hydrogen, oxygen, nitrogen and rarely sulphide. Proteins are the main building blocks of cells. They not only give cells a structure, but are also molecular machines, where they transport materials, pump ions, catalyze chemical reactions and recognize signaling substances. The Kjeldahl Method is used to determine the protein content in cereals, a method invented since 1883, which consists of mineralizing the content of flour using Se and Cu 2 SO 4 catalysts and burning the content with H 2 SO 4 cc for about 1 hour. After mineralization, it continues with distillation and finally with the titration of the distillate to determine the amount of acid needed to neutralize the distillate. This methodology is used to calculate the nitrogen content in cereals and then it is converted into protein content using conversion coefficients. In this study, are analyzed 24 samples of flour collected from Korça city markets? Those samples belong to 8 different cereals cultivated in Albania, Italy and Germany and for each of them the same analysis were performed. The results are presented in the final table where

buckwheat has the highest protein content of 17.59% and rice has the lowest content of 2.89%.

*Keywords:* Kjeldahl, protein, distillation, titration, catalyst, nitrogen.

# **GREEN PERSPECTIVE: UNDERSTANDING PALM OIL'S FUTURE**

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## **Abstract**

This study delves into the intricate dynamics of sustainability within the palm oil industry, focusing on its implications for economic growth, environmental conservation, and social well-being. By examining the dynamic interplay between economic development and environmental sustainability, the study evaluates the multifaceted impacts of palm oil development from various perspectives.

At the heart of the discussion lies the ongoing debate surrounding palm oil sustainability, prompting critical inquiry into whether the industry acts as a catalyst for progress or presents ecological challenges. Through an interdisciplinary lens encompassing economic, sociological, and environmental viewpoints, this study aims to foster constructive dialogue and inform the formulation of sustainable development strategies.

Additionally, the study explores crucial aspects of environmental compliance, including regulatory frameworks, land use practices, wildlife conservation efforts, and adherence to palm oil codes of practices. It also anticipates future challenges and proposes best development practices aimed at steering the industry towards a more sustainable trajectory.

In conclusion, "Green Perspective: Understanding Palm Oil's Future" offers valuable insights into navigating the complexities of sustainability in agriculture. It underscores the significance of



proactive measures and interdisciplinary collaboration in addressing environmental and social concerns within the palm oil sector.

*Keywords:* palm oil industry, sustainability, economic growth, environmental protection, social impact, effective practices, challenges.

# EXAMINATION OF THE COMPOSITION OF WHEY FROM MIXED CHEESE

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## **Abstract**

In recent years, the ingredients of milk represent a functional food, because their use has a great effect on health. Whey is a byproduct of cheese production, which was previously considered waste. Whey proteins strengthen the immune system by helping the body produce the antioxidant glutathione, which protects against free radicals, pollution, toxins and infections. In this research we examine the composition of whey (minerals: Ca, K, Fe and P, total proteins and albumins) from mixed cheese from the "Ideal Shipka" dairy factory - Bitola. All parameters were determined spectrophotometrically, spectrophotometric, photometric - colorimetric and nephelometric methods were applied to prove the amount of certain components present in the whey composition. From the obtained results we can see that whey has the highest amount of total proteins, it contains 17.6 g/L, from which amount of albumen is 1,99 g/L. Of the minerals, the highest value was obtained for potassium 26,6 mmol/l, followed by calcium 9,47 mmol/l, amount of phosphorus was 9,39 mmol/l, while iron is found in a very small percentage 11,74  $\mu\text{mol/l}$ . From the research we can conclude that whey contains a large percentage of total proteins, and of the minerals potassium. Thus, whey can be used as a dietary supplement for protein and potassium and it is attractive product for both the food and pharmaceutical industries and consumers.

*Keywords:* whey, protein, minerals, spectrophotometry.

# WAYS OF TREATING BED RETAINED PLACENTA COWS OF THE FRIESIAN BREED

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## **Abstract**

Retained placenta in dairy cows is when the fetal membrane or placenta does not exit the uterus within 9-12 hours after calving. Retained placenta is a pathological disorder when the placenta does not fall out within a certain period of time after calving. The placenta in cows is most often expelled 6 (77.3%) to 8 hours after calving (Van Werven et al., 1992). The incidence of placental abruption in cows averages 8.6%. The cause of placental exit is not fully understood. There are several factors on which the separation of the fetal placenta from the uterus depends: genetic (inherited), nutritional, immunological and as a result of some diseases of the reproductive tract. The causes of placental retention can be: fatigue of the uterus, inflammatory conditions of the bed, insufficient amount of some hormones, lack of vitamins and/or minerals, toxic effects of some substances and poisons and mechanical obstacles.

The conclusion is that cows with retained placenta belong to the risk group because they are prone to inflammation of the uterus, so they have a prolonged service period and delayed or absent recovery of the cyclic activity of the ovaries, which can be the cause of sterility, temporary or permanent.

Treatment of retained placenta should be carried out in time, removing the fetal placenta manually and inserting foaming tablets for intrauterine use. After that, PgF2 $\alpha$  and oxytocin are applied.

*Keywords:* retained placenta, PgF2 $\alpha$ , ovarian cycle, uterus

# THE INFLUENCE OF THE CONTENT OF TOTAL NITROGEN, POTASSIUM AND THE METHOD OF CULTIVATION ON SOME QUALITATIVE FEATURES OF STRAWBERRY FRUITS

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## **Abstract**

The qualitative composition of the ripe fruits of strawberry (hybrid variety- Alba) was examined on growing areas in Glumova (open field) and Shishova (in greenhouse conditions) in the municipality of Saraj- Skopje, with some different agrochemical characteristics, i.e. in Glumova the average total nitrogen values of 0.182% and potassium (K<sub>2</sub>O) 29.50mg/100g soil were significantly higher than those found in Shishova (0.116% and 20.24mg/100g soil). In ripe strawberry fruits, the amounts of total sugars, ascorbic acid (vitamin C), total nitrogen and potassium found were significantly dependent on the agrochemical properties and the method of their cultivation. In strawberry fruits grown in greenhouse conditions (Shishova), the amount of total sugars 3.68%, ascorbic acid (64.57 mg/100g FW), total nitrogen 9.10 mg/g<sup>-1</sup> DM and potassium (K) 1.64 % in DM were significantly lower in relation to the average values found in strawberry samples grown in an open field (Glumova).

*Keywords:* strawberry, agrochemical content, open field, greenhouse condition.

# EFFECTIVENESS OF PREVENTIVE FUNGICIDE TREATMENTS IN CONTROLLING PLASMOPARA VITICOLA OUTBREAKS

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## **Abstract**

The effectiveness of preventive fungicide treatments in controlling outbreaks of *Plasmopara viticola* (Berk. & M.A. Curtis) Berl. & De Toni, was tested on experimental grapevine plots in Smilica, Kavadarci, Republic of North Macedonia, during the spring-summer of 2023, characterized by high humidity and abundant rainfall. Two variants were implemented: (i) a control plot and (ii) a plot with a preventative fungicide treatment. The Climate Forecast System Reanalysis (CFSR) is a climate dataset used for intraday climate predictions of rainy weather, where chemical treatments were carried out immediately before the onset of precipitation as a necessary measure for plant protection. This forecasting model was enhanced by incorporating data from experimental vineyard plots on disease incidence and fungicide efficacy, in addition to weather data. ANOVA analysis of data on the efficacy of fungicides from both experimental plots showed statistical significance ( $P < 0.007$ ).

*Keywords:* *Plasmopara viticola*, outbreaks, preventive fungicide treatments, ANOVA analysis, fungicide efficacy.

# CHEMOMETRIC EVIDENCE FOR SR AND RB ISOTOPES DUE TO THE SPECIFIC SOIL CHEMISTRY IN DIFFERENT GEOGRAPHICAL REGIONS

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## **Abstract**

Strontium and rubidium are the commonly used metals for isotope-ratio analysis. Moreover, this geochemical marker varies between different rock types and formations. The  $^{87}\text{Sr}/^{86}\text{Sr}$  ratio has been shown to vary widely in surface rocks, so any Sr released into soils, rivers, and groundwaters has an isotopic signature that reflects its source. Sr and Rb isotopes have also been used to trace agricultural products, which have incorporated Sr, along with Ca, from soils incorporating the Sr-isotope ratios of the underlying rocks.

The specific conditions in the soil represent characteristic conditions of the environment which is reflected in a certain way in the plants. Despite uncertainty about the organic compounds in a sample, the content of selected elements (trace and rare earth elements, REEs) reflects the growing conditions in the environment. For that instance, in the present research we will give focus on the inorganic compounds' identifications, due to the more stable response to the lithogenic nature of the soil-plant interaction.

For the present study, the target isotopes were  $^{88}\text{Sr}$ ,  $^{87}\text{Sr}$ ,  $^{86}\text{Sr}$  and  $^{85}\text{Rb}$ . The isotope analysis was conducted with application of ICP-MS, following the protocol provided in the EPA METHOD 6020. In the validation process, no significant interference occurred that could

affect the sensitivity of the measurement of the selected isotopes. Data analysis has been applied within the comparative issues between Sr and Rb content in soil from North Macedonia and selected regions in China. Moreover, the same chemometric model was applied for data analysis for selected plant species for both regions.

*Keywords:* Isotopic measurement, Rubidium, Strontium, Soil chemistry, Geochemical markers, ICP-MS.

# **CHEMICAL COMPOSITION OF MADŽUN (GRAPE MOLASSES) PRODUCED FROM DIFFERENT GRAPE VARIETIES**

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## **Abstract**

In this study, some chemical properties of Madžun (grape molasses) samples produced using the traditional method with five different grape cultivars (Cardinal, Vranec, Afus ali, Stanushina, Smederevka) were investigated. The water-soluble dry matter, pH, titratable acidity and hydroxymethyl furfural (HMF) content of the samples were determined to be 61.67-84.98%, 3.11-4.47, 3.8-11.1 g/L and 620.30-875.30 mg/kg, respectively. The mean fructose and glucose contents of the Madžun (grape molasses) samples were determined to be 39.64% and 40.86%, respectively. Sucrose content in all samples was at the detection threshold (<0.1%). This indicates that no sugar was added in the production of grape molasses (Madžun). The total phenols (gallic acid) were identified in five samples and significant differences were observed between samples ( $P < 0.01$ ). Sensory analysis of the samples was carried out by a committee consisting of 7 members. All members are women with experience in sensory evaluation of plant-based foods.

The following elements were evaluated: color, smell, taste, sweetness, acidity, texture and aftertaste. The maximum number of points is 20 (ISO 6564, ISO 8587 and ISO 11036). Based on the results of the sensory evaluation, we concluded that the highest score



of 17.92 points is sample Madžun (grape molasses) produced from the Vranec grape variety.

*Keywords:* Madžun, sugar, total phenols, total acids, HMF (hydroxymethyl furfural), sensory evaluation.

# **THE IMPACT OF RURAL TOURISM ON THE DEVELOPMENT OF RURAL ECONOMY WITH SPECIAL EMPHASIZES ON “STANET E SHIPKOVICËS”**

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## **Abstract**

The development of rural tourism has been determined as one of the key factors for local economic development and especially for the rural economy.

Small and developing process countries, one of the main benefits that can and should be used is the natural resources. The accent is set on less developed countries as well as those in developing process, since nature and the natural resources are still “saved” from pollution and uncontrolled exploitation. In North Macedonia such a wonderful segment is located in the north-west part of the country. Based in the heart of the National Park “Sharr Mountain”, last years very popular among the tourists as “Stanet e Shipkovicës”. The aim of this research is to identify the possible organization of these natural resources and the wonderful biodiversity combined with the local product and services of the rural population and its impact on the local economy.

*Keywords:* rural economy, development, tourism, stanet, resources, etc.

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