

Македонски Фармацевтски Macedonian билтен Pharmaceutical Bulletin

волумен 62 (додаток) 2016 / volume 62 (supplement) 2016



Македонско фармацевтско друштво, ул. Маршал Тито 13б/8, Скопје, Македонија
Macedonian Pharmaceutical Association, Marshal Tito 13b/8, Skopje Macedonia

It is our great pleasure to present this Supplement Issue on “*Macedonian Pharmaceutical Bulletin*” to the scientific and professional community. This supplement includes the short communications from the *Sixth Congress of Pharmacy in Macedonia with International participation*, as the largest gathering for the pharmacy profession held in the Republic of Macedonia. The main theme of the Congress was “Modern pharmacist - bridging science with practice”.

A broad spectrum of topics within the pharmaceutical sciences and practice carefully selected for this special occasion in order to build up a highly interesting and comprehensive program were covered. The contributions submitted to the Congress included 6 plenary lectures, 84 section lectures, and more than 240 posters. This Congress, followed the excellent international tradition, was attended by close to 1000 domestic and foreign participants. We received 326 short paper submissions from more than 25 countries. These numbers show that our Congress is aiming for the highest scientific standards, and that it can be considered a well-established venue for researchers in the broad fields of Pharmaceutical sciences and practice.

We would like to thank all internationally prominent researchers for their contribution to reinforcing the overall quality of the Congress. They give the state of the art of the recent advances in the field of pharmacy research.

Sincere thanks to the hosts of the Sixth Congress of Pharmacy in Macedonia with International participation, Macedonian Pharmaceutical Association and Faculty of Pharmacy, Ss Cyril and Methodius University in Skopje for their vision and commitments.

We acknowledge the sponsoring companies: the platinum sponsor AD ALKALOID, Skopje, the golden sponsor PLIVA, the silver sponsor EUROFARM and the bronze sponsor SEPTIMA, for the permanent support to our efforts during the organization.

We would also like to thank our members of the Scientific Committee for their volunteer time and dedication to the critical peer review process and in the organization of the program. We also wish to thank all the members of the Organizing Committee, whose work and commitment was invaluable.

On behalf of the Advisory and Scientific Committees, we would like to especially thank the authors, whose work was the essential part of the congress and contributed to a very successful event. Besides the many academic staff and professionals who contributed to the success of the Congress, we are grateful to the students who participated with oral presentations and posters.

The pharmaceutical sciences continue to grow as dynamic scientific interdisciplinary fields. We believe that published short communications will be an excellent source of scientific material in the fast evolving fields in Pharmaceutical sciences and practice.

Chair of the Scientific committee

Prof. Marija Glavas Dodov



Chair of the Organizing committee

Prof. Rumenka Petkovska



Your hosts
Macedonian Pharmaceutical Association
and
Faculty of Pharmacy, Ss Cyril and Methodius University in Skopje

Organizing Committee

Rumenka Petkovska, Ss Cyril and Methodius University, Faculty of Pharmacy / Chair
Zoran Sterjev, Ss Cyril and Methodius University, Faculty of Pharmacy / Co-Chair
Nikola Geskovski, Ss Cyril and Methodius University, Faculty of Pharmacy / Secretary
Jelena Acevska, Ss Cyril and Methodius University, Faculty of Pharmacy
Aleksandra Kapedanovska Nestorovska, Ss Cyril and Methodius University, Faculty of Pharmacy
Arlinda Haxhiu Zaimi, The State University of Tetovo, Faculty of Medical Sciences
Katerina Smilkov, Goce Delcev University, Faculty of Medical Sciences
Gjorge Stojadinovic, Alkaloid AD Skopje

Advisory Board

Svetlana Kulevanova - Macedonia, Suzana Trajkovic Jolevska - Macedonia,
Aleksandar Dimovski - Macedonia, Aneta Dimitrovska - Macedonia, Atila Hinchal –Turkey,
Biljana Bauer - Macedonia, Borut Bozic - Slovenia, Carmen Fernández – Sweden,
Dominik Duchene - France, Jerka Dumic – Croatia, Katerina Goracinova - Macedonia,
Lidija Petrusavska Tozi - Macedonia, Lilian Azzopardi - Malta, Ljubica Suturkova - Macedonia,
Nada Kovacevic - Serbia, Renata Slaveska Raicki – Macedonia, Slobodan Apostolski – Serbia,
Vasia Bankova – Bulgaria, Zoran Kavrakovski - Macedonia

Scientific Committee

Marija Glavas Dodov / Chair
Maja Simonoska Crcarevska / Secretary

Aleksandra Grozdanova - Macedonia
Ana Poceva Panovska - Macedonia
Antonio Makris - Greece
Arijana Meštrović -Croatia
Balázs Hankó - Hungary
César Viseras Iborra - Spain
Dea Baricevik - Slovenia
Dinko Vitezic – Croatia
Dragana Vujanović – Serbia
Ela Hoti - Albania
Emilija Janjevik - Macedonia
Giangiacomo Beretta - Italy
Gjose Stefkov - Macedonia
Jasmina Tonic Ribarska - Macedonia
Jelena Filipovich Grhic - Croatia
Johanes Novak - Austria
Katerina Ancevska Netkovska - Macedonia
Katerina Brezovska - Macedonia
Kristina Mladenovska - Macedonia
Margarida Caramona – Portugal
Marija Hiljadnikova Bajro - Macedonia

Michaele Montagne - USA
Milen I. Georgiev - Bulgaria
Milenko Tanasijevic – USA
Mitko Efremov - Italy
Nasir Behxheti - Macedonia
Nebojsa Menkovic - Serbia
Neda Mimica Dukić - Serbia
Ran Balicer - Israel
Rok Dreu – Slovenia
Rubin Zareski - Macedonia
Rumenka Petkovska - Macedonia
Sasha Baumgartner- Slovenia
Sema Calis – Turkey
Slavica Razic – Serbia
Suela Kellici - Albania
Tatjana Kadifkova Panovska - Macedonia
Vesna Kuntic - Serbia
Vilma Papajani - Albania
Zbigniew Fijałek - Poland
Zoran Sterjev - Macedonia

The present issue of *Macedonian Pharmaceutical Bulletin* is a special issue of the 6th Congress of Pharmacy in Macedonia with international participation.

This issue of *Macedonian Pharmaceutical Bulletin* contains short papers accepted by the scientific committee for the presentation at the Congress.

The authors are fully responsible for the contents of their short papers.

All reviewers that were involved in the short papers revision process are sincerely acknowledged.

Determination of cannabidiol and Δ^9 tetrahydrocannabinol in *Cannabis sativa* L. preparations present in the European market by HPLC/DAD

Maja Shishovska^{1*}, Dragica Doneva¹, Zorica Arsova-Sarafinovska^{1,2},
Katerina Starkoska^{1*}

¹Institute for Public Health of the Republic of Macedonia, Medicines Quality Control Department,
“50 Divizija” No 6, 1000 Skopje, Republic of Macedonia

²University “Goce Delcev”, Stip, Republic of Macedonia

Introduction

Cannabis sativa L. is a medicinal plant, known and used for a long time. There are 400 – 500 compounds that have been identified in its extracts, and among them approximately 70 are C₂₁ terpenophenols, members of a group known as cannabinoids, specific for this plant (ElSohly and Slade, 2005; Fishedick, et al., 2009; Turner, et al., 1980). The constituent of *Cannabis sativa* L., Δ^9 -tetrahydrocannabinol (Δ^9 THC), is the primary psychoactive cannabinoid. Given that the main pharmacological and psychoactive effects have been attributed to this compound, the most of the studies have been focused on its effects (Costa, 2007). The effects of *Cannabis sativa* L. are not solely due to Δ^9 THC because cannabidiol (CBD) was found to cause pharmacological effects (Russo and Guy, 2006). It was shown that CBD and other cannabinoids achieve synergy with Δ^9 THC causing potentiation of benefits, antagonism of adverse effects, summation, pharmacokinetic advantages, and metabolism (Russo and Guy, 2006).

Many countries became more liberal towards medicinal use of *Cannabis sativa* L. (Baker et al., 2003). Recently there has been an increasing interest in development of cannabinoids and *Cannabis sativa* L. preparations as legitimate medicines for a variety of medical applications. Some of them include, but are not limited to, multiple sclerosis, chronic pain, glaucoma, asthma and cardiovascular conditions, and as an antiemetic (Williamson and Evans, 2000). Cannabidoids are very potent compounds and their control

in *Cannabis sativa* L. preparations is very important, especially because their potential users are patients which already have serious health problems.

The aim of this study was to apply our in-house HPLC/DAD method on the *Cannabis sativa* L. preparations present in the European market and to control their quality.

Materials and methods

The samples of *Cannabis sativa* L. preparations were purchased from the European market, produced by Endoca (Pharmaceutical Company, Denmark). The standard substances were obtained from Lipomed AG (Switzerland). The samples of standard substances were: Δ^9 -THC (3-pentyl-6,6,9-trimethyl-6a,7,8,10a-tetrahydro-6H-dibenzo(b,d)pyran-1-ol), delivered as 1 mL ampule solution (5 mg/mL prepared in ethanol, with purity 98.52%, m/m) and CBD ((-)-trans-2-p-mentha-1,8-dien-3-yl-5-pentylresorcinol) as the solid substance (99.73%, m/m). The solvents used during the analysis were with HPLC grade.

For the chromatographic analysis Agilent Technologies HPLC system 1200 series (Germany) was used. The analysis was performed on HPLC-column: Purospher® Star RP18e (150 mm x 4.6 mm ID, 5 μ m) from Merck KGaA (Germany) using mobile phase composed of acetonitrile and water in gradient mode with acetonitrile from 50%, V/V, to 80%, V/V, at flow rate 1.5 mL/min, temperature 30 °C, detection at 220 nm, injection 10 μ L, in 31 min run time.

The working solutions of standard substance CBD were prepared in methanol in two concentration ranges:

* k.starkoska@iph.mk

95.48 µg/mL – 286.43 µg/mL and 103.13 µg/mL – 309.40 µg/mL. The Δ^9 THC working solutions were prepared in methanol in concentration range: 9.81 µg/mL – 19.63 µg/mL.

The sample solutions were prepared by liquid/liquid extraction technique using a mixture of methanol and chloroform (9:1). When the layers were clearly separated, the sample from the methanolic layer was applied in HPLC/DAD system.

Results and discussion

Five different *Cannabis sativa* L. preparations purchased from the European market were analyzed. All were prepared from hemp oil with various amounts of CBD as active compound and naturally contains Δ^9 -THC, as an impurity. According to the certificates the amount of CBD was: 3%; 5%; 10 %; 15% and 30%, *m/m*, and expected impurity as Δ^9 THC was limited at maximum of 0.20%, *m/m*.

For preparation of the samples we used the recommended United Nations Office on Drugs and Crime method (UNODC Manual, 2009). For identification and quantification of cannabinoids we used our in-house chromatographic gradient method which we have proposed for hemp seed oil analysis (Shishovska et al., 2014) because of the similarity of samples in origin and form.

In the analyzed samples of hemp oil preparations cannabidiol and Δ^9 THC were identified and quantified. Identifications were done by comparing of the retention times and UV spectra of standard compounds with retention times of peaks at the chromatograms of samples and their UV spectra. The retention times of CBD and Δ^9 THC peaks were 15.9 min and 21.0 min, respectively.

For the quantification, data obtained from the chromatograms were calculated using the method of the calibration curve (constructed as concentration, *c* (µg/ml), versus peak area, *A* (mAU)). The analyzed working solutions of the active compound CBD and the trace compound Δ^9 THC showed high linearity in the working ranges. The estimated coefficient of the linearity for CBD working solutions at concentration range: 95.48 µg/mL – 286.43 µg/mL was 1.000 ($A = 23688 c + 16.188$); while for the CBD working solutions at concentration range: 103.13 µg/mL – 309.40 µg/mL it was 0.9998 ($A = 39613 c + 31.129$), and for the working solutions of standard substance Δ^9 THC at concentration range: 9.81 µg/mL – 19.63 µg/mL it was 0.9997 ($A = 25269 c - 7.0738$).

It was found that content of cannabidiol in analyzed samples is from 109.7% to 125.4%, *m/m* of the declared values. The assays of Δ^9 THC traces at the samples vary according to the concentration of the active compound. As

quantities of CBD at samples were lower (3 – 5%), the assay of Δ^9 THC is under the allowed maximum limit (0.02% – 0.14%), but at samples with higher concentrations of CBD (10 – 30%) the Δ^9 THC traces are above the allowed maximum limit (0.45% – 1.14%).

Conclusion

The satisfactory chromatographic data proved that our in-house gradient HPLC/DAD method can be successfully used for determination of the active substance CBD and traces of Δ^9 THC in *Cannabis sativa* L. preparations. The results obtained for the analyzed samples of *Cannabis sativa* L. preparations showed higher amounts of CBD than declared value in the certificate (differences range from 9.7% *m/m* to 25.4%, *m/m*). In two samples, the amount of Δ^9 THC found was under allowed maximum limit of 0.20%, while in three samples the amount was above that value. Not all of the samples tested have composition as declared in the certificate, although they all origin from a European manufacturer and are present in the European market.

References

- Baker, D., Pryce, G., Giovannoni, G., Thompson, A.J., 2003. The therapeutic potential of cannabis. *Lancet Neurol.* 2(5), 291–298.
- Costa, B. 2007. On the pharmacological properties of Δ^9 tetrahydrocannabinol (THC). *Chem Biodiv.* 4, 1664–1677.
- ElSohly, M.A., Slade, D., 2005. Chemical constituents of marijuana: the complex mixture of natural cannabinoids. *Life Sci.* 78, 539–548.
- Fischedick, J.T., Glas, R., Hazekamp, A., Verpoorte, R., 2009. A qualitative and quantitative HPTLC densitometry method for the analysis of cannabinoids in *Cannabis sativa* L. *Phytochem Anal.* 20, 421–426.
- Russo, E., Guy, G.W., 2006. A tale of two cannabinoids: The therapeutic rationale for combining tetrahydrocannabinol and cannabidiol. *Med Hypotheses* 66, 234–246.
- Shishovska, M., Doneva, D., Starkoska, K., Arsova-Sarafinovska, Z., 2014. Determination of Δ^9 -tetrahydrocannabinol by HPLC/DAD in food supplement samples of hempseed oil. Presented at: XXIII Congress of Chemists and Technologists of Macedonia, Ohrid, Macedonia, AC-018.
- Turner, C.E., ElSohly, M.A., Boeren, E.G., 1980. Constituents of *Cannabis sativa* L. XVII. A review of the natural constituents. *J Nat Prod.* 43(2), 169–234.
- United Nations Office on Drugs and Crime, 2009. Recommended methods for the identification and analysis of cannabis and cannabis products; Manual for use by national drug analysis laboratories, United Nations, New York, pp. 41–43.
- Williamson, E.M., Evans, F.J., 2000. Cannabinoids in clinical practice. *Drugs* 60(6), 1303–1314.

CONTENTS

Opening lecture

The modern pharmacist: Is the future in the past? _____	7
Roberto Frontini	

Closing lecture

Commitment to quality means commitment to change _____	11
Michael J. Rouse	

Plenary lectures

New psychoactive substances - analytical challenges and threats to the public health: European and Polish experience in the new drugs combating _____	15
Zbigniew Fijalek	
Green “cage” nanoparticles as efficient carriers for challenging drugs _____	17
Ruxandra Gref	
Data-driven innovation in health policy _____	19
Ran Balicer	
Clinical pharmacy - established paths and new opportunities _____	21
Dorothea Rudolf	
Brown fat induction in treatment of metabolic disorders _____	25
Mirko Trajkovski	
Bridging the computer and life sciences: the case of VI-SEEM _____	27
Anastas Mishev	

Pharmacoeconomy / Social pharmacy / Drug information

Data-driven approaches to tackling medication adherence _____	33
Ran Balicer	
Analyzing pharmaceutical policies: Hungary as a case study _____	35
Rok Hren	
Impact of parallel trade/import of pharmaceuticals in Central East European Countries _____	37
Zoran Sterjev, Rubin Zareski, Katerina Anchevska Netkovska, Zorica Naumovska, Aleksandra Kapedanovska Nestorovska, Aleksandra Grozdanova, Ljubica Shuturkova	
The effects of the new methodology application on the method of pricing of drugs _____	39
Rubin Zareski, Ljubica Suturkova, Zoran Sterjev	
Market access of biosimilar medical products – economical, regulatory and clinical issues _____	41
Aleksandra Grozdanova, Katerina Anchevska Netkovska, Zorica Naumovska, Aleksandra Kapedanovska Nestorovska, Zoran Sterjev, Ljubica Shuturkova	

The importance of pharmacists in primary healthcare	43
Lovorka Nikolic, Una Ivosevic, Natasa Lalic Cunkovic, Mirjana Savicevic	
Internet and computer use amongst European pharmacy students	45
SelenYeğeneoğlu, Bilge Sozen Sahne, Daisy Volmer, Afonso Cavaco, Maarten Postma	
Activities of Macedonian Agency of medicines and medical devices in the improvement of rational use of medicines	47
Merjem Hadjihamza Marija Darkovska Serafimovska, Mirjana Donceva	
Sources of medicines information used by Lithuanian community pharmacy patients	49
Paulius Brazauskas, Jurgita Daukšienė, Romualda Gauryliene, Raimondas Radžiūnas	
Characterization of typical and atypical antipsychotics use in Albania, 2006-2012	51
Elda Hoxha, Vilma Papajani	
Developing and implementation of good pharmaceutical practices in a small private pharmacy	53
Sead Salkoski	
The research exemption in Macedonian industrial property law and its effects on the extent of patent protection for drugs	55
Jadranka Dabovic-Anastasovska, Nenad Gavrilovic, Katerina Ancevska-Netkovska	
Parallel pharmaceutical trade in Macedonia – pros and cons	57
Goran Koevski, Jadranka Dabovik Anastasovska	
Evaluation of reliability and validity of the European Organization for Research and Treatment of Cancer Quality of Life Questionnaire (EORTC QLQ-C30) questionnaire (Albanian version) among breast cancer patients from Kosovo	59
Selveta Shuleta-Qehaja, Aleksandra Grozdanova, Aleksandra Kapedanovska Nestorovska, Zorica Serafimoska, Ljubica Shuturkova, Zoran Sterjev	
Additional services as a basis for the concept of pharmaceutical care	61
Martin Gigovski, Yiannis E. Polychronakis	
Protection of public interest in the area of health through compulsory licenses of patents for pharmaceuticals under the Macedonian legislation	63
Neda Zdraveva, Valentin Pepljugoski	
Attitudes of pharmacists about professional practice and work with patients in regard to reaching high level of adherence	65
Milica Zeković, Dusanka Krajnović, Valentina Marinković, Tatjana Stojković, Ljiljana Tasić	
The role of pharmacists and other health professionals in promotion of reproductive health of young people	67
Bijana Vasić, Dragana Đuričić	
The use of drugs outside of approved application	69
Svetlana Golocorbin-Kon, Mladena Lalic-Popovic, Nebojsa Pavlovic, Maja Đanić, Natasa Milosevic, Branislava Rakic, Momir Mikov	
The impact of clinical effectiveness of gemcitabine on quality of life in patients with pancreatic cancer in all stages	71
Zana Ibrahim, Ilir Kurtishi, Ardiana Murtezani, Agim Shehi, Edita Alili	
Ad-hoc comparative analysis of regulatory safety information and web-based data for recombinant medicines for assisted reproduction techniques	73
Svetoslav Stoev, Hristina Lebanova, Emilia Naseva, Vladimir Atanasov, Ilko Getov	
Results from PPS of antimicrobial prescribing in University Clinical Center of Kosovo	75
Denis Raka, Kreshnik Hoti, Naim Morina, JetëmiraBytyçi, Albiona Rashiti, Zana Deva, Besa Bahtiri, Lul Raka	
Antibiotic prescribing in regional hospital Prizren	77
Denis Raka, Kreshnik Hoti, Naim Morina, Jetëmira Bytyçi, Albiona Rashiti, Zana Deva, Besa Bahtiri, Lul Raka	

Analysis of consumption of insulin in the municipality of Stip from 2011 to 2014	79
Dijana Atanasova, Aleksandra Petrova, Elena Drakalska, Marija Atanasova, Bistra Angelovska	
Medication errors in the health care delivery-a review of the literature	81
Tatjana Stojkovic, Valentina Marinkovic, Dusanka Krajnovic, Milica Zekovic, Ljiljana Tasic	
Analysis of coordination compound of germanium with nicotinic acid as potential cardioprotector	83
Violetta P. Narokha, Iryna V. Nizhenkovska, Olena V. Kuznetsova, Olga V. Afanasenko	
Importance of clinical pharmacist in system of health care in Bosnia and Herzegovina	85
Vedina Čordalija, Fahir Bečić, Tea Mušić-Dreković, Esmā Karahmet	
Perception about health promotion and smoking cessation counselling among community pharmacists in Lithuania	87
Jurgita Dauksiene, Greta Pavasaryte, Aurelija Batakyte, Gediminas Daukšys, Daisy Volmer	
ACE inhibitors, calcium antagonists, β-blockers products authorized in Albania and their availability for pediatric groups	89
Briseida Dosti, Ledjan Malaj	
The characteristics of non-chain community pharmacies in Lithuania and their owners' attitude towards professional autonomy	91
Jurgita Dauksiene, Edita Tiurninaite, Edita Kizeviciene, Aiste Balzekiene	
The impact of socio-demographic and lifestyle factors in patients diagnosed with heart failure	93
Pamela Gruda, Mihal Tase, Mirjeta Beqiri, Suela Këllici	
The approach to the pharmaceutical waste management in the world and in Serbia	95
Svetlana Goločorbin-Kon, Mladena Lalić-Popović, Nebojša Pavlović, Maja Đanić, Jelena Cvejić, Velibor Ilić, Momir Mikov	
Type 2 diabetes risk assessment in patients of a Portuguese community pharmacy	97
Esperança Maria Simoes da Silva, Maria Margarida Duarte Caramona	
A study of the public knowledge of use of antibiotics in Kosovo	99
Arijana Dëshishku, Merita Berisha, Linda Duraku, Arjeta Dëshishku, Bujar Fetahu	
Pharmaceutical care for people with depression: experiences and challenges	101
Zahida Binakaj, Svetlana Stojkov, Bistra Angelovska	
Adjuvant chemotherapy, with or without taxanes, among women with breast cancer in Albania	103
Erina Hilaj, Vilma Papajani, Alketa Ymeri	
Bevacizumab in addition to FOLFOX chemotherapy for metastatic colorectal cancer: A Macedonian-based cost-effectiveness/utility analysis	105
Aleksandra Kapedanovska-Nestorovska, Zorica Naumovska, Aleksandra Grozdanova, Aleksandar Dimovski, Ljubica Suturkova, Zoran Sterjev	
The advertising influence on pharmacist recommendations and consumer selection of over-the-counter drugs	107
Aleksandra Kapedanovska-Nestorovska, Zorica Naumovska, Zoran Sterjev, Ljubica Suturkova, Aleksandra Grozdanova	
The relationship of law and pharmacy	109
Katerina Anchevska Netkovska, Aleksandra Grozdanova	
Pharmaceutical waste management: a necessity to position a pharmacist as a pillar of public awareness campaign	111
Nataša Jovanović Lješković, Manda Dizdar, Branislava Rakić, Milan Ilić, Nikola Jojić, Marina Gavrančić, Slobodan Gigov	
Awareness of the importance of self-management in Macedonian diabetes patients	113
Biljana Indova, Zorica Naumovska, Aleksandra Kapedanovska Nestorovska, Aleksandra Grozdanova, Ljubica Suturkova, Zoran Sterjev	

Evaluation of rational / irrational drug use at orthopedic department in Clinical Hospital Stip in the period from January to April 2013	115
Biljana Lazarova, Aleksandra Kapedanovska Nestorovska, Zorica Naumovska, Aleksandra Grozdanova, Ljubica Suturkova, Zoran Sterjev	
Intellectual property rights and patent litigation on biosimilar medicinal products	117
Aleksandra Grozdanova, Jadranka Dabovic Anastasovska, Katerina Ancevska Netkovska	
Use NSAID drugs with prescription of the doctor or without prescription in the one pharmacy in Bosnia and Hercegovina	119
Tea Mušić-Dreković, Vedina Čordalija, Maja Malenica	
 Pharmaceutical analysis / Quality assurance / Regulatory affairs	
QRM in the GMP environment - 10 years on since ICH Q9... Are medicines any safer now?	123
Kevin O'Donnell	
The challenges of the qualified person in a complex pharmaceutical quality system	125
Miroslava Ilievska, Nina Ekart Oman, Jasmina Velevska Ivanovska, Verce Jovanovska Jankovska, Katerina Beldedovska Aleksievska, Maja Velinovska Chadinoska, Ksenija Brzilova, Ornela Kuzmanovska	
Quality control of drug products: implementation of the new ICH Q3D guideline on elemental impurities	127
Gregory Lecornet	
Chemometrics - powerful tool in tracking the origin of cannabis samples?	129
Slavica Ražić, Nataša Radosavljević-Stevanović	
Pattern recognition techniques in preventing of API falsification	131
Jelena Acevska, Katerina Brezovska, Natalija Nakov, Rumenka Petkovska, Aneta Dimitrovska	
Orphan drugs - comparative review of FDA and EMA regulations	133
Zoran Nakov, Jasmina Tonic-Ribarska, Suzana Trajkovic Jolevska	
Development of cleaning validation master plan, including cleaning validation protocol	135
Nade Dimovska, Nena Smiljanovska, Marina Petreska, Ketj Shapkovska, Stojne Tanevska	
Method suitability test for determination of microbiological purity of Gastoguard chewable tablets	137
Adrijana Nosacheva Trajkovska, Maja Simjanovska Daskalova, Nadezhda Stojkova, Dragi Todorovikj, Hristina Babunovska	
High-performance liquid chromatography method for determination of caffeine from different matrices	139
Nevena Grujić-Letić, Branislava Rakić, Emilia Šefer, Maja Milanović, Nataša Milić	
Determination of α-tocopheryl acetate in sunscreen lotion and cream by using the solid phase extraction and HPLC method	141
Milica Kostić and Slavica Sunarić	
Validation of analytical method for determination of microbiological purity of active pharmaceutical ingredient in Caffetin cold tablets	143
Silvana Ilioska-Zlatanovikj, Dragi Todorovikj, Elizabeta Popovska, Hristina Babunovska	
Contemporary approach in LC-MS/MS bioanalytical method development	145
Natalija Nakov, Zoran Kavrakovski, Rumenka Petkovska, Aneta Dimitrovska	
Implementation of design of experiments for optimization of forced degradation of simvastatin	147
Maja Hadzieva Gigovska, Marija Grozdanoska, Ana Petkovska, Jelena Acevska, Biljana Sapkarova, Irena Brašnarska, Sonja Ugarkovic, Aneta Dimitrovska	
Residual solvent profiling in active pharmaceutical ingredients; approaches in sample preparation and method optimization	149
Ana Poceva Panovska, Jelena Acevska, Katerina Brezovska, Rumenka Petkovska, Aneta Dimitrovska	

Detecting the weakness in the hygiene - a mean for prevention of the health care-associated infections and improvement of the patients' health care in the Clinical hospital Bitola	151
Tatjana Dimitrovska Manojlovič, Dona Trombeva, Lenche Najdovska, Magdalena Vrchkovska, Angjela Delova, Marta Ivanovska, Ljupcho Anastasovski	
Bacterial endotoxin test: a microbiological challenge	153
Eva Troja	
Quantity of disinfectants and antiseptics used in general hospital in Gevgelija in relation to appearance of intra-hospital infections	155
Biljana Gjorgjeska, Sofija Petkovska	
HPLC determination of caffeine in anti-cellulite gels after the solid phase extraction	157
Kristina Mladenov and Slavica Sunarić	
Validation and quantification of bacterial endotoxins with turbidimetric kinetic method for benzyl alcohol	159
Elizabeta Popovska, Silvana Ilioska-Zlatanovic, Hristina Babunovska, Biserka Simonovska	
A rapid and validated reverse phase liquid chromatographic method for <i>in vitro</i> dissolution test for determination of bromazepam in tablet formulations	161
Irena Brchina, Biljana Gjorgjeska	
New generation antiepileptic drugs: affordable bioanalytical method for therapeutic monitoring	163
Arlinda Haxhiu Zajmi, Jasmina Tonic Ribarska, Emilija Cvetkovska, Rumenka Petkovska, Suzana Trajkovic Jolevska	
Trend analysis in stability data for Caffetin Cold film coated tablets	165
Sanja Despotovska, Milena Dobrkovic Shotarovska, Mena Ivanoska, Ana Aleksandric, Marina Mandzukovska, Dragana Kafedziska, Vasilka Dubrova Koceva, Hristina Babunovska	
Comparative analysis of advertising and promotion of traditional herbal medicine and food supplement at different markets - case study	167
Marjan Dzeperoski, Suzana Trajkovic-Jolevska	
Validation of NIR methods for identification of ibuprofen lysine	169
Biljana Bujaroska, Marija Spasevska, Biserka J. Trajkovska, Maja Ilijoska, Andrea Alagjozovska, Hristina Tomovska, Nada Stojanoska, Hristina Babunovska	
Verification of method for determining methanol in sodium citrate with gas chromatography	171
Marija Spasevska, Biljana Bujaroska, Gordana Mitrovska, Miona Manasova, Andrea Alagjozovska, Dafinka Damcevska, Biserka J. Trajkovska, Hristina Babunovska	
Validation and quantification of bacterial endotoxins with turbidimetric kinetic method for (<i>S</i>)-Lactic acid	173
Silvana Ilioska-Zlatanovikj, Elizabeta Popovska, Hristina Babunovska	
Marketing authorization of veterinary medicinal products in Macedonia	175
Todor Šapov, Suzana Trajković-Jolevska, Romel Velez, Jasmina Tonic-Ribarska, Nataša Krleska-Veleva, Biljana Šapova	
Transfer of analytical procedures for quality control of Cilostazol 100 mg tablets	177
Cveta Dolikjoska Trajkova, Nikola Pavleski, Ana Giceva - Pepovska, Blagica Samarova Stoev, Silvija Saveska, Maja Stojkovska, Hristina Babunovska	
Counterfeit medicines - threat to worldwide public health	179
Biljana Petrovska Jakimovska, Biljana Nanova, Milkica Gligorova	
Comparative evaluation of the efficacy of local administration of doxycycline and chlorhexidine in patients with periodontal disease using multivariate chemometric data analysis	181
Liljana Bogdanovska, Ana Poceva Panovska, Natalija Nakov, Marija Zafirova, Mirjana Popovska, Aneta Dimitrovska, Rumenka Petkovska	

Development and validation of RP-HPLC-FLD method for determination of doxycycline in gingival crevicular fluid and saliva	183
Liljana Bogdanovska, Spiro Spasovski, Mirjana Popovska, Silvana Gjoseva, Katerina Goracinova, Natalija Nakov, Marija Zafirova, Aneta Dimitrovska, Rumenka Petkovska	
Phospholipids monitoring as a tool for elimination of matrix effect during LLE optimization	185
Natalija Nakov, Jelena Acevska, Rumenka Petkovska, Zoran Kavrakovski, Aneta Dimitrovska	
Evaluation of stability data on pharmaceutical dosage form in order of extending the shelf life with application of statistical methods	187
Vasilka Dubrova - Koceva, Sonja Chortosheva, Hristina Babunovska, Sanja Despotovska, Dafinka Damcevska, Dragana Kafedziska, Marija Stojanovska	
Determination of clarithromycin residues on manufacturing equipment surfaces in cleaning validation process	189
Katerina Kochova, Elena Petrovska, Gordana Trendovska Serafimovska	
Validation of RP-HPLC stability-indicating method for cilazapril and hydrochlorothiazide	191
Jasmina Šljivić, Mira Zečević, Biljana Otašević, Ana Protić, Jelena Golubović	
Development of fast, simple RP- HPLC method for determination of moxifloxacin in solid pharmaceutical dosage forms	193
Marjan Piponski, Tanja Bakovska, Marina Naumoska, Emilija Janeva, Tatjana Rusevska Marija Globochki, Magdalena Piponska, Gordana Trendovska Serafimovska	
Positive chaotropic role in development of RP- HPLC method for quantification of norfloxacin in pharmaceutical dosage forms	195
Marjan Piponski, Tanja Bakovska, Marina Naumoska, Marija Globochki, Irena Slaveska Spirevska, Stefan Stefov, Magdalena Piponska, Elena Petrovska, Gordana Trendovska Serafimovska	
Forced degradation study of moxifloxacin in tablet formulation using RP-HPLC	197
Alma Salkić, Mira Zečević, Amra Butković, Jelena Golubović, Jasmina Šljivić	
Simple RP-HPLC method for estimation of diazepam and benzyl alcohol in microclisme	199
Maja Vragolic, Branka Ivkovic, Olivera Cudina, Sote Vladimirov, Jasmina Brboric	
GC-MS method for chemical characterization of pharmaceutical packaging materials	201
Vlado Petruševski, Suzana Trajković-Jolevska, Jasmina Tonić-Ribarska, Sonja Ugarković	
Development of fast simple RP-HPLC method with UV detection for determination of Pregabalin in solid pharmaceutical dosage forms	203
Marjan Piponski, Tanja Bakovska, Marina Namoska, Tatjana Rusevska, Irena Slaveska Spirevska, Elena Lazarevska Todevska, Stefan Stefov, Gordana Trendovska Serafimovska	
Comparison of new developed UV/VIS-spectrophotometric and HPLC method with UV/VIS detection for determination of Vitamin B12 in various pharmaceutical dosage forms	205
Tanja Bakovska, Marina Naumoska, Marjan Piponski, Emilija Janeva, Elena Petrovska, Elena Lazarevska Todevska, Hristina Andonoska, Tatjana Rusevska, Gordana Trendovska Serafimovska	
Analytical approach in development of a new drug product formulation	207
Aleksandra Petrovska, Marija Velii Veli, Veronika P. Jakimovska, Sonja Ugarkovic	
Strengthening the position of OMCLs	209
Jelena Acevska, Katerina Brezovska, Liljana Ugrinova, Suzana Trajkovic Jolevska, Aneta Dimitrovska, Richard Wanko, Kevin O'Donnell	
Mathematical modeling of drug dissolution from prolonged-release drug product	211
Blagica Manchevska, Packa Antovska, Irena Brashnarska, Sonja Ugarkovic	
Validation of RP-HPLC method for determination of exemestane and its impurities in pharmaceutical dosage forms	213
Branka Ivković, Aleksandra Jonić, Jelena Žunić, Sote Vladimirov, Milkica Crevar Sakač, Zorica Vujić	

Dissolution method development for generic drug products _____	215
Marija Petrovska, Ivana Mitrevska, Tina Achkoska, Irena Brashnarska, Packa Antovska, Dejan Kuneski, Sonja Ugarkovic	
Validation of GC method for determination of ethanol, methanol, toluene and benzene as residual solvents in pholcodine monohydrate drug substance _____	217
Olivera Blažeska, Vlado Petruševski, Ana Petkovska, Monika Stojanovska, Gjorgji Petruševski, Irena Brašnarska, Biljana Šapkareva, Sonja Ugarković	
Evaluation of drug-excipient interaction in formulation of ibuprofen topical gel by High Performance Liquid Chromatography _____	219
Elena Kazandzievska, Slavica Mitrevska, Irena Brasnarska, Liljana Krsteska, Dejan Kostovski, Marina Kajdzanoska, Sonja Ugarkovic	
A quality by design approach for liquid chromatography method development for determination of assay of drug product _____	221
Tina Achkoska, Ivana Mitrevska, Marija Petrovska, Irena Brasnarska, Sonja Ugarkovic	
Comparison of method A and method B described in Ph.Eur. for determination of bacterial endotoxins in pharmaceutical preparation containing somatropine _____	223
Branislava Janeva, Sandra Zinoski, Katerina Starkoska	
Liability for damage caused by using medical devices _____	225
Vlatko Kokolanski, Katerina Anchevska-Netkovska, Zoran Sterjev, Suzana Trajkovikj Jolevska	
A quality by design based analytical method development for determination of impurities in new pharmaceutical drug product _____	227
Ana Georgieva, Irena Brašnarska, Sonja Ugarković	
Optimization of an UPLC method for determination of moxifloxacin hydrochloride and its related substances _____	229
Marija Zafirova, Gabriela Petrovska, Liljana Ugrinova, Liljana Bogdanovska, Vasil Karcev, Katerina Brezovska, Aneta Dimitrovska, Suzana Trajkovik Jolevska	
Photo stability study design of drug product containing fluoroquinolon as active compound _____	231
Veronika Popovska Jakimovska, Marija Velichkovska, Aleksandra Petrovska, Irena Brashnarska, Biljana Šapkareva, Suzan Memed-Sejfulah, Sonja Ugarkovich	
Investigation of chromatographic behavior of aripiprazole and its five impurities _____	233
Nevena Maljurić, Ana Protić, Biljana Otašević, Jelena Golubović, Jovana Krmar, Mira Zečević	
Alcohol induced dose dumping for prolonged-release drug product _____	235
Elena Davitkovska, Blagica Manchevska, Dusica Angelovska, Irena Brasnarska, Packa Antovska, Biljana Šapkareva, Sonja Ugarkovic	
AlkaSAP computer system validation _____	237
Sonja Sterjevska, Nada Popstefanova, Darko Atanasoski, Miroslava Ilievska	
Determination of cannabidiol and Δ^9tetrahydrocannabinol in <i>Cannabis sativa</i> L. preparations present in the European market by HPLC/DAD _____	239
Maja Shishovska, Dragica Doneva, Zorica Arsova-Sarafinovska, Katerina Starkoska	
Generation and combined study on the chemical structure of nitrofurantoin radical anion _____	241
Angelina Popova, Simeon Stoyanov, Denitsa Yancheva	
Bioanalytical HPLC method for therapeutic drug monitoring of azathioprine metabolites during inflammatory bowel disease _____	243
Bojana Danilova, Dragana Mladenovska, Matea Miceska, Jasmina Tonic Ribarska	

Clinical biochemistry / Toxicology / Food and nutrition

New <i>in vitro</i> technique for evaluation of anti-inflammatory activities of natural products and plants extracts	247
Neda Mimica-Dukić, Ivana Beara and Dejan Orčić	
Metals specificities in environmental risk assessment	249
Dragana Vujanović	
Dimethoate-induced renal toxicity in rats and the protective/ameliorative effects of <i>Laurocerasus officinalis</i> Roem. (cherry laurel) fruit extract	251
Ayşe Eken, Burcu Ünlü-Endirlik, Elçin Özger, Ayşe Baldemir, Arzu Hanım Yay	
Probiotic/synbiotic enriched ayran as functional food product – quality and therapeutic benefits	253
Tanja Petreska Ivanovska, Zoran Zhivikj, Liljana Bogdanovska, Maja Jurhar Pavlova, Ivica Gjurovski, Trpe Ristoski, Kristina Mladenovska, Lidija Petrushevska-Tozi	
Approved health claims for amino acids in/as food supplements	255
Ermira Krasniqi, Lidija Petrusevska Tozi	
Preclinical studies for evaluation of antitumor effects and normal tissue toxicity of antibody conjugates	257
Darinka Gjorgieva Ackova, Katarina Smilkov, Emilija Janevik-Ivanovska	
The pro-inflammatory effects of the organic phase obtained during Cosorb process observed in different animal strains	259
Cristina Adriana Dehelean, Codruta Soica, Georgeta Simu, Iulia Pinzaru, Dorina Coricovac	
Antioxidant versus toxic capacity of selected herbal products	261
Blagica Jovanova, Marija Hiljadnikova-Bajro, Tatjana Kadifkova Panovska	
Trend of obesity, sport and nutrition	263
Simona Bernátová, Zuzana Hegedusová, Katarína Dostálová, Soňa Wimmerová, Zora Gerová, Eva Horváthová, Štefánia Móricová	
Turkey's highlights within inprofood (FP-7) project	265
SelenYeegenoglu, Bilge Sozen Sahne	
Assessment of cytogenetic damage and oxidative stress status in hospital staff occupationally exposed to ionizing radiation	267
Ayşe Eken, Ahmet Aydın, Onur Erdem, Cemal Akay, Ahmet Sayal, İbrahim Somuncu	
Dietary supplement use among adolescents	269
Gordana Svonja Parezanovic	
Acute and chronic renal failure related with anemia and thrombocytopenia	271
Milena Spasovska and Tatjana Kadifkova Panovska	
<i>In vivo</i> study of the effects of different phases of the Cosorb process on skin's intrinsic properties	273
Simu Georgeta-Maria, Coricovac Dorina, Cseh Liliana, Soica Codruta, Borcan Florin, Ionescu Daniela, Andoni Mihaiela, Dragos Dan, Dehelean Cristina	
Thiamine and riboflavin content in infant formulas available in Serbia: Level of compliance with recommended dietary intake and adequacy of nutritional needs of infants	275
Marko Denić, Slavica Sunarić, Jelena Lalić, Gordana Kocić	
Determination of pesticide residuals by GC-ECD	277
Ela Hoti, Lindita Qefalia, Linda Matua	
The toxicity of organic solvents mixtures, containing toluene and its oxidation products	279
Soica Codruta, Simu Georgeta-Maria, Coricovac Dorina, Mioč Marius, Borcan Florin, Ionescu Daniela, Dragos Dan, Andoni Mihaiela, Dehelean Cristina	
Assessment of vitamin E content in bovine colostrum supplement by using solid phase extraction and HPLC method	281
Slavica Sunarić, Jelena Lalić, Marko Denić, Gordana Kocić	

Effects of different doses zinc gluconate on copper, iron and calcium levels in experimentally induced diabetic rabbits and type 2 diabetic patients	283
Zorica Stanojević Ristić, Snežana Stević, Julijana Rasić, Dragana Valjarević, Momčilo Stanić	
Viability and metabolic activity of <i>Lactobacillus casei</i> 01 in dairy and non-dairy products	285
Tanja Petreska Ivanovska, Kristina Mladenovska, Lidija Petrushevska-Tozi	
Effect of glucose concentration on glucose oxidase activity in a minimal model must	287
Verica Petkova, Irina Mladenovska, Tatjana Kadifkova Panovska	
Determination of lead and cadmium in foods by Graphite Furnace Atomic Absorption Spectroscopy	289
Suzana Angelova, Biljana Mladenovski and Tatjana Kadifkova Panovska	
Determination of aflatoxins in some foodstuffs by HPLC	291
Suzana Angelova, Valide Sabani and Tatjana Kadifkova Panovska	
Screening of some plant species for their antioxidant and antibacterial activity	293
Eljona Chilku, Blagica Jovanova, Snežana Ivic Kolevska and Tatjana Kadifkova Panovska	
Approach to detect possible genotoxic effects of metals in plants	295
Darinka Gjorgieva Ackova, Tatjana Kadifkova Panovska, Katerina Bačeva Andonovska and Trajče Stafilov	
Biochemical pathways in cancer progression as pharmacological targets	297
Milena Prculovska, Ivana Angelovska, Tatjana Kadifkova Panovska, Marija Hiljadnikova-Bajro	
Biomolecular mechanisms of cancer initiation as targets for therapeutic intervention	299
Ivana Angelovska, Milena Prculovska, Tatjana Kadifkova Panovska, Marija Hiljadnikova-Bajro	
Biochemical identification of <i>Helicobacter pylori</i> using the urea breath test	301
Irena Smokvarska, Tatjana Kadifkova Panovska, Marija Hiljadnikova-Bajro	
Determination of Ochratoxin A in some dried fruits by liquid chromatography	303
Suzana Angelova, Valide Sabani and Tatjana Kadifkova Panovska	
Determination of the toxic bioactivity of methanol extracts of selected commercial herbal teas	305
Blagica Jovanova and Tatjana Kadifkova Panovska	
The cancer metabolism and associated therapeutic interventions	307
Iva Antova, Tatjana Kadifkova Panovska, Marija Hiljadnikova-Bajro	
Evaluation of the toxic potential of <i>Pinus</i> species natively growing on the territory of Republic of Macedonia	309
Blagica Jovanova, Marija Karapandzova, Tatjana Kadifkova Panovska, Svetlana Kulevanova	
Exposure to organophosphates: cholinergic and non-cholinergic targets	311
Biljana Antonijevic, Evica Antonijevic, Danijela Djukic-Cosic, Marijana Curcic, Nina Umicevic	
The role of cardiac markers in the diagnosis of acute myocardial infarction and angina pectoris	313
Emilija Kostoska, Aleksandra Crvenpanova, Tanja Angjuseva, Zan Mitrev, Tatjana Kadifkova Panovska	
Challenges in interpretation of forensic toxicological findings for opiates: case report and a literature review	315
Marija Bujaroska, Nataša Bitoljanu, Ljupčo Čakar, Renata Jankova-Ajanovska, Zlatko Jakjovski, Verica Poposka, Aleksej Duma	
Drug-related deaths linked with concomitant use of methadone and benzodiazepines in the period between 2011 and 2015 in the Republic of Macedonia	317
Marija Bujaroska, Nadica Sibinovska, Klimentina Trajkova, Verica Poposka, Goran Pavlovski, Viktorija Belokaposka Srpanova, Biljana Janeska	
Unusual case of suicide with pentobarbital	319
Natasa Bitoljanu, Verica Poposka, Elena TrajcovaKovacovska, Aleksandar Stankov, Iskra Trencavska Ivanovska, Zdravko Čakar	

Evaluation of antioxidant activity of berries of <i>Juniperus excelsa</i>, <i>Juniperus communis</i> and <i>Juniperus oxycedrus</i> from Macedonian flora	321
Leonard Kurti, Blagica Jovanova, Ariana Kelmendi, Tatjana Kadifkova Panovska and Svetlana Kulevanova	
Biological variation of serum cholesterol and triglycerides	323
Biserka Simonovska, Nikola Simonovski, Elizabeta Popovska	
Biological variation of serum creatinine and urea	325
Biserka Simonovska, Nikola Simonovski, Elizabeta Popovska	
How long are opiates present in urine after consumption of product which contains poppy seeds?	327
Danijela Đukić-Čosić, Katarina Baralić, Milka Kostadinović, Marko Antunović, Snežana Đorđević, Zorica Bulat, Marijana Čurčić, Evica Antonijević, Aleksandra Buha, Biljana Antonijević, Vesna Matović	
Nutritional properties of two hybrids of dried and fresh cabbage	329
Ljubica Karakashova, Frosina Babanovska - Milenkovska, Biljana Chuleva, Silvija Nakova	
Determination of some phenolic constituents in extract of local wine species by using a validated HPLC-DAD method	331
Ebru Türköz Acar, Mehmet Engin Celep, Mohammad Charehsaz, Gülşah Selin Akyüz, Erdem Yeşilada	
 Pharmaceutical technology and biotechnology/ Cosmetology / Biopharmacy	
Cyclodextrin-based nanoparticles for drug encapsulation	335
Ruxandra Gref	
Geomaterials in the design of new drug delivery systems	337
César Viseras	
University Institute for positron emission tomography in Skopje - unique facility for the new challenges in the regional health care system	339
Emilija Janevik-Ivanovska, Katerina Kolevska, Maja Velickovska, Filip Jolevski, Marija Atanasova, Marina Zdraveska-Kocovska, Meri Angeleska, Maja Chochevska, Zlatko Filipovski, Saso Nikolovski	
Design and evaluation of differently produced glyceride based mini-matrices as extended release systems for highly soluble model drug	341
Aleksandar Aleksovski, Chris Vervae, Rok Dreu	
Formulation of chronotherapeutic delivery systems for delayed release of verapamil hydrochloride using polyethylene oxide polymers	343
Sanja Bundalo, Jelena Đuriš, Svetlana Ibrić, Zorica Đurić	
The role of cocrystallization screening for the assessment of structure-activity relationship in drug development	345
Aleksandar Cvetkovski, Bistra Angelovska	
Recombinant monoclonal antibody rituximab – medical uses and structural characterization	347
Dashnor Nebija, Christian Noe, Bodo Lachmann, Kristina Mladenovska, Arlinda Daka, Pranvera Breznica	
Comparison of emollient efficacy - a single centre, randomised, double-blind, bi-lateral comparison of two emollients prescribed in the UK for the management of dry skin conditions such as atopic eczema	349
Jasmina Gallagher, Phil Rosher	
Implementation of mexametry in periorbital hyperpigmentations studies	351
Dragomirescu Anca Octavia, Simu Georgeta-Maria, Dehelean Cristina	
A novel natural mixed emulsifier of alkyl polyglucoside type as liposome and skin-friendly cosmetic ingredient	353
Mila Filipović, Milica Lukić, Sanela Đorđević, Gordana Vuleta, Snežana Savić	

Development of an improved method for the <i>in vitro</i> determination of the Sun Protection Factor (SPF) for sunscreens	355
Aleksandra Dimitrovska Cvetkovska, Valeria Dissette, Ilenia Magri, Laura Nucibella, Paola Ziosi, Silvia Vertuani, Stefano Manfredini	
Emollient gels: characterisation of physical structure and behaviour in the presence of salts	357
Samuel Owusu-Ware, Beatriz Sanchon-Lopez and Milan D. Antonijević	
Emollient gels: Characterisation of textural properties and behaviour in the presence of salts	359
Samuel Owusu-Ware, Beatriz Sanchon-Lopez and Milan D. Antonijević	
Influence of diabetes and hypertension on cefuroxime permeation across placenta in pregnant women	361
Mladena Lalić-Popović, Svetlana Goločorbin-Kon, Nebojša Pavlović, Jovana Paunković, Zorica Grujić, Momir Mikov	
Placental transfer of lipophilic drug diazepam in pregnant women with diabetes and hypertension	363
Mladena Lalić-Popović, Svetlana Goločorbin-Kon, Nebojša Pavlović, Jovana Paunković, Zorica Grujić, Momir Mikov	
Self-microemulsifying drug delivery systems containing simvastatin: formulation and characterization	365
Zora Četković, Marko Krstić, Sandra Cvijić, Dragana Vasiljević	
A spectroscopic insight into the albumin structure on the nano-bio interface	367
Nikola Geskovski, Simona Dimchevska, Rozafa Koliqi, Gjorgji Petruševski, Marina Chacorovska, Sonja Ugarkovic, Katerina Goracinova	
Preliminary study concerning <i>Linum usitatissimum</i> oil as sebum-reducing agent	369
Anca Dragomirescu, Ersilia Alexa, Georgeta Pop, Felicia Andrei, Georgeta Simu	
Safety profile assessment of cosmetic anti-age creams based on natural ingredients using <i>in vivo</i> bioengineering techniques	371
Ana Žugić, Nada Čujić, Jelena Živković, Gordana Zdunić, Katarina Šavikin, Nebojša Menković, Dubravka Bigović	
Small-scale production and evaluation of an acetate-and a lactate -based balanced infusion solution	373
Elena Najdovska, Zora Veljanova	
Distribution coefficient of gliclazide as <i>in vitro</i> prediction model of blood brain barrier penetration	375
Mladena Lalić-Popović, Svetlana Goločorbin-Kon, Maja Đanić, Nataša Milošević, Velibor Vasović, Boris Milijašević, Momir Mikov	
Choosing the right blister packaging film	377
Biljana Pavicevic, Maja Lazarova, Biljana Nanova, Milkica Gligorova	
Qualification of cleanrooms in pharmaceutical industry	379
Viktorija Veljanoska, Silvana Gjosheva, Elena Tomovska, Milkica Gligorova	
Effect of formulation and process variables on probiotic viability after microencapsulation by spray-drying in soy protein-alginate microparticles	381
Jasmina Hadzieva, Maja Simonoska Crcarevska, Simona Dimceska, Nikola Geskovski, Marija Glavas Dodov, Katerina Goracinova, Tanja Petreska Ivanovska, Lidija Petrushevska, Nadica Vanova, Milena Nikolovska, Kristina Mladenovska	
Preparation of curcumin loaded nanoparticles: physicochemical characterization and <i>in vitro</i> evaluation	383
Elena Drakalska, Denitsa Momekova, Stanislav Rangelov, Nikolai Lambov	
Assessing the risk of alcohol-induced dose dumping: diclofenac sodium case	385
Marija Lukic, Andjela Lipovac, Ivana Aleksic, Sandra Cvijic	
Small scale production of gel with menthol, benzocaine and procaine HCl	387
Slavica Maleska Stojadinovik, Bistra Angelovska	
Approaches in evaluation of freeze-dried antibody conjugates	389
Katarina Smilkov, Darinka Gjorgieva Ackova, Petre Makreski, Icko Gjorgoski, Emilija Janevik- Ivanovska	

An injection method for preparation of liposomes as ketoconazole carriers	391
Olga Popovska, Jana Simonovska, Elena Trajkoska-Bojadziska, Zoran Kavrakovski, Vesna Rafajlovska	
<i>In vitro</i> model for the analysis of 12-monoketocholate impact on simvastatin physico-chemical behavior in octanol/buffer system	393
Maja Danić, Nebojša Pavlović, Mladena Lalić Popović, Bojan Stanimirov, Svetlana Goločorbin Kon, Karmen Stankov, Momir Mikov	
Influence of the particle size at oleoresin extraction from red hot pepper	395
Jana Simonovska, Olga Popovska, Elena Trajkoska-Bojadziska, Željko Knez, Zoran Kavrakovski, Vesna Rafajlovska	
Development of nanoemulsion formulations of wild oregano essential oil using low energy methods	397
Elena Trajkoska-Bojadziska, Jana Simonovska, Olga Popovska, Željko Knez, Zoran Kavrakovski, Biljana Bauer, Vesna Rafajlovska	
Risk assessment in blister packaging	399
Marija Cveevska, Irena Zdravaska, Biljana Nanova, Milkica Gligorova	
Current therapeutic options and trends in drug development for Alzheimer's disease	401
Maja Simonoska Crcarevska, Renata Slaveska Raicki, Marija Glavas Dodov	
Protein corona evolution on polymer nanoparticles for targeted drug delivery	403
Simona Dimchevska, Nikola Geskovski, Rozafa Koliqi and Katerina Goracinova	
Formulation development and characterization of modified release matrix tablets with water-soluble drug	405
Vesna Petrovska Jovanovska, Marija Velickovska, Aleksandra Petrovska, Sonja Ugarkovic, Marija Glavas Dodov	
Statistical process control as a tool for process understanding and continuous process verification	407
Violeta Dinić Milisavljević, Sonja Georgieva Jovanović, Igor Popović, Aleksandra Zeljković, Viška Miceska, Valentina Ilieva	
Effects of PSD and wet granulation properties (concentration of granulation aid, temperature and humidity) on physical stability of ascorbic acid 95% granulate	409
Oja Memed, Krume Tosev, Natasa Anevska Stojanovska, Gjorgji Petruševski, Marina Chacorovska, Sonja Ugarkovic	
Preparation of doxycycline loaded chitosan microparticles for periodontal disease treatment by TPP ionic cross-linking combined with spray drying	411
Silvana Gjoseva, Nikola Geskovski, Simona Dimchevska, Katerina Goracinova	
Preformulation studies as initial phase in development of film-coated tablets with BCS class II active component	413
Bosilka Stefanova, Packa Antovska, Sonja Ugarkovic, Gjorgji Petruševski, Marina Chachorovska	
Influence of the formulation factors on the dissolution of highly dose water soluble active pharmaceutical ingredient	415
Dejan Kuneski, Packa Antovska, Sonja Dimcevska, Bosilka Stefanova, Blagica Mancevska, Dusica Angelovska, Zoran Zivic, Sonja Ugarkovic	
Trastuzumab and its radioimmunoconjugates in treatment of cancer	417
Marija Sterjova, Paulina Apostolova, Predrag Dzodic, Katarina Smilkov, Darinka Gjorgjieva-Ackova, Emilija Janevik-Ivanovska	
Trends in radiopharmacy in developing african countries	419
Aschalew Alemu, David Mwanza Wanjeh, Joel Munene Muchira, Emilija Janevik	
Solid-state compatibility screening of CaCO₃ and MgCO₃ with selection of excipients suitable for development of solid-dosage formulation	421
Marina Chachorovska, Sonja Dimchevska, Sonja Ugarkovic, Gjorgji Petrushevski	

Formulation development of immediate release tablets with water insoluble drug using fluid-bed granulation	423
Sanja Simeonovska Gushic, Dejan Kostovski, Aleksandra Petrovska, Marija Velickovska Sonja Ugarkovic, Marija Glavas Dodov	
Evaluation of physical properties on nonsteroidal anti-inflammatory gel formulation with different polymers	425
Milka Mijalkova Dokova, Ljiljana Krsteska, Dejan Kostovski, Sonja Ugarkovic	
Taste masking approach in oral suspension with nonsteroidal anti - inflammatory drug	427
Roza Markovska Dameska, Liljana Krsteska, Milka Mijalkova Dokova, Dejan Kostovski, Sonja Ugarkovic	
Influence of formulation variables on encapsulation efficiency of microsponges	429
Maja Simonoska Crcarevska, Tanja Kjurkchieva Olumcheva, Renata Slaveska Raicki, Kristina Mladenovska, Marija Glavas Dodov	
Optimization of viscosity building agent in oral paediatric suspension	431
Eleonora Trajanovska, Suzan M. Sejfulah, Sanja Simeonovska Gushic, Vesna Petrovska Jovanovska, Ana Georgieva, Gjorgji Petrusevski, Sonja Ugarkovic	
Risk assessment of excipients in medicinal drug products: a short review	433
Borche Stamatovski, Elisaveta Adamova Abraseva, Miroslav Popovski, Suzan Memed Sejfulah, Sonja Ugarkovic, Miroslava Ilievska	
Hold-time stability study - a “must-do” for pharmaceutical industry	435
Ognjenka Rahić, Edina Vranić, Jasmina Hadžiabdić, Alisa Elezović, Marija Glavas Dodov	
Comparison between some methods for solubility enhancement of lorazepam	437
Jasmina Hadžiabdić, Edina Vranić, Ognjenka Rahić, Alisa Elezović, Marija Glavas Dodov	
Comparison of biopharmaceutical properties of 5-FU loaded TEOS and TEOS/APTES microparticles for colon targeting	439
Beti Djurdjic, Nikola Geskovski, Simona Dimchevska, Katerina Goracinova	
Doxycycline hyclate-enriched gelatine nanoparticles for periodontal disease treatment: preparation and evaluation study	441
Selestina Gorgieva, Vanja Kokol, Nikola Geskovski, Simona Dimchevska and Katerina Goracinova	
Prospective of PET radiopharmaceutical development –new approach and strategy for their application	443
Katerina Kolevska, Maja Velickovska, Marija Atanasova, Filip Jolevski, Maja Chochevska, Emilija Janevik-Ivanovska	
Cosmetovigilance	445
Irina Dukovska	
Good Distribution Practice for medicinal products	447
Fjola Hadjihatma, Eleonora Pandova, Violeta Bozinova	
 Medicinal and aromatic plants	
How to include DNA-based authentication in quality control of medicinal plants and phytomedicines?	451
Johannes Novak	
High-content screening for identification of bioactive compounds in plant extracts	453
Laco Kacani	
The application of mass spectrometry and pathway analysis in understanding the biochemistry of medicinal plants	455
Shaun Bilsborough and Zoran Nastov	
Cannabis in R. Macedonia: present situation	457
Gjoshe Stefkov, Ivana Cvetkovikj, Marija Karapandzova, Svetlana Kulevanova	

ALKMAF – Breeding opium poppy for improved alkaloid content	459
Gjoshe Stefkov, Jelena Acevska, Mirjana Jankulovska, Marija Karapandzova, Aneta Dimitrovska, Svetlana Kulevanova, Sonja Ugarkovik, Igor Mickovski, Natasha Nasteva, Sonja Ivanovska	
Possible health benefits of pine nuts as a source of omega fatty acids	461
Marija Karapandzova, Ivana Cvetkovikj, Gjoshe Stefkov, Svetlana Kulevanova	
Biogenic amines in red and white wines determined by HPTLC method	463
Igno Tasev Jasmina Tonic Ribarska, Jürgen Fröhlich ³ , Donka Doneva-Sapceska	
Herbal additives for extended shelf-life of processed meat products	465
Ivana Cvetkovikj, Gjoshe Stefkov, Marija Karapandzova, Marija Glavash-Dodov, Maja Simonovska Carcarevska, Vesna Kotevska, Ana Kaftandzieva, Svetlana Kulevanova	
Essential oils from Kosovar aromatic plants	467
Avni Hajdari, Behxhet Mustafa	
Homeopathic remedies - classical and complex homeopathy in Serbia	469
Snezana Cupara, Olivera Milovanovic, Ana Barjaktarevic	
Is cannabis addictive?	471
Svetlana Golocorbin-Kon, Nebojša Pavlovic, Maja Đanić, Mladena Lalic-Popovic, Slobodan Gigov, Nikola Jojic, Momir Mikov	
Macedonian bean diversity and its health benefits potential	473
Sonja Ivanovska, Mirjana Jankulovska, Gjoshe Stefkov	
Apoptotic and antioxidant activity of <i>Centaurea depressa</i> Bieb. (Asteraceae) extracts on colon colorectal adenocarcinoma (Caco-2) cell lines	475
Özge Tarançi, Selcen Babaoğlu Aydaş, Belma Aslim	
Cannabis history and timeline	477
Biljana Bauer, Vesna Kostic, Svetlana Cekovska, Zoran Kavrakovski	
Chemical composition of the essential oils of <i>Juniperus communis</i> subsp. <i>alpina</i> (Suter) Čelak (Cupressaceae)	479
Behxhet Mustafa, Dashnor Nebija, Avni Hajdari	
Chemical characterization and determination of antioxidant activity of basil (<i>Ocimum basilicum</i> L.) extracts using different types of <i>in vitro</i> tests	481
Branislava Rakić, Nevena Grujić-Letić, Svetlana Goločorbin-Kon, Zorica Mrkonjić, Jovana Drljača, Aleksandar Rašković	
Evidence-based research of plants used in cancer prevention or treatment	483
Snezana Cupara, Ana Barjaktarevic, Olivera Milovanovic	
Chemical profiling and antioxidant activity of <i>Sorbus intermedia</i> (Ehrh.) Pers fruit extracts and jam	485
Zorica Mrkonjić, Jelena Nađpal, Branislava Rakić, Marija Lesjak, Ivana Beara	
Chemical composition of volatile aroma compounds in fresh and dried spontaneous and cultivated rosette leaves of <i>Sideritis scardica</i> from R. Macedonia	487
Bujar Qazimi, Gjoshe Stefkov, Marija Karapandzova, Ivana Cvetkovikj, Svetlana Kulevanova	
Comparison of phenolic compounds between spontaneous and cultivated flowering stems of mountain tea (<i>Sideritis scardica</i> Griseb.) from R. Macedonia	489
Bujar Qazimi, Jasmina Petreska-Stanoeva, Gjoshe Stefkov, Marina Stefova, Svetlana Kulevanova	
Spectral analysis of extracts from red hot pepper (<i>Capsicum annuum</i> L.)	491
Jana Simonovska, Denitsa Yancheva, Bozhana Mikhova, Žejko Knez, Mateja Primožić, Zoran Kavrakovski, Vesna Rafajlovska	
Molecular mechanisms of capsaicin mediated cytotoxic activity	493
Viktorija Maksimova, Zorica Arsova Sarafinovska, Liljana Koleva Gudeva	

Review of critical points in quality assessment of red clover dry extract (<i>Trifolium pratense extractum siccum</i>): quantitative composition and providing of a representative sample	495
Veljko Petrović, Nada Pavičić, Ivan Velikinac, Tamara Miladinović	
Chemical composition and antimicrobial activity of <i>Chenopodium botrys</i> L. (Amaranthaceae) from Macedonian flora	497
Ljubica Adji Andov, Marija Karapandzova, Ivana Cvetkovikj, Gjose Stefkov, Ana Kaftandzieva, Svetlana Kulevanova	
The content of some biogenic elements in <i>Chenopodium album</i> L. and <i>Chenopodium botrys</i> L. (Amaranthaceae) from Macedonian flora	499
Ljubica Adji Andov, Marija Karapandzova, Gjose Stefkov, Ivana Cvetkovikj, Katerina Baceva, Trajce Stafilov, Svetlana Kulevanova	
Phytochemical study and antioxydant properties of Tunisian <i>Zizyphus lotus</i> L. extracts	501
Simu Georgeta-Maria, Rădulescu-Grad Maria, Anca Dragomirescu, Bouani Bouthaina, Dehelean Cristina	
Antimicrobial activity of Macedonian black pine	503
Marija Karapandzova, Ivana Cvetkovikj, Gjoshe Stefkov, Elena Trajkovska-Dokik, Ana Kaftandzieva, Svetlana Kulevanova	
The essential oil composition of Macedonian <i>Juniperus communis</i> L. (Cupressaceae)	505
Ivana Cvetkovikj, Marija Karapandzova, Floresa Sela, Gjose Stefkov, Maja Simonoska Crcarevska, Marija Glavas Dodov, Svetlana Kulevanova	
Polyphenolic profile of wild growing populations of <i>Salvia fruticosa</i> Mill. from Balkan Peninsula	507
Ivana Cvetkovikj, Gjoshe Stefkov, Marija Karapandzova, Jasmina Petrevska-Stanoeva, Marina Stefova, Svetlana Kulevanova	
The possibilities of application of medicinal plant materials in stomatology	509
Elvira Kovac-Besovic, Salih Saracevic, Adnan Besovic, Kemal Duric	
Investigation of chemical substances of essential oils in commercial perfumes by method of thin layer chromatography	511
Elvira Kovac-Besovic, Azra Besovic, Haris Niksic	
Chemical composition of the essential oils of some <i>Thymus</i> spp. (Lamiaceae) from Kosovo	513
Verka Nedanova, Nebija Flurim, Marija Karapandzova, Ivana Cvetkovikj, Gjoshe Stefkov, Svetlana Kulevanova	
Routes of cannabis administration: a brief review	515
Gordana Geshtakovska, Gjoshe Stefkov	
 Clinical pharmacy / Pharmaceutical chemistry / Biomolecular sciences	
Pharmacotherapeutic interventions and consults - Daily practice of a clinical pharmacist and academician	519
Dorothea Rudolf	
Status of clinical pharmacy in Slovenia	521
Aleš Mrhar	
Population pharmacokinetic modeling of therapeutic drug monitoring data from patients with epilepsy	523
Daniela Milosheska, Tomaž Vovk, Iztok Grabnar	
The role of drug metabolizing enzymes in personalized therapy	525
Aleksandra Kapedanovska-Nestorovska, Zorica Naumovska, Krume Jakovski, Zoran Sterjev, Aleksandar Dimovski, Ljubica Suturkova	
Influence of efflux transporter protein P-glycoprotein (<i>ABCB1/MDR1</i>) on therapeutic outcome	527
Zorica Naumovska, Aleksandra Kapedanovska-Nestorovska, Ana Filipce, Zoran Sterjev, Aleksandar Dimovski, Ljubica Suturkova	

What do we learned from new treatment of multiple myeloma?	529
Sonja Genadieva Stavrik	
Improved analgesics: BU08028 a novel, bifunctional NOP/MOP ligand	531
Gerta Cami-Kobeci, Mei-Chuan Ko, Lawrence Toll and Stephen M. Husbands	
Innovative drug discovery projects in the Latvian Institute of Organic Synthesis: from meldonium to new cardioprotective drug methyl-GBB	533
Maija Dambrova, Edgars Liepinsh	
DNA topoisomerase inhibitory activity and 3D-QSAR analysis of benzazoles	535
Esin Aki-Yalcin, Ismail Yalcin	
Development and standardization of Rituximab-conjugates for labeling with Lutetium-177 and Yttrium-90	537
Emilija Janevik-Ivanovska, Darinka Gjorgieva Ackova, Katarina Smilkov, Icko Gjorgoski, Trajce Stafilov, Petre Makreski, Zorica Arsova-Sarafinovska, Lajos Baloch, Angela Carollo, Alberto Signore, Adriano Duatti ⁸	
Guillain Barré syndrome (GBS): new insights in the molecular mimicry between C. jejuni and human peripheral nerve (HPN) proteins	539
Aida Loshaj - Shala, Luca Regazzoni, Armond Daci, Marica Orioli, Katerina Brezovska, Ana Poceva Panovska, Giangiacomo Beretta, Ljubica Suturkova	
Impact of KRAS mutations on capecitabine adjuvant monotherapy in CRC patients	541
Nadica Matevska-Geshkovska, Marija Staninova, Ivana Trajkovska, Aleksandar Eftimov, Milco Panovski, Natalija Petrushevska-Angelovska, Biljana Grozdanovska, Aleksandar Dimovski	
Binding site description of 2-substituted benzothiazoles as potential RND efflux pump inhibitors	543
Ismail Yalcin, Serap Yilmaz, Kayhan Bolelli, Esin Aki-Yalcin, Ufuk Over-Hasdemir	
Ectoine nasal spray in treatment of allergic rhinitis	545
Vladimir Šaranović	
Monitoring of azathioprine active metabolite concentration in patients with inflammatory bowel disease in R. Macedonia	547
Kristina Pavlovska, Maja Slaninka, Miceska Emilija Atanasovska, Marija Petrushevska, Kalina Gjorgjievska, Dragica Zendelovska, Igor Kikerkov, Jasmina Tonik Ribarska, Petranka Mishevska, Ljudmila Efremovska	
The relationship between plasma protein binding and molecular properties of selected antifungal agents	549
Jadranka Odović, Jovana Trbojević, Jasna Trbojević-Stanković, Ratimir Jelić, Biljana Stojimirović	
Zileuton in treatment of patients with bronchial asthma	551
Naim Morina, Gëzim Boçari, Ali Iljazi, Liridona Gashi, Naime Morina Shaqiri	
Docking studies of neurokinin-1 receptor antagonists as an anticancer target	553
Esin Aki-Yalcin, Özüm Öztürk, Kayhan Bolelli, Ismail Yalcin	
Application of isocratic hydrophobic index obtained by RP-TLC of some succinimide derivatives in QSA(P)R studies	555
Jelena Curcic, Natasa Milosevic, Vesna Kojic, Natasa Milic, Gordana Uscumlic, Nebojsa Banjac	
Individualization of therapy in patients with renal impairment	557
Jelena Curcic, Mladena Lalic Popovic, Svetlana Golocorbin Kon, Natasa Milic, Maja Milanovic, Natasa Milosevic	
Distribution coefficients of novel coumarin derivatives	559
Lulzime Ballazhi, Elena Dogazanska, Faik Imeri, Ahmed Jashari, Emil Popovski, Goran Stojkovikj, Bozhana Mikhova, Kristina Mladenovska	
Mesenchymal stem cells as a new approach in treatment of systematic lupus erythematosus	561
Magdalena Vrchkovska, Tatjana Dimitrovska Manojlovik, Marija Vrchkovska	

May bile acids be utilized to enrich oncological armamentarium?	563
Bojan Stanimirov, Nebojša Pavlović, Karmen Stankov, Maja Đanić, Vesna Kojić, Svetlana Goločorbin-Kon, Momir Mikov	
Prediction of binding affinities of different bile acids towards multidrug transporters in <i>Lactobacillus acidophilus</i> NCFM - a pharmacoinformatic approach	565
Maja Đanić, Nebojša Pavlović, Bojan Stanimirov, Tijana Stojančević, Svetlana Goločorbin Kon, Momir Mikov	
Therapeutic drug monitoring as a tool for good clinical outcomes	567
Suela Kellici, Anyla Buló, Joana Mihani, Jera Kruja	
Impact of SLCO1B1 521T>C and 388A>G polymorphisms on response to atorvastatin in the albanian population	569
Arlinda Daka, Aleksandar Dimovski, Aleksandra Kapedanovska, Marija Vavlukis, Aleksandar Eftimov, Nadica Matevska Geshkovska, Sashko Kedev, Dashnor Nebija, Pranvera Breznica Selmani, Blerina Koshi, Kristina Mladenovska	
New human Glutathione-S-transferase P1-1 inhibitors and their ligand binding site and GSH complex formation descriptions	571
Ismail Yalcin, Tugba Ertan-Bolelli, Esin Akı-Yalcin	
Physicochemical properties of novel derivatives of norfloxacin: solubility and pKa	573
Pranvera Breznica-Selmani, Kristina Mladenovska, Bozhana Mikhova, Arlinda Daka, Dashnor Nebija, Blerina Koshi, Z. Kavrovski and Emil Popovski	
Physicochemical properties of novel derivatives of norfloxacin: distribution coefficient	575
Pranvera Breznica-Selmani, Emil Popovski, Bozhana Mikhova, Arlinda Daka, Dashnor Nebija, Blerina Koshi, Maja Stevanoska and Kristina Mladenovska	
Methotrexate - an old drug with new pharmaceutical formulations and new indications	577
Svetlana Goločorbin-Kon, Nebojša Pavlović, Bojan Stanimirov, Saša Vukmirović, Boris Milijašević, Hani Al-Salami, Momir Mikov	
Targeting endoplasmic reticulum stress in diabetes	579
Bojan Stanimirov, Karmen Stankov, Nebojša Pavlović, Maja Đanić, Svetlana Goločorbin-Kon, Momir Mikov	
Detection of chromosomal abnormalities with multiplex ligation dependent probe amplification in patients with myelodysplastic syndromes	581
Tatjana Sotirova, Borce Georgievski, Oliver Karanfilski, Aleksandar Stojanovic, Sonja Genadieva-Stavric, Aleksandar Eftimov, Aleksandar J. Dimovski	
Regulatory aspects of data protection and privacy requirements in interventional biomedical studies	583
Milica Zugic, Kristina Mladenovska	
Protecting personal data in (pharmaco)epidemiological research: international regulation and macedonian law	585
Milica Zugic and Kristina Mladenovska	
Oxidative stress index in rat stomach as a measure of gastric tolerability of newly synthesized anti-inflammatory compounds	587
Jelena Savić, Marina Milenković, Jelena Kotur-Stevuljević, Zorica Vujić, Sote Vladimirov and Jasmina Brborić	
Antiproliferative effects of a betulin nanoformulation on a lung carcinoma cell line – A549	589
Ioana Zinuca Pavel, Iulia Pinzaru, Roxana Ghiulai, Stefana Avram, Marius Mioc, Codruta Soica, Dorina Coricovac, Cristina Adriana Dehelean	
Treatment of uremic pericarditis treated with intermittent hemodialysis	591
Mirlind Behxheti, Lutfi Zylbeari, Nasir Behxheti, Gazmend Zylbeari, Zamira Bexheti	
Treatment of arterial hypertension with ACE (Angiotensin-Converting-Enzyme) inhibitors for patients with chronic renal insufficiency	593
Dorontina Bexheti, Sadi Bexheti, Nexhbedin Beadini, Lutfi Zylbeari	

Treatment of apolipoprotein profile in patient with rheumatoid arthritis _____ 595
Nasir Behxheti, Lutfi Zylbeari, Mirlind Behxheti, Gazmend Zylbeari, Zamira Bexheti.

Treatment with L-carnitine in uremic patients treated with chronic hemodialysis - resistant erythropoietin _____ 597
Lutfi Zylbeari, Driton Selmani Nexhibe Nuhii, Zamira Bexheti, Gazmend Zylbeari

Prediction of blood-brain barrier permeation of α -adrenergic and imidazoline receptor ligands using different HPLC systems and quantitative structure-permeability relationship analysis _____ 599
Jelica Vucicevic, Marija Popovic, Katarina Nikolic, Slavica Filipic, Danica Agbaba

Continual professional development

Excellence in pharmacy practice – Quality indicators based on tradition, experience and innovations _____ 603
Arijana Meštrović

Quality of community pharmacy service in Republic of Macedonia – professional supervision _____ 605
Bistra Angelovska and Jasminka Patceva

Model framework for off label use of medicines _____ 607
Blerina Koshi, Elizabeta Zisovska, Vasilka Nica, Maja Simonoska Crcarevska, Marija Glavas Dodov, Renata Slaveska-Raicki

Developing community pharmacy practice _____ 609
Vesna Stavrova, Maja Simonoska Crcarevska, Marija Glavash Dodov and Renata Slaveska-Raicki

Lifelong learning - reality and perspective _____ 611
Elizabeta Tomevska Ilievska, Jasmina Tonic Ribarska, Suzana Trajkovic Jolevska, Katerina Ancevska Netkovska, Goran Ajdinski

Ethics, professionalism and autonomy of pharmacist – vision for the future _____ 613
Arijana Meštrović

Ethical dimensions of pharmacy _____ 615
Kiril Temkov

Continuing professional development - challenge for professional organization _____ 617
Svetlana Stojkov, Dragana Rajković, Bistra Angelovska, Zahida Binakaj

Implementation of standards for good compounding practices in hospital pharmacy _____ 619
Vasilka Nica, Maja Simonoska Crcarevska, Marija Glavas Dodov, Renata Slaveska Raicki

Role of community pharmacists in chronic disease management in the Republic of Macedonia _____ 621
Donka Pankov, Maja Simonoska Crcarevska, Kristina Mladenovska, Renata Slaveska Raicki, Marija Glavas Dodov

The role of the community pharmacist in self-medication with over-the-counter drugs: R. Macedonia survey _____ 623
Marija Glavas Dodov, Ana Poceva Panovska, Maja Simonoska Crcarevska, Andrea Puzderliski, Vladimir Indov, Aneta Dimitrovska

Relationship between management style and pharmacist job satisfaction in marketing strategy departments (MSDs) in headquarters of ten pharmaceutical companies in Bangladesh: a cross-sectional study _____ 625
Dilshad Noor Lira, Abu Shara Shamsur Rouf

Student session

Porous microparticulated system for topical delivery of natural bioactive compounds _____ 629
Lea Taneska, Elena Risteska, Blagorodna Koprivica, Marija Glavas Dodov, Maja Simonoska Crcarevska

HPLC determination of hypericin content in Hyperici oleum _____ 631
Veronika Stoilkovska, Jelena Acevska, Gjose Stefkov

Optimization of HPLC method for determination of related substances in metamizole sodium using core-shell columns	633
Belma Asanova, Filip Cvetanovski, Gabriela Petrovska, Marija Zafirova, Katerina Brezovska	
Survey of community pharmacy practice in Republic of Macedonia	635
Angela Arsovska, Maja Simonoska Crcarevska, Marija Glavas Dodov, Tatjana Sterjeva, Renata Slaveska Raicki	
Antimicrobial resistance to antibacterial agents in common respiratory tract pathogens in pediatric population	637
Stefan Matik, Ana Vavlukis, Aleksandra Kapedanovska Nestorovska, Zorica Naumovska, Aleksandra Grozdanova, Zoran Sterjev	
Risperidone loaded nanostructured lipid carriers: formulation optimisation and characterisation	639
Nikola Lazarevski, Hristina Litovin, Maja Simonoska Crcarevska, Marija Glavas Dodov	
Formulation and characterization of rosmarinic extract loaded PEGylated liposomes for brain delivery	641
Ljubica Cambuleva, Dushko Shalabalija, Ivana Cvetkovikj, Maja Simonoska Crcarevska, Marija Glavas Dodov	
Determination of the arbutin content in wild growing populations of <i>Arctostaphylos uva-ursi</i> (L.) Spreng from Korab mountain	643
Viktorija Labroska, Ivana Cvetkovikj, Gjoshe Stefkov	
Influence of ABCB1 C3435T genotype on clinical cardiovascular outcomes in coronary artery disease patients on Clopidogrel treatment	645
Ana Vavlukis, Lile Zdraveska, Viktorija Nikolovska, Aleksandra Kapedanovska Nestorovska, Zoran Sterjev, Aleksandra Grozdanova, Zorica Naumovska	
Formulation development of self-microemulsifying system containing Atorvastatin	647
Andrej Slavkovski, Maja Simonoska Crcarevska, Marija Glavas Dodov	
A topical w/o/w multiple emulsions containing resveratrol: formulation and characterization	649
Radmila Stanojkovska, Maja Simonoska Crcarevska, Marija Glavas Dodov	
Probiotics and immunological disorders	651
Spase Stojanov, Katarina Smilkov	
The functions of sialic acid and its polymers and associated diseases	653
Sofija Gicheva, Marija Hiljadnikova Bajro, Tatjana Kadifkova Panovska	
Biosimilars in clinical use	655
Martina Keshkjec, Martina Miloshevska, Aleksandra Grozdanova	
The toxicology of aflatoxins and public awareness	657
Elisaveta Durolojkova, Marija Hiljadnikova Bajro and Tatjana Kadifkova Panovska	
World Health Organization standards for ethical and efficient promotion of over-the-counter pharmaceuticals	659
Aleksandar Derlis, Rosana Bozhinovska, Elena Todorovska, Monika Mitreska, Renata Slaveska Raicki	
The impact factors during proper chamomile drying	661
Petar Dacev, Ile Canev	
Development of microsponges as drug delivery carriers: Optimization of formulation variables using sequential experimental strategy	663
Elena Markova, Monika Kostovska, Tanja Kjurkchieva Olumcheva, Marija Glavas Dodov, Maja Simonoska Crcarevska	
Pharmacovigilance practice in community pharmacies	665
Aleksandar Spirov, Aleksandra Kapedanovska Nestorovska, Aleksandra Grozdanova, Zoran Sterjev, Zorica Naumovska	
Quality assurance of volumetric glassware in analytical laboratory	667
Blagoj Achevski, Vasil Karcev, Katerina Brezovska	

Application of AAS vs ICP-OES in determination of macro and microelements in dietary supplements _____	669
Rosana Trpeska, Matilda Petrova, Liljana Bogdanovska, Aneta Dimitrovska, Rumenka Petkovska	
Mineral composition of soil substrate of <i>Arctostaphylos uva-ursi</i> (L.) Spreng. fam. Ericaceae _____	671
Elena Petrova, Mile Markoski, Gjoshe Stefkov	
HPLC determination of amygdalin in different plant material _____	673
Cvetanka Petrevska, Ivana Cvetkovikj, Gjose Stefkov	
GC determination of potential phytoestrogenic compounds in alcoholic beverages _____	675
Marjan Gjurcheski, Gjoshe Stefkov, Ivana Cvetkovikj	
Essential oil composition of St. John's wort (<i>Hypericum perforatum</i> L.) _____	677
Veronika Angelovska, Marija Karapandzova	
Comparison of pharmacopoeial methods for analysis of residual solvents _____	679
Marija Brezovska, Ana Ivcevska, Ana Poceva Panovska	
Comparative analysis of EU and USA falsified medicine legislation _____	681
Filip Cvetanovski, Belma Asanova, Katerina Brezovska	