

## **2<sup>nd</sup> SCIENTIFIC CONFERENCE**

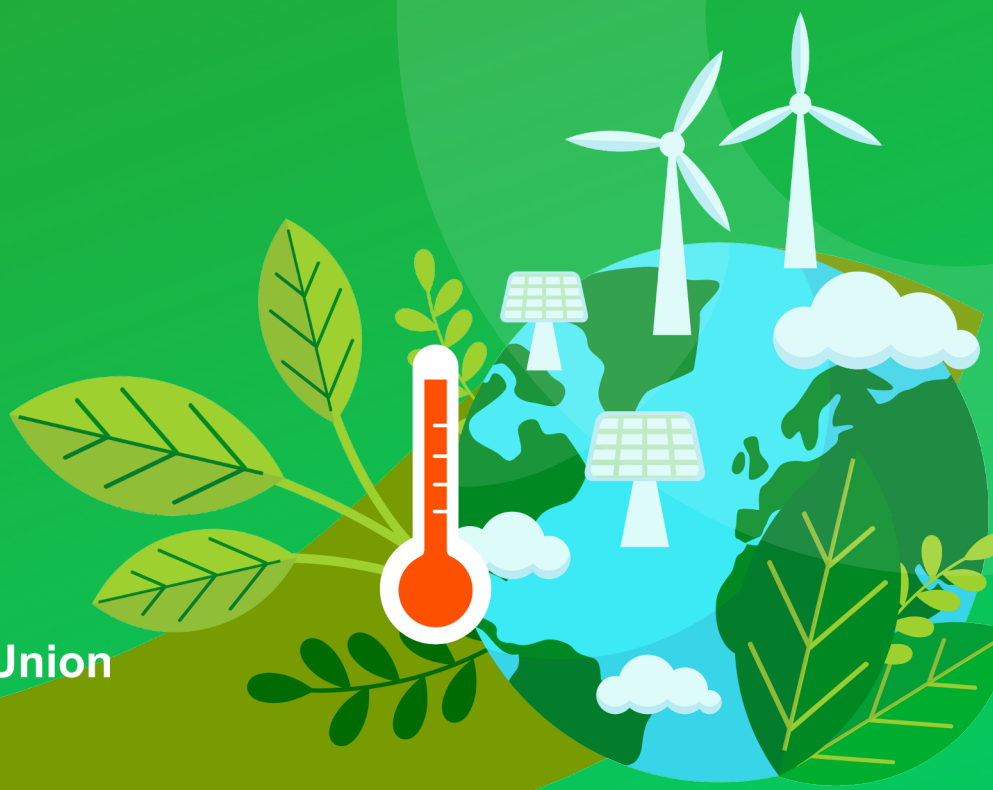
**FOR CRITICAL ENVIRONMENTAL ISSUES OF  
THE WESTERN BALKAN COUNTRIES**

# **BOOK OF ABSTRACTS**

October 28<sup>th</sup> to 30<sup>th</sup>, 2021, Faculty of Agriculture, Goce Delčev University, Štip,  
Republic of North Macedonia



Funded by  
the European Union





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## **ORGANIZERS:**

Goce Delčev University, Faculty of Agriculture, Štip,  
Republic of North Macedonia

WBAA-Western Balkan Alumni Association

The conference is organized and financed within the project titled “Extracting Green-COVID effects for generating clean technologies and successful youth transition awareness for the climate change and sustainable development of the Western Balkan countries”, **project number 2021030, financed by Western Balkans Alumni Association.**

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## WELCOME

On behalf of the project coordinators of

“Extracting Green-COVID effects for generating clean technologies and successful youth transition awareness for the climate change and sustainable development of the Western Balkan countries”

Project number 2021030

financed by Western Balkans Alumni Association

*The project involves networking of students and scientific researchers from Western Balkan countries for creating dataset base of the latest chemi-metric approaches for environmental pollution/protection and ecological effects as well. Even the environmental pollution is a global problem, the latest research indicate that the Western Balkan countries are significantly affect with the environmental pollution. Furthermore, the Western Balkan countries still deals with the problem of poor population awareness for environmental protection. Therefore, this project idea is to unite knowledge from Western Balkan countries and share with youth from this region, increasing the environmental protection awareness within students. Therefore, the students will have the main role in lunching the environmentally friendly aspects for creating novel chemi-metric models in environmental sciences. The beneficiary effect for the Western Balkan students will be creating long-term valuable and sustainable correlations.*

*The project has regional focus, networking six universities from the Western Balkan countries (students and scientific experts and professors). Furthermore, this project has a national focus for the students from three state universities from North Macedonia (students from Goce Delčev University in Štip, Ss. Ss. Cyril and Methodius University in Skopje and University in Tetovo and St. Kliment Ohridski University - Bitola). Even the environmental pollution is a global problem, the latest research indicate that the Western Balkan countries are significantly affected with the pollution, pointing strongly on heavy metal industry, uncontrolled xenobiotic introduction in the different parts of the environment, electronic waste disposal etc. Furthermore, the Western Balkan countries still deals with the problem of poor population awareness for environmental protection. Therefore, this project will involve regional and national students and scientific researches in order to provide novel chemi-metric methodology and beneficial environmental protection methods.*

*The project intends to involve three national and five regional universities (WBAA members). Each regional university will participate with one scientific expert (university professor) and two students (WBAA member). Three national universities (Ss. Cyril and Methodius University in Skopje, State University in Tetovo and St. Kliment Ohridski University - Bitola) will participate with one scientific expert and three students. Goce Delčev University will participate with scientific experts, young researchers and students. Participants from North Macedonia, Albania, Kosovo, Serbia, Bosnia and Hercegovina and Montenegro shall collaborate for the benefit of the whole region for several critical environmental issues.*

*Overall objective: Use of universities' expertise in creation new valuable, suitable and accurate chemimetric models for predicting and measuring the contamination level in different parts of the environment (air, soil, water, plant food). Creating a regional scale of experience for determining the anomalous parts of the environment. Proposing new ideas for national and regional strategies for environmental protection. Promoting new ideas for Inter-university cooperation. Creating sustainable University network for continuous cooperation in the field of environmental monitoring, pollution and protection (both, for students and researchers).*

**Assoc. Prof. Biljana Balabanova**

**Kiril Jordanov**

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### ***About the Western Balkans Alumni Association (WBAA)***

The Western Balkans Alumni Association (WBAA) is a regional network of students and alumni from the Western Balkan region (Albania, Bosnia and Herzegovina, Kosovo\*, North Macedonia, Montenegro, Serbia) who have spent part of their studies in one of Erasmus+ programmed countries. These exchanges were mostly funded by the European Commission. WBAA is neutral, unbiased and nonpartisan in the existing political discourse.

WBAA is supported and funded by the European Commission.

WBAA Mission:

- Advocating modernization and improvement of higher education quality in the region;
- Empowering young people of the Western Balkans on their academic and career development towards successful employment;
- Strengthening regional exchange, collaboration and integration;
- Supporting region's efforts towards European integration;

Web page:

<https://www.western-balkans-alumni.eu/>

FB page: <https://www.facebook.com/WesternBalkansAlumniAssociation/>

Instagram: @wbaassociation

e-mail: [info@western-balkans-alumni.eu](mailto:info@western-balkans-alumni.eu)

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***SCIENTIFIC COMMITTEE MEMBERS***

**President:**

**Biljana Balabanova** - Faculty of Agriculture, Goce Delčev University, Štip, Republic of North Macedonia

**Members:**

Panvera Lazo - University of Tirana, Department of Chemistry, Tirana, Albania.

Musaj Pacarizi - University of Pristina, Department of Chemistry, Pristina, Kosovo.

Jovica Vasin - Institute of Field and Vegetable Crops, Laboratory for Soil and Agroecology, Novi Sad, Serbia.

Jordana Ninkov - Institute of Field and Vegetable Crops, Laboratory for Soil and Agroecology, Novi Sad, Serbia.

Radomir Ljupkovich - Department of Chemistry, Faculty of Science and Mathematics, University of Niš, Serbia.

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Marija Hadzi-Nikolova - Faculty of Natural and Technical Sciences, Goce Delčev University, Štip, Republic of North Macedonia.

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**Sanja Stefanova**, MSc, Board Member of Western Balkans Alumni Association and International Relations Officer at Goce Delčev University, Štip, Republic of North Macedonia

**Biljana Balabanova**, Associate Professor at Faculty of Agriculture, Goce Delčev University, Štip, Republic of North Macedonia

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<b>SCIENTIFIC PROGRAM</b>		
<b>October 28<sup>th</sup>, 2021 (Thursday)</b> <b>Time: 12:00-16:00, Registration for regional participants</b> (Faculty of Agriculture, Campus 2)		
16:00-16:15	Presentation of Goce Delčev University to the regional participants	
16:15-16:30	WBAA representative	
16:30-17:30	Introducing Scientific Research Centers of Goce Delčev University	
17:30-17:40	<i>Coffee break</i>	
17:40-18:30	<p align="center"><b>Regional experts meeting</b></p> Problems and challenges facing each country; Introduction and proposal of new and beneficial chemi- metric tools for environmental pollution; Proposal of “environmentally friendly tools” for reduction of toxic effect of pollutants and hazards.	<p align="center"><b>Students/young participants meeting</b></p> Introduction of regional and national participants; Presentation of environmental issues from each country; Generation of new proposal ideas; Creation sustainable cooperations.
19:00	<i>Welcoming dinner (Hotel Izgrev hall)</i>	
<b>October 29<sup>th</sup>, 2021 (Friday)</b> <b>Time: 08:00-09:00, Registration for national participants</b> (Faculty of Agriculture, Campus 2)		
<b>09:00-9:15</b>	<b>OPENING CEREMONY (HALL CAMPUS 2)</b>	
	Moderator's Introduction speech	
	Dean of the Faculty of Agriculture, Prof. Ljupco Mihajlov / Vice dean Assoc. prof. Emilija Arsov	
	Project coordinator introduction: Assoc. prof. Biljana Balabanova WBAA representative/ Kiril Jordanov	
<i><b>ENVIRONMENTAL POLLUTION: critical issues concerning at national and regional scale</b></i> <i><b>- PLENARY LECTURES -</b></i> <i><b>Chairwoman Assoc. prof. Biljana Balabanova</b></i>		
09:15-09:30	<p align="center"><b>Trajče Stafilov</b></p> Faculty of Natural Sciences and Mathematics, Institute of Chemistry, Ss. Cyril and Methodius , Skopje, Republic of North Macedonia	<p align="center"><b>GEOCHEMISTRY OF MAJOR AND TRACE ELEMENTS IN SOILS OF THE REPUBLIC OF NORTH MACEDONIA</b></p>
09:30-09:45	<p align="center"><b>Musaj Pacarizi</b></p> University of Pristina, Department of Chemistry, Pristina, Kosovo	<p align="center"><b>DETERMINATION AND STATISTICAL ANALYSIS OF THE ATMOSPHERIC DEPOSIT OF ELEMENTS IN KOSOVO THROUGH MOSSES AS BIOMONITORS</b></p>
09:45-10:00	<p align="center"><b>Panvera Lazo</b></p> University of Tirana, Department of Chemistry, Tirana, Albania	<p align="center"><b>STUDY OF AIR QUALITY BY MOSS BIOMONITORING AND TRACE ELEMENTS CONTENT</b></p>
	<b>High-end Dialogue</b>	
10:00-10:30	<i>Coffee break</i>	


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<p align="center"><i>Creating sustainable transfer of knowledge and technology</i>                      - <b>PLENARY LECTURES</b> -                      Chairwoman Assist. prof. Biljana Balabanova</p>		
10:30-10:45	<p align="center"><b>Stanko Milić</b>                      Institute of Field and Vegetable Crops,                      Laboratory for Soil and Agroecology,                      Novi Sad, Serbia</p>	<p align="center"><b>SOIL CHARACTERISTICS                      OF PLUM ORCHARDS WITH                      INDICATION OF                      GEOGRAPHICAL ORIGIN</b></p>
10:45-11:00	<p align="center"><b>Radomir Ljupkovich</b>                      Department of Chemistry, Faculty of                      Science and Mathematics, University of                      Niš, Serbia</p>	<p align="center"><b>COMPOSITES OF                      GRAPHENE-OXIDE AND                      TITANIA AS PROMISING                      PHOTOCATALYSTS FOR                      ORGANIC POLLUTANTS                      DEGRADATION</b></p>
11:00-11:15	<p align="center"><b>Flamur Sopaj</b>                      Chemistry Department of Natural                      Sciences Faculty, University of                      Prishtina, Kosovo</p>	<p align="center"><b>FENTON AND ELECTRO-                      FENTON ADVANCED                      OXIDATION PROCESSES                      FOR ORGANIC                      POLLUTANTS REMOVAL                      FROM POLLUTED WATERS</b></p>
<b>High-end Dialogue</b>		
11:20-12:20	<b>POSTER SESION – PART 1</b>	
12:30-13:30	<i>Lunch break, University lunch bar (First Floor-Campus 2)</i>	
<p align="center"><b>ENVIRONMENTAL PROTECTION: critical issues concerning at national and regional scale</b>                      Chairwoman Assoc. prof. Natalija Markova-Ruzdik</p>		
13:30-13:45	<p align="center"><b>Alen Mujčinović</b>                      University of Sarajevo, Faculty of                      Agricultural and Food Sciences,                      Sarajevo, Bosna and Hercegovina</p>	<p align="center"><b>INTRODUCING CLIMATE                      OPTIMIZED PRODUCTION                      OPPORTUNITIES FOR WESTERN                      BALKAN ECONOMIES</b></p>
13:45-14:00	<p align="center"><b>Elena Doneva</b>                      Faculty of Natural and Technical                      Sciences, Goce Delceev University, Štip,                      North Macedonia                      (students’ oral presentation)</p>	<p align="center"><b>INDOOR AIR QUALITY IN HOMES                      USING BIOMASS FOR HEATING                      AND COOKING</b></p>
14:00-14:15	<p align="center"><b>Kristina Panev</b>                      UNILAB, Faculty of Agriculture, Goce                      Delceev University, Štip, North                      Macedonia                      (students’ oral presentation)</p>	<p align="center"><b>DETERMINATION OF                      CHLOROPHYLL IN A WATER                      SAMPLE</b></p>
<b>High-end Dialogue</b>		
14:15-14:30	<p align="center"><b>Filip Andonovski</b>                      Some practical aspects:                      “SOLAR HEATER AND AIR PURIFIER”                      AGRO SOLAR</p>	
14:40:15:00	<i>Coffee break</i>	
15:00-16:30	<b>POSTER SESION Part 2</b>	
16:30-17:00	<b>Experts’ meeting-evaluation of poster presentations</b>	
17:00-18:30	<p><b>Students workshop</b>                      “Eliminate &amp; Minimize &amp; Hazards &amp; Pollution”                      Laboratory for Environmental Chemistry (Part 1)</p>	

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<i>19:00</i>	<i>Dinner -Hotel Izgrev</i>	
<b>October 30<sup>th</sup>, 2021 (Saturday)</b>		
Faculty of Agriculture, Campus for Natural, Technical and Biotechnical Sciences, Goce Delčev University, Republic of North Macedonia		
09:00-10:00	<b>Students workshop</b> <b>“Eliminate &amp; Minimize &amp; Hazards &amp; Pollution”</b> Laboratory for Environmental Chemistry (Part 2)	
10:00-10:10	Summary event conclusions and perspectives (Hall-Campus 2)	
10:10-10:30	Closing remarks and generation of new project proposal ideas	
<i>10:30 -10:40</i>	<i>Coffee break</i>	
10:40-11:00	Certificate awards for participation	
11:00-11:20	Awarding the best student presentations	
11:20-12:00	Student event evaluation (SWOT)	
12:00-12:30	WBAA meeting- Closing remarks	
<i>12:40-13:30</i>	<i>Lunch break – Hotel Izgrev</i>	
<i>14:00</i>	<i>Departure</i>	

**Protocols for COVID safe conditions will be in accordance and within the published decision on preventive recommendations, interim measures, follow-up measures, purposeful protocols, plans and algorithms for action to protect the health of the population from the infectious disease COVID-19 caused by the SARS-CoV-2 virus, the cases and the period of their application, published on 15.10.2021 in the Official Gazette No. 234/21, Republic of North Macedonia.**

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## OP1

# INDOOR AIR QUALITY IN HOMES USING BIOMASS FOR HEATING AND COOKING

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The impact of indoor air quality (IAQ) on occupants' health and welfare is a subject that gathered the attention of the scientific community over the last two decades. Homes were found to be micro-environments with the highest contribution to the daily exposure, especially to particulate matter and VOC's. According to WHO, 3.8 million deaths every year, occur as a result of household exposure to smoke from dirty cookstoves and fuels, with particularly high risks among women and children's groups. Our study involves IAQ measurements in residential spaces in Skopje urban and sub urban area (Lisiche), using biomass for heating and cooking purposes. A total of 40 houses were included in preliminary program, with 21 passing QA/QC procedures and qualified for further analysis. Parameters measured include particulate matter (PM 1, PM 2.5, PM 4 and PM10), carbon dioxide, temperature, relative humidity and atmospheric pressure. Measurements were performed using optical sensor (light scattering) for PM, NDIR sensor for CO<sub>2</sub>, temperature and humidity combined resistance/capacitive probe for T(°C) and RH % and piezoresistive sensor for atmospheric pressure (Delta Ohm, HD 50). Monitoring was conducted for several consecutive days in order to avoid influence of different space usage habits and ambient pollution levels. The obtained results shows that 24 hours average PM10 concentration in homes heating with indoor stoves are in range of  $200.1 \pm 126.9 \mu\text{g}/\text{m}^3$  (n = 17) while in homes using biomass with external heating systems the 24 hours average PM10 concentration were in range  $14.7 \pm 6.5 \mu\text{g}/\text{m}^3$  (n = 4). In the same period (28.12.2020-28.01.2021), 24 hours average outdoor PM 10 concentrations at Lisiche station were  $72.25 \pm 57.19 \mu\text{g}/\text{m}^3$ . Data obtained, exhibit significantly higher indoor concentration for homes using indoor stoves, indicating indoor stoves as very significant source of indoor air pollution.

**Keywords:** PM10, air pollution, Skopje, stoves.