

## REPORT

### 1<sup>st</sup> TwiNSol-CECs Workshop

#### Advance multicomponent analyses and novel solutions for protection of environmental resources with contaminants of emerging concern in focus

University of Novi Sad, Faculty of Technology Novi Sad (TFNS)

Novi Sad, Serbia

October 20-21, 2022

The first TwiNSol-CECs Workshop “Advance multicomponent analyses and novel solutions for protection of environmental resources with contaminants of emerging concern in focus” was organized by TFNS in Novi Sad, Serbia, on October 20-21, 2022, as a part of dissemination activities planned within Work Package no. 6 “Dissemination, communication, and outreach activities” of the TwiNSol-CECs project (GA 101059867).

The aim of this event was to gather scientists and experts interested in, but not limited to, problems of contaminants of emerging concern (CECs) occurrence in the environment and relevant analytical methods, as well as novel solutions for their removal. The Workshop served as a forum for exchange of project ideas and results in the domain of environmental protection, contributing to the harmonization of research and innovation efforts important for the sustainable transition of whole Europe, as foreseen by the European Green Deal, towards zero-pollution, i.e. toxic free environment. Special session of the Workshop promoted the ongoing Horizon Twinning projects coordinated by the Serbian institutions, dealing with the various latest environmental challenges.

Thematic areas of the Workshop were:

- ❖ analysis of environmental contaminants, including CECs;
- ❖ environmental and human health relevancy of CECs determination;
- ❖ adsorption, membrane, and catalytic-based processes for wastewater treatment;
- ❖ linking sustainable development principles and wastewater treatment processes.

The Chair of the Workshop was Prof. Dr. Nataša Đurišić-Mladenović, while the Scientific Committee of the Workshop consisted of researchers from 6 countries (in alphabetic order):

Prof. João G. Crespo, NOVA University of Lisbon, Portugal

Dr. Marijana Dragosavac, Loughborough University, UK

Dr. Marinella Farré, IDAEA-CSIC, Barcelona, Spain

Dr. Szabolcs Kertész, Department of Biosystems Engineering, Faculty of Engineering, University of Szeged, Hungary

Prof. Biljana Pajin, TFNS, Serbia

Prof. Ivica Strelec, Faculty of Food Technology Osijek, Josip Juraj Strossmayer University of Osijek, Croatia

Prof. Zita Šereš, TFNS, Serbia

Prof. Marina Šćiban, TFNS, Serbia

Prof. Maja Turk-Sekulić, Faculty of Technical Sciences, University of Novi Sad, Novi Sad, Serbia

The members of the Organizing Committee were (in alphabetic order):

Dr. Igor Antić, TFNS, Serbia,

Dr. Maja Buljovčić, TFNS, Serbia,

Dr. Dragana Kukić, TFNS, Serbia,

Dr. Ivana Lončarević, TFNS, Serbia,

Dr. Nikola Maravić, TFNS, Serbia,

Dr. Ivana Nikolić, TFNS, Serbia,

Dr. Sanja Panić, TFNS, Serbia,

Dr. Jovana Petrović, TFNS, Serbia,

Dr. Vesna Vasić, TFNS, Serbia,

Dr. Jelena Živančev, TFNS, Serbia

The Workshop was organized as a 2-day medium-scale scientific event targeting from the very beginning about 40-50 participants in accordance to the planned venue, the Blue Hall of TFNS. However, in order to spread the information on the project to wider audience, including representatives of academia, industry and decision-making authorities, the Workshop was organized as a parallel to a large-scale event of 2<sup>nd</sup> International Conference on Advanced Production and Processing (ICAPP 2022) organized by TFNS in the period 20-22 October 2022. The Opening ceremony of ICAPP and the Workshop was jointly organized at the Rectorate Building of the University of Novi Sad with about 200 attendees from 16 countries. During the ceremony of the official opening, representatives of the Serbian Ministry for Education, Science and Technological Development, Vojvodina Provincial Secretariat for Higher Education and Scientific Research, authorities of the Novi Sad city, and the Rector of the University of Novi Sad were presented together with scientists and representatives of various industries. The national and local media covered the opening ceremony during which Prof. Dr. Zita Šereš, Vice Dean for Science of TFNS, emphasized the importance of the TwiNSol-CECs project, as the largest project in the last ten years at TFNS.

The joint morning session of the Workshop and ICAPP 2022 started with the plenary lectures of the outstanding researchers from the TwiNSol-CECs partner institutions:

- “Membranes in Bioprocessing”, Prof. Dr. João G. Crespo from *LAQV-Requimte, Department of Chemistry, FCT - NOVA University of Lisbon*, and
- “The challenge of assessing contaminants of emerging concern in the environment”, Prof. Dr. Marinella Farré from *ON HEALTH research group, Institute of Environmental Assessment and Water Research (IDAEA-CSIC), Barcelona, Catalonia*.

After the plenary lectures, the participants had the opportunity to get to know better each other better through networking during the coffee and lunch break at the Rectorate building.

The afternoon session of the first day of the Workshop was primarily dedicated to the ongoing TWINNING projects in domain of environmental research coordinated by institutions from Novi Sad and Belgrade. In total 6 TWINNING projects were presented: as an introductory lecture on Twinning Western Balkans call and the hosting TwiNSol-CECs project was given by Prof. Dr. Nataša Đurišić-Mladenović, followed by invited lectures of coordinators of ExtremeClimTwin (GA 952384) Prof. Dr. Biljana Basarin, TwinSubDyn (GA 101059546) Prof. Dr. Snežana Maletić, PFASwin (GA 101059534)

Prof. Dr. Vladimir Beškoski, SmartWaterTwin (GA 101060110) Prof. Dr. Đurđa Kerkez, and CROPPINO (GA 101079772) Dr. Dragana Miladinović.

After the session of Twinning, a series of invited and oral presentations of registered participants on research topics of interest for the project were given in accordance to the Workshop Programme (in Annex I of the Report). Besides those plenary and invited lectures on Twinning, there were 10 oral lectures, while the afternoon session of the second day after the lunch break included 12 poster presentations.

In total, there were 58 participants of the Workshop from 19 institutions from 7 countries (Hungary, Spain, Portugal, UK, Croatia, Bosnia and Herzegovina, and Serbia), who signed the attendance list. Before the signing, they were informed that by signing the list they would also granted the permission and consent to TwiNSol-CECs team for the use of the any photograph(s) or electronic media images taken/made at the 1st TwiNSol-CECs workshop for presentation under any legal use. During the registration, all participants were provided with the registration pack free of charge, containing the prepared project promotional material (brochure of the project, pencil, and a notebook, all with obligatory visual elements for identifying the funding source and the project itself), as well as the printed agenda of the Workshop and the questionnaire for gathering the opinions on the Workshop organization success (the questionnaire and the gathered data are presented in Annex II).

An electronic version of the Book of Abstracts was published with ISBN and catalogization data obtained in accordance to the official procedure for Cataloguing in Publication (CIP) by the Matica Srpska Library. The electronic version of the Book of Abstracts of the 1<sup>st</sup> TwiNSol-CECs Workshop is available on the internet page of TwiNSol-CECs project ([http://www.twinsol-cecs.com/images/documents/news\\_and\\_events/1st\\_twinsol-cecs\\_book\\_of\\_abstracts-20-21oct2022.pdf](http://www.twinsol-cecs.com/images/documents/news_and_events/1st_twinsol-cecs_book_of_abstracts-20-21oct2022.pdf)).

Selected photos took during the Workshop sessions were available in Annex III of the Report.



Cover page of the Workshop Book of Abstracts available at [http://www.twinsol-cecs.com/images/documents/news\\_and\\_events/1st\\_twinsol-cecs\\_book\\_of\\_abstracts-20-21oct2022.pdf](http://www.twinsol-cecs.com/images/documents/news_and_events/1st_twinsol-cecs_book_of_abstracts-20-21oct2022.pdf)

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## Annex I

### Program of 1<sup>st</sup> TwiNSol-CECs Workshop

20 Oct 2022

- 9,00-15,00 Registration at the Faculty of Technology Novi Sad, Entrance Hall (Bulevar cara Lazara 1)  
**Joint morning session of the 1<sup>st</sup> TwiNSol-CECs Workshop and 2<sup>nd</sup> ICAPP,  
University of Novi Sad Rectorate building, Amphitheater** (Dr Zorana Đindića 1)
- 10,45-12,00 Official opening  
*Plenary lectures*
- 12,00-12,30 João G. Crespo: **Membranes in Bioprocessing**
- 12,30-13,00 *Coffee break*
- 13,00-13,30 Marinella Farré, Marta Llorca, Katerina Savva, Albert Vega: **The challenge of assessing contaminants of emerging concern in the environment**
- 13,30-14,00 *TwiNSol-CECs Networking with coffee* – Exploring further project endeavours
- 14,00-15,00 *Lunch break*
- Afternoon session, Faculty of Technology, Blue Hall** (Bulevar cara Lazara 1)  
*Invited lectures on TWINNING projects in domain of environmental research*  
Chairs: Vladimir Beškoski and Nataša Đurišić-Mladenović
- 15,00-15,20 Nataša Đurišić-Mladenović, Zita Šereš, Biljana Pajin, Jelena Živančev, Nikola Maravić, Igor Antić, TFNS: **Twinning for excellence in protection of environmental resources: TwiNSol-CECs**
- 15,20-15,40 Biljana Basarin, Faculty of Science, Novi Sad: **EXTREMECLIMTWIN – Extremely important linking for excellence in hydroclimate research**
- 15,40-16,00 Snežana Maletić, Faculty of Science, Novi Sad: **Twinning excellence on organic soil amendments effect on nutrient and contaminant dynamics in the subsurface, TwinSubDyn**
- 16,00-16,20 Vladimir Beškoski, Faculty of Chemistry, Belgrade: **Twinning to address the PFAS challenge in Serbia – PFASTwin**
- 16,20-16,35 *Coffee break*
- 16,35-16,55 Đurđa Kerkez, Faculty of Science, Novi Sad: **Twinning for smart water – thinking and rethinking wastewater management in circular economy frame (SmartWaterTwin)**
- 16,55-17,15 Dragana Miladinović, Ankica Kondić-Špika, Tijana Zeremski, Sandra Cvejić, Sonja Gvozdenac, Boško Dedić, Siniša Jocić, Aleksandra Radanović, Ana Marjanović-Jeromela, et al., Institute of Field and Vegetable Crops, National Institute of Republic of Serbia, Novi Sad: **Institute of Field and Vegetable Crops: CROPINNO - Stepping up scientific excellence and innovation capacity for climate-resilient crop improvement and production**

*Invited lectures on topics of TwiNSol-CECs interest*

Chairs: Jelena Živančev and Vesna Vasić

- 17,15-17,40 Szabolcs Kertész, Gabriella Huszár, Balázs Szegedi, József R. Lennert, József Csanádi, Nikolett Sz. Gulyás, Zsuzsanna László, Gábor Veréb, Sándor Beszédes, Cecilia Hodúr, **Opportunities and challenges for membrane separation process intensification**  
*Oral presentation of registered participants*
- 17,40-17,55 Marija B. Lješević, Branka D. Lončarević, Vladimir P. Beškoski, **Application of respirometry and comprehensive two-dimensional gas chromatography in biodegradation studies**

21 Oct 2022

- 9,00-10,00 Registration at the Faculty of Technology Novi Sad, Entrance Hall (Bulevar cara Lazara 1)  
**Morning session, Faculty of Technology, Blue Hall** (Bulevar cara Lazara 1)  
*Invited lectures on topics of TwINSol-CECs interest*  
Chairs: Marijana Dragosavac and Ivica Strelec
- 10,00-10,25 Jelena Živančev, Igor Antić, Maja Buljovčić, Dušan Rakić, Nataša Đurišić-Mladenović, **Analysis of CECs in the environment of Western Balkans**
- 10,25-10,50 Sanja Panić, Mirjana Petronijević, Nataša Đurišić-Mladenović: **The development strategies for nano-engineered heterogeneous catalysts for wastewater treatment – towards greener approach**
- 10,50-11,15 Sandra Budžaki, Zita Šereš, Ivica Strelec: **Immobilization of lipases on functionalised carriers produced from selected agro-food industrial waste**
- 11,15-11,30 *Coffee break*
- 11,30-11,55 Nikola Maravić, Zita Šereš, Biljana Pajin, Dragana Šoronja Simović, Nataša Đurišić-Mladenović, Jelena Šurlan, **Membrane technologies in water treatment**
- 11,55-12,20 Vesna Vasić, Dragana Kukić, Marina Šćiban: **Biomaterials in water and wastewater treatment**  
*Oral presentation of registered participants*
- 12,20-12,35 Marijana Dragosavac, **Bespoke particles for purification and separation manufactured via membrane emulsification**
- 12,35-12,50 Dragana B. Ljubojević Pelić, Nikolina, J, Novakov, Brankica, D, Kartalović, Jelena, M, Vranešević, Miloš, M, Pelić, Željko, A, Mihaljev, Milica, M. Živkov Baloš, **Emerging contaminants in aquatic ecosystem and their effects on fish and human health through the food web**
- 12,50-13,05 Nikolina, J, Novakov, Brankica, D, Kartalović, Dragana, B, Ljubojević Pelić, Jelena, M, Vranešević, Miloš, M, Pelić, **Use of purified wastewater from slaughterhouse and farm industries in aquaculture and agriculture**
- 13,05-14,30 *Lunch break*  
**Afternoon session, Faculty of Technology, Central Lobby** (Bulevar cara Lazara 1)
- 14,30-16,30 Poster presentations with coffee (set-up 11,15-11,40, dismantling: 16,30-17,00)

#### Posters list:



- P1 ANALYSIS OF BIODEGRADATION PRODUCTS FROM BIOPLASTICS BY LC-HRMS,  
Katerina Savva, Maria Fernandez-Altimira, Maria Vila, Marinella Farré, Marta Llorca

- P2 SYNTHESIS AND CHARACTERIZATION OF MAGNETITE-BIOCHAR COMPOSITE AS A POTENTIAL ADSORBENT FOR WASTEWATER TREATMENT,  
Mirjana Petronijević, Sanja Panić, Saša Savić, Sanja Petrović, Nataša Đurišić-Mladenović
- P3 APPLICABILITY OF LIFE CYCLE IMPACT ASSESSMENT METHODOLOGIES: DESIGN OF NATURE BASED SOLUTIONS FOR WATER DECONTAMINATION,  
Sanja Radovic, Maja Turk Sekulic, Sabolc Pap, Boris Agarski, Djordje Vukelic, Jelena Radonic, Jelena Prodanovic
- P4 IS THERE A SHARP DIFFERENCE BETWEEN THE DEFINITIONS "COMPOUNDS OF EMERGING CONCERNS" AND "ENDOCRINE-DISRUPTING COMPOUNDS"?  
Igor Antić, Jelena Živančev, Maja Buljovčić, Dušan Rakić, Nataša Đurišić-Mladenović
- P5 OCCURRENCE AND FATE OF PHARMACEUTICALS IN SPANISH INTERMITTENT STREAMS,  
Olga Gómez-Navarro, Nicola Montemurro, Sandra Pérez
- P6 PRESENCE OF CECs IN CROPS AFTER IRRIGATION WITH CONTAMINATED WATER USING HRMS, Nicola Montemurro, Sandra Perez Solsona
- P7 BLACKBERRY STEM LIGNIN AS A BIOSORBENT FOR REMOVAL OF Cr(VI) IONS FROM WASTEWATER,  
Vesna M. Vasić, Dragana V. Kukić, Marina B. Šćiban, Mirjana G. Antov, Jorge Gominho, Ana Lourenço, Ricardo A. Costa, Duarte M. Neiva
- P8 MICROPLASTICS AS A VECTOR OF POLLUTION WITH PERSISTENT ORGANIC POLLUTANTS,  
Brankica D. Kartalović, Jelena M. Vranešević, Dušan S. Lazic, Nikolina J. Novakov, Krešimir M. Mastanjević, Kristina J. Habschied
- P9 WATER REGULATIONS, TREATMENT OF INDUSTRIAL WASTEWATER AND PROBLEMS IN PRACTICE,  
Žužana Šandor Milošević
- P10 PAHs ORIGINATING FROM TRADITIONAL SMOKEHOUSES AND THEIR EFFECT ON ENVIRONMENT AND HUMAN HEALTH,  
Jelena M. Vranešević, Brankica D. Kartalović, Nikolina J. Novakov, Snezana Škaljac, Suzana L. Vidaković Knežević, Miloš M. Pelić, Dragana B. Ljubojević Pelić
- P11 APPLICATION OF ORGANIC ACTIVATED BENTONITE IN THE TREATMENT OF AMMONIA-PHENOL WASTEWATER,  
Hana Alihodžić, Abdel Đozić, Melisa Ahmetović, Indira Šestan, Sabina Begić, Mirnesa Zohorović, Halid Junuzović
- P12 APPLICATION OF RAW BENTONITE IN THE TREATMENT OF AMMONIA-PHENOL WASTEWATER,  
Abdel Đozić, Hana Alihodžić, Halid Junuzović, Indira Šestan, Sabina Begić, Mirnesa Zohorović, Melisa Ahmetović

16,30-16,45 Certificate awarding and concluding remarks (Blue Hall)

## Annex II

### Questionnaire on the 1<sup>st</sup> TwiNSol-CECs Workshop

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**QUESTIONNAIRE**  
**1<sup>st</sup> TwiNSol-CECs Workshop**

Advance **multicompound** analyses and novel solutions for protection of environmental resources with  
contaminants of emerging concern in focus  
organized within TwiNSol-CECs project (GA101059867)  
University of Novi Sad, Faculty of Technology Novi Sad, Serbia  
October 20-21<sup>st</sup> 2022

- Did you find the lectures useful?  
Yes ☐ No ☐
- Did you learn some new information?  
Yes ☐ No ☐
- What did you find the most interesting?  
a) Topic  
b) Presentation material  
c) Presenters  
d) All of the above
- What is your personal topic of interest?  
a) Membrane technology  
b) Analytical methods  
c) Environmental protection  
d) Twinning projects  
e) Other \_\_\_\_\_
- Future workshops should include presentations of:  
a) Environmental involved SME  
b) Product suppliers  
c) Student research  
d) Policy makers  
e) None of the above  
f) Other \_\_\_\_\_
- Please, feel free to write any suggestions you might have.  
\_\_\_\_\_  
\_\_\_\_\_

*Thank you for your participation!*

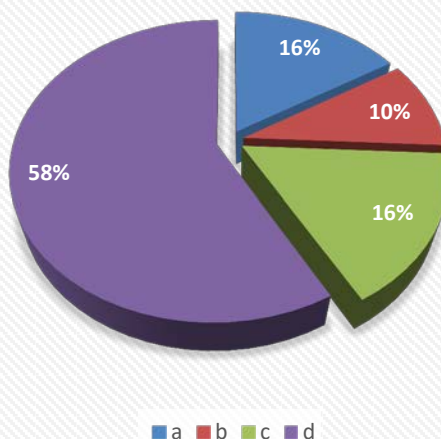
UNIVERSITET U NOVI SAD  
FACULTY OF TECHNOLOGY  
NOVI SAD

### Assessment of the completed questionnaires

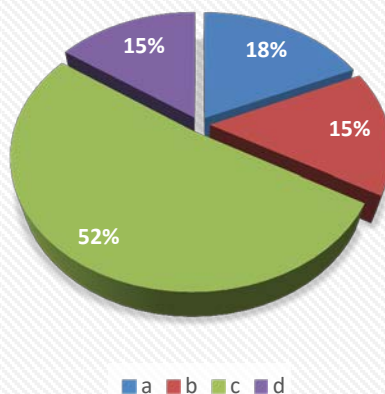
The illustration of the assessment of the completed questionnaires is presented in graph under. All of the participants answered "YES" to the first and second question in the questionnaire.



### 3. What did you find most interesting?

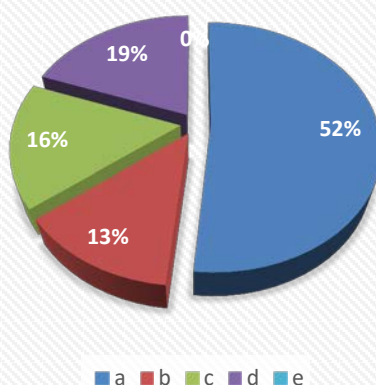


### 4. What is your personal topic of interest?





## 5. Future workshops should include presentations of:



The answers to the question six "6. Please, feel free to write any suggestions you might have:" were following:

*"Please repeat it, everything was great", "I am glad to participate", "I found out that everything is on a high level. Faculty of Technology is a great host", "The topics were very interested, I enjoyed it."*

### Annex III

#### Selected photos during the Workshop



*The opening ceremony: speech of Prof. Dr. Biljana Pajin, Dean of TFNS*



*Plenary lectures of Prof. Dr. João G. Crespo (left) and Dr. Marinella Farré (right) during the morning session of the 1st day of the Workshop at the rectorate building of University of Novi Sad*



*Details from the coffee and lunch break at the Rectorate building on the first day of the Workshop*



*Workshop session on Twinning projects: Invited lectures of Prof. Dr. Biljana Basarin (left) and Prof. Dr. Snežana Maletić (right)*

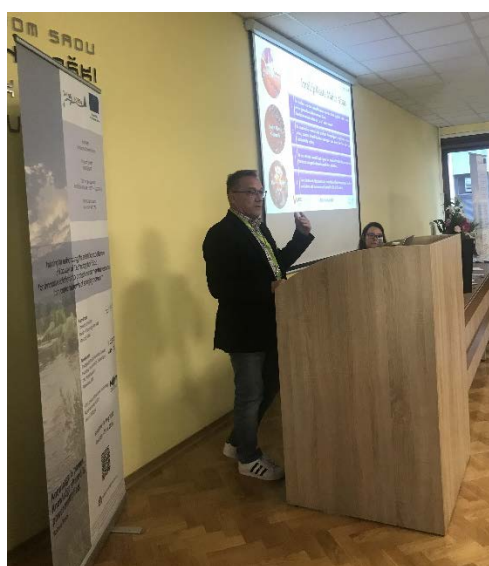


*Workshop session on Twinning projects: Invited lectures of Prof. Dr. Vladimir Beškovski (up) and Dr. Dragana Miladinović (down)*





Workshop session on Twinning projects: Invited lectures of Prof. Dr. Nataša Đurišić Mladenović (left) and Prof. Dr. Đurđa Kerkez (right)



Invited lectures of Dr. Jelena Živančev (left) and Prof. Dr. Ivica Strelec (right)



*Invited lectures of Dr. Nikola Maravić (up) and Dr. Vesna Vasić (down)*



*Invited lecture of Dr. Sanja Panić*



*Oral presentations of registered participants Dr. Marijana Dragosavac (left) and Marija Lješević (right)*





*Oral presentations of registered participants Dr. Dragana Ljubojević Pelić (left) and Dr. Nikolina Novakov (right)*



*Participants of the Workshop session on the ongoing Horizon Twinning projects*



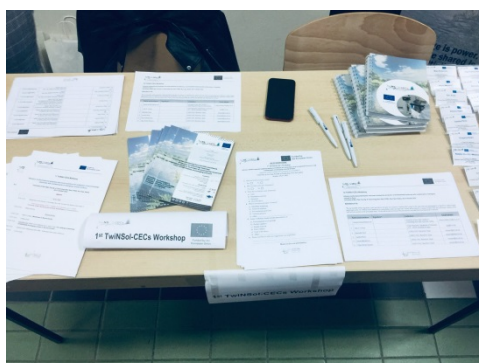
*Lunch on the second day of the Workshop*



*Details from the Workshop poster session*



*Promotional material prepared for the Workshop*



*The Workshop registration desk*

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