ENVIRONMENTAL OCCURRENCE, DISTRIBUTION, AND CHALLENGES OF PFAS: A GLOBAL PERSPECTIVE

Perović M.[1]

[1]Jaroslav Černi Water Institute, Jaroslava Černog 80, 11226 Pinosava Belgrade, Serbia
(e-mail: marija.perovic@jcerni.rs)

Abstract:

Per- and polyfluoroalkyl substances (PFAS) are a rapidly expanding group of synthetic compounds, often referred to as "forever chemicals," due to their exceptional chemical stability and resistance to degradation. These substances are widely used in various products, including cosmetics, textiles, fire-fighting foams, food packaging, and agricultural applications. PFAS are persistent, bioaccumulative, and pose potential health risks, leading to their classification as persistent organic pollutants. The presented research provides an overview of concentration levels and key characteristics of the most prevalent and extensively studied PFAS, such as PFOS and PFOA, which influence their environmental behaviour, aiding in tracing their sources and explaining their long-term presence in the environment. PFAS are found in surface and groundwater at concentrations ranging from ng/L to µg/L. Short-chain PFAS (with up to 8 carbon atoms) are more mobile in surface waters, while long-chain PFAS (with more than 8 carbon atoms) tend to accumulate in sediments and biota. Reviewed research has demonstrated that perfluorinated PFAS are highly stable and resistant to degradation, whereas polyfluorinated substances are less stable and tend to degrade into persistent perfluorinated components. Despite regulations like those under the EU Water Framework Directive and the Stockholm Convention, PFAS contamination remains widespread. Their global distribution is amplified by long-range atmospheric transport and regional industrial hotspots. Traditional wastewater treatment methods have proven largely ineffective at removing PFAS, allowing their continuous discharge into aquatic environments. While some countries have set regulations for PFAS in water, soil, and food products, there is a pressing need for more coordinated global efforts and innovative treatment technologies. This research aims to review the existing literature on the presence, characteristics, fate, and concentrations of PFAS in surface waters and groundwater globally, with an emphasis on understanding the specific traits of these compounds to better trace their sources and predict their transformation in aquatic environments.

Keywords: *PFAS; PFOS; PFOA; water bodies*.

DISC2024

4th International Student Conference

ABSTRACT BOOK

Republic of Serbia
MINISTRY OF SCIENCE,
TECHNOLOGICAL DEVELOPMENT AND INNOVATION

REPUBLIC OF SERBIA
AUTONOMOUS PROVINCE OF VOJVODINA
PROVINCIAL SECRETARIAT FOR HIGHER EDUCATION
AND SCIENTIFIC RESEARCH

DEPARTMENT OF
ENVIRONMENTAL
ENGINEERING AND
OCCUPATIONAL
SAFETY AND HEALTH

4th INTERNATIONAL STUDENT CONFERENCE

DISC2024

Faculty of Technical Sciences
University of Novi Sad

Hybrid event
5th & 6th December, 2024
Novi Sad, Serbia

Organizers:

Department of Environmental Engineering and Occupational Safety and Health
Faculty of Technical Sciences, University of Novi Sad, Serbia

The 4th International Student Conference - DISC2024 is supported by the Ministry of Science, Technological Development and Innovation, Republic of Serbia and the Provincial Secretariat for Higher Education and Scientific Research AP Vojvodina.

CIP - Каталогизација у публикацији
Библиотеке Матице српске, Нови Сад

502(048.3)
331.45/.46(048.3)

INTERNATIONAL Student Conference – DISC2024 (4 ; 2024 ; Novi Sad)
Abstract book [Elektronski izvor] / 4th International Student Conference – DISC2024, hybrid event, 5-6th December 2024, Novi Sad ; [editors Maja Petrović, Ivana Mihajlović, Nevena Živančev]. - Novi Sad : Faculty of Technical Sciences, 2024

Način pristupa (URL):
https://www.izzs.uns.ac.rs/uploads/files/shares/Abstract_Book_DISC2024.pdf. - Opis zasnovan na stanju na dan 24.2.2025. - Nasl. s naslovnog ekrana.

ISBN 978-86-6022-715-9

а) Заштита животне средине -- Апстракти б) Заштита на раду -- Апстракти

COBISS.SR-ID 163666185

Abstract Book

4th INTERNATIONAL STUDENT CONFERENCE

DISC2024

Publisher

Faculty of Technical Sciences

Trg Dositeja Obradovića 6, Novi Sad, Republic of Serbia

Editors

Maja Petrović

Ivana Mihajlović

Nevena Živančev

ISBN

978-86-6022-715-9

Year

2024

PREFACE

Welcome to the Abstract Book for DISC2024 – a forward-thinking collection that captures the synergy of robust academic research and innovative project work. Over the course of this transformative conference, we have witnessed 112 scholarly research contributions alongside 19 inspiring project presentations, each delving into topics critical to shaping our sustainable future. This year's themes include:

- **Environmental Protection and Sustainable Development**
- **Occupational Safety and Health**
- **Strategic Human Resource and Business Management**
- **Sustainable Project Management**
- **Civil Engineering**
- **Education 3.0**

In addition to the main sessions, we were honored to host a special session featuring our distinguished guest, Arijana Filipić from National Institute of Biology, Slovenia. Her captivating presentation, "Mission Possible: Successful Scientific Presentation," provided invaluable insights into delivering impactful and persuasive scientific discourse, setting a high benchmark for academic excellence.

Hosted in the vibrant city of Novi Sad this December, DISC2024 has provided a dynamic forum where experts, practitioners, and emerging scholars converged to exchange ideas, challenge conventional boundaries, and chart new paths in research and practice.

We extend our sincere gratitude to every author, presenter, and mentor whose contributions have enriched this publication. I also wish to recognize our entire organizing team for their remarkable efforts in bringing this event to life. In particular, my heartfelt thanks go to Dr. Nevena Živančev, Dr. Jovana Topalić, MSc. Dunja Istrat and MSc. Tijana Adamov for their visionary leadership and steadfast commitment. Your invaluable contributions have been the cornerstone of this event's success.

As you explore the abstracts and project summaries contained within these pages, we hope you find the insights and innovations presented here as inspiring as they are thought-provoking – fueling future collaborations and breakthroughs in your respective fields.

Looking ahead, we eagerly anticipate welcoming you once again in December 2025 as we continue to build on the success and collaborative spirit of DISC. May your journey of discovery and innovation continue unabated in the coming years.

With warm regards,

Dr. Maja Petrović

Associate Professor and Editor

Scientific and Program Committee:

Dr. Dejan Ubavin, President, University of Novi Sad, Serbia

Dr. Dragana Tomašević Pilipović, Vice-president, University of Novi Sad, Serbia

Dr. Ivan Špánik, Slovak University of Technology in Bratislava, Slovakia
Dr. Friedo Zölzer University of South Bohemia in České Budějovice, Czech Republic
Dr. Killi Uday Kumar, University of South Bohemia in České Budějovice, Czech Republic
Dr. Juraj Ševčík, Palacký University Olomouc, Czech Republic
Dr. João Paulo Teixeira, University of Porto, Portugal
Dr. António Canatário Duarte, Polytechnic Institute of Castelo Branco, Portugal
Dr. Stevo Lavrnić, University of Bologna, Italy
Dr. Jakub Drewnowski, Gdańsk University of Technology, Poland
Dr. Zakhar Maletskyi, Norwegian University of Life Sciences, Norway
Dr. Agnieszka Cuprys, Norwegian University of Life Sciences, Norway
Dr. Mira Čelić, Catalan Institute for Water Research, Spain
Dr. Arijana Filipić, National Institute of Biology, Slovenia
Dr. Viktoria Blanka-Vegi, University of Szeged, Hungary
Dr. Patrick Ssebugere, Makerere University, Uganda
Dr. Christine Kyarimpa, Kyambogo University, Uganda
Dr. Solomon Omwoma Lugas, Jaramogi Oginga Odinga University of Science and Technology, Kenya
Dr. Elizabeth Ndunda, Machakos University, Kenya
Dr. Eliezer Brown Mwakalapa, Mbeya University of Science and Technology, Tanzania
Dr. Fikira Kimbokota, Mkwawa University College of Education, Tanzania
Dr. Ali Hgeig, Nalut University, Libya
Dr. Bojan Jovanovski, University of Applied Sciences, Austria
Dr. Trajče Velkovski, Ss. Cyril and Methodius University in Skopje, North Macedonia
Dr. Jasmina Chaloska, Ss. Cyril and Methodius University in Skopje, North Macedonia
Dr. Radmil Polenakovikj, Ss. Cyril and Methodius University in Skopje, North Macedonia
Dr. Ivona Nuić, University of Split, Croatia
Dr. Aleksandra Anić Vučinić, University of Zagreb, Croatia
Dr. Emina Hadžić, University of Sarajevo, Bosnia and Herzegovina
Dr. Merima Šahinagić-Isović, Dzemal Bijedic University of Mostar, Bosnia and Herzegovina
Dr. Nedim Čelebić, Sarajevo School of Science and Technology, Bosnia and Herzegovina
Dr. Biljana Šćepanović, University of Montenegro, Montenegro
Dr. Aleksandra Petrović, University of Kragujevac, Serbia
Dr. Aleksandra Tubić, University of Novi Sad, Serbia
Dr. Đurđa Kerkez, University of Novi Sad, Serbia
Dr. Bogdana Vujić, University of Novi Sad, Serbia
Dr. Maja Milanović, University of Novi Sad, Serbia
Dr. Igor Peško, University of Novi Sad, Serbia
Dr. Vladimir Mučenski, University of Novi Sad, Serbia
Dr. Andrea Ivanišević, University of Novi Sad, Serbia
Dr. Jelena Ćulibrk, University of Novi Sad, Serbia
Dr. Minja Bolesnikov, University of Novi Sad, Serbia
Dr. Danijela Ćirić Lalić, University of Novi Sad, Serbia
Dr. Ivana Mihajlović, University of Novi Sad, Serbia
Dr. Bojan Batinić, University of Novi Sad, Serbia
Dr. Srđan Kovačević, University of Novi Sad, Serbia
Dr. Zoran Čepić, University of Novi Sad, Serbia

Organizing Committee:

Dr. Maja Petrović, President, University of Novi Sad, Serbia

Dr. Nevena Živančev, Vice-president, University of Novi Sad, Serbia

Dr. Maja Sremački, InoSens d.o.o., Novi Sad, Serbia
Dr. Bojana Zoraja, University of Novi Sad, Serbia
Dr. Jovana Topalić, University of Novi Sad, Serbia
Dr. Miljan Šunjević, University of Novi Sad, Serbia
MSc. Jelena Mirjanić, University of Novi Sad, Serbia
MSc. Jovana Krtinić, University of Novi Sad, Serbia
MSc. Dunja Istrat, University of Novi Sad, Serbia
MSc. Jasmina Naerac, University of Novi Sad, Serbia
MSc. Tijana Adamov, University of Novi Sad, Serbia