# DISC2023

3rd DIFENEW International Student Conference

# ABSTRACT BOOK

# 3rd DIFENEW INTERNATIONAL STUDENT CONFERENCE

# DISC2023

**Faculty of Technical Sciences**
**University of Novi Sad**

**Hybrid event**
**5th December, 2023**
**Novi Sad, Serbia**

**Organizers:**

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

Institute of Analytical Chemistry, Faculty of Chemical and Food Technology
Slovak University of Technology in Bratislava, Slovakia

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# Abstract Book

# 3rd DIFENEW INTERNATIONAL STUDENT CONFERENCE

# DISC2023

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# PREFACE

We are delighted to announce the release of the Abstract Book, showcasing a wealth of outstanding research contributions presented at the 3rd DIFENEW International Student Conference (DISC2023). This conference represents a collaborative effort of two esteemed institutions, the Department of Environmental Engineering and Occupational Safety and Health from the Faculty of Technical Sciences, University of Novi Sad, Serbia, and the Institute of Analytical Chemistry from the Faculty of Chemical and Food Technology, Slovak University of Technology in Bratislava, Slovakia. This significant event is a part of the dissemination activities associated with the Serbian-Slovak bilateral cooperation project titled "Microplastics Impact on the Occurrence of Plasticizers in Surface Water and Effects on Human Health (PLASTICINE) generously supported by the Ministry of Education, Science, and Technological Development of Serbia and the Slovak Research and Development Agency.

At DISC2023, we aim to provide a dynamic platform for participants to engage in the exchange of research interests, innovative ideas, and valuable experiences across a spectrum of vital fields, including Environmental Engineering and Sustainable Development, Occupational Safety and Health, Sustainable Project Management, Civil Engineering and Education 2.0.

We extend our heartfelt gratitude to all authors, co-authors, and their mentors, whose contributions have been instrumental in shaping this conference. We also want to express our appreciation to the dedicated members of the Scientific and Organizing Committees for their unwavering commitment and hard work.

Furthermore, I would like to extend my heartfelt appreciation to the entire organizing team for their outstanding efforts in making this event possible. I am especially grateful to Dr. Maja Sremački, Dr. Nevena Živančev, Dr. Miljan Šunjević and MSc. Tijana Adamov for their exceptional dedication and leadership in orchestrating the entire event. Your contributions have been invaluable, and I am truly thankful for your hard work and commitment.

Looking forward to DISC2024, which will take place in the city of Novi Sad in December 2024, we extend our best wishes to all participants for a year filled with success and enriching experiences.

Warm regards,

Dr. Maja Petrović

Associate Professor

Editor

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# CELLULOSE-DERIVED CARBON MATERIALS: A STUDY OF ISOTHERMS IN MALATHION REMOVAL

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**Abstract:** Pesticides, whether synthetic or natural, are crucial in managing insects, and weeds, and influencing plant growth. However, the widespread use of organophosphates, a highly effective class of chemical pesticides, raises environmental concerns due to their slow biodegradation, resulting in ecosystem and food chain contamination. The inhibitory effect of organophosphates on acetylcholinesterase contributes to various health disorders. Malathion, commonly used for mosquito and insect control in crops and pet care, exhibits gradual decomposition in water and soil, leading to heightened concentrations in discharge areas and potential risks to aquatic organisms and human health. To address the removal of organophosphates, various methods have been explored, with adsorption standing out for its simplicity, cost-effectiveness, and environmental friendliness. Cellulose-derived carbon materials, characterised by porous structures and large surface areas, provide an efficient solution. This study focuses on utilising cellulose-derived carbon materials as an adsorbent for malathion removal, employing SEM, EDX, FTIR, and BET analysis for comprehensive characterisation. The investigation concentrates on malathion adsorption onto cellulose-derived carbon materials, employing four isotherm models: Freundlich, Langmuir, Temkin, and Dubinin-Radushkevich. The experimental data best fit the Freundlich isotherm, indicating a multilayer adsorption mechanism on the heterogeneous surface of carbon materials. The Langmuir isotherm model shows the maximum adsorption capacities for malathion onto materials CDCM3, CDCM6, and CDCM8, respectively, are 38.67 mg $g^{-1}$, 170.20 mg $g^{-1}$, and 254.41 mg $g^{-1}$. The adsorption energy from the Dubinin-Radushkevich isotherm confirms that the adsorption process for malathion removal is physisorption, while the Temkin isotherm suggests an exothermic process. These findings significantly contribute to sustainable strategies for mitigating the environmental impact of organophosphates.

**Keywords:** *Malathion; Cellulose; Carbon materials; Adsorption.*

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