PROMOTING ENVIRONMENTAL SUSTAINABILITY: INNOVATIVE PROJECT FUNDED BY AP VOJVODINA

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Abstract: The Autonomous Province (AP) of Vojvodina in Serbia is blessed with abundant surface water resources yet suffers from significant organic pollution due to inadequate waste management practices. In line with AP Vojvodina's sustainability strategy, this project focuses on developing innovative technologies for managing industrial waste and removing organic pollutants from water resources. The main objective is to create an efficient and environmentally sustainable solution for integrated industrial effluent management and organic pollutant removal in AP Vojvodina. Specific goals include the development of biotechnological procedures for utilizing industrial effluents in the production of xanthan, biopolymer with potential photocatalytic activity for decomposing organic substances in natural waters. By promoting sustainable materials and technologies, the project aims to advance scientific and technological knowledge in biopolymer production and water purification, fostering regional scientific and industrial growth. The project's outcomes are expected to enhance researchers' visibility, facilitate international cooperation, and contribute to the ecological, economic, and social sustainability of AP Vojvodina.

Keywords: Organic pollution; Xanthan production; Biopolymer materials; Photocatalytic activity; Water purification

1. Introduction

The Autonomous Province (AP) of Vojvodina is renowned for its abundant surface water resources, including the Danube, Sava, and Tisa rivers and the Danube-Tisa-Danube canal system. Despite this natural wealth, the region faces a significant environmental

Citation: S.J. Armaković et al., AIDASCO Reviews 2, 1 (2024) 8-11. DOI: https://doi.org/10.59783/aire.2024.48

challenge in the form of organic pollution resulting from inadequate waste management practices. The regional environmental action plan of AP Vojvodina has embarked on a comprehensive sustainability strategy, aware of the importance of safeguarding its water quality and environmental integrity.

As part of this strategy, a concerted effort is being made to develop innovative technologies and protocols to manage industrial waste effectively and mitigate organic pollutants from water resources. This project represents the AP Vojvodina's commitment to environmental protection and sustainable development. By focusing on developing efficient and environmentally sustainable solutions for integrated industrial effluent management and organic pollutant removal, the project seeks to address pressing environmental challenges within the region.

This article overviews the project's goals, methodologies, and expected outcomes. Additionally, we highlight the significance of this endeavor in advancing scientific and technological knowledge, fostering regional development, and promoting international cooperation in environmental protection.

2. Project objectives

General project information

Project title: Application of photocatalytic active polymers biosynthesized on media containing industrial effluents of AP Vojvodina

Participating institutions: Faculty of Sciences, University of Novi Sad, and Faculty of Technology Novi Sad, University of Novi Sad

Funded by: Republic of Serbia, Autonomous Province of Vojvodina, Provincial Secretariat for Science and Technological Development of Vojvodina

Grant ID: 142-451-3166/2023-01/01

The overarching goal of the project is twofold

Biotechnological utilization of industrial effluents: Develop a procedure to harness industrial effluents for producing photocatalytically active biopolymers, specifically xanthan.

Purification of water resources: Use biopolymer materials with photocatalytic activity to eliminate dangerous organic pollutants from natural waters.

Achievements

The project has already made significant strides towards its objectives:

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- Biopolymer synthesis and application: The successful biosynthesis of xanthan on industrial wastewater media highlights the project's commitment to sustainable practices. In addition, the newly synthesized materials' demonstrated photocatalytic activity directs further research toward practical application.
- Publication success: the work on the application of naturally derived photocatalytic xanthan in removing pharmaceutical contaminants from water has been published by A. Bilić et al. [1] in Elsevier's *Catalysis Communications* journal. This original research article showcases the project's scientific merit.
- Conference presentations: The project's findings have been disseminated at international and national conferences [2-5], underscoring its contribution to the scientific community and fostering collaboration on a global scale.

The project continues to push boundaries with ongoing activities, including further synthesis of xanthan using industrial effluents and exploring its photocatalytic activity against selected pharmaceutical compounds.

One of the project's strengths is its commitment to transparency and accessibility. Interested parties can track the project's developments through the dedicated website[1] of the EMOS research group (Figure 1), ensuring the journey toward environmental sustainability remains open to the broader community.

Figure 1. Logo of EMOS research group from the University of Novi Sad, Faculty of Sciences[2]

3. Conclusions

In conclusion, the project "Application of photocatalytic active polymers biosynthesized on media containing industrial effluents of AP Vojvodina" represents a significant step towards addressing the environmental challenges faced by AP Vojvodina. The project has demonstrated a clear commitment to sustainability and environmental stewardship by innovatively developing biotechnological procedures and using photocatalytic materials.

[1] https://emos.armakovic.com/project-funded-by-apv-2023/
[2] https://www.dh.uns.ac.rs/computational-and-analytical-chemistry-of-the-environment/

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The successful biosynthesis of xanthan on industrial wastewater media and its demonstrated photocatalytic activity showcase the project's potential to provide efficient and environmentally sustainable solutions for integrated industrial effluent management and organic pollutant removal. Moreover, the publication success and conference presentations highlight the project's scientific merit and contribution to advancing knowledge in biopolymer production and water purification.

The project will continue to explore the practical application of its findings and further analyze the efficacy of xanthan in removing pharmaceutical contaminants from water. Through ongoing activities and a commitment to transparency and accessibility, the project aims to foster collaboration, promote international cooperation, and contribute to AP Vojvodina's ecological, economic, and social sustainability.

Ultimately, this project's outcomes are expected to have a positive and lasting impact on the region, paving the way for a more environmentally conscious and sustainable future.

Acknowledgments: The authors acknowledge the financial support of the Provincial Secretariat for Science and Technological Development of Vojvodina, Republic of Serbia (Project No. 142-451-3166/2023-01/01).

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