

ISSN 2414-5955 (Print)  
ISSN 2522-4417 (Online)

**Editor-in-Chief**  
**Myroslav Malovanyy**

# Environmental Problems

# Екологічні проблеми

**Volume 6 • Number 3**



LITTERIS ET ARTIBVS  
2 0 2 1

## Founders

Lviv Polytechnic  
National University

Odessa State  
Environmental University

Kremenchuk Mykhailo Ostohradskyi  
National University

Ivano-Frankivsk National Technical  
University of Oil and Gas

Vinnitsia National  
Technical University

Kyiv National University of  
Construction and Architecture

# Environmental Problems

Volume 6 • Number 3

2 0 2 1

## Editorial Board

*Editor-in-Chief:*

Prof. **Myroslav Malovanyy**, Lviv Polytechnic National University, Ukraine

*Deputy editor:*

Prof. **Ihor Petrushka**, Lviv Polytechnic National University, Ukraine

*Responsible secretary:*

Dr. **Kateryna Petrushka**, Lviv Polytechnic National University, Ukraine

Dr. **Gilbert Ahamer**, Austria

Dr. **Markus Ahnert**, Germany

Prof. **Yaroslav Adamenko**, Ukraine

Prof. **Elzbieta Plaza**, Sweden

Prof. **Krzysztof Józwiakowski**, Poland

Prof. **Inga Bochoidze**, Georgia

Prof. **Gintaras Denafas**, Lithuania

Prof. **Bogdan Dlugogorski**, Australia

Prof. **Maria Gonta**, Moldova

Prof. **Olga Kordas**, Sweden

Prof. **Beata Kowalska**, Poland

Prof. **Dariusz Kowalski**, Poland

Prof. **Hristo Krachunov**, Bulgaria

Prof. **Galina Krusir**, Ukraine

Prof. **Heinz Leuenberger**, Switzerland

Prof. **Oleh Mandryk**, Ukraine

Prof. **Jun-ichi Matsushita**, Japan

Prof. **Oleksandr Moroz**, Ukraine

Prof. **Oleg Nagursky**, Ukraine

Prof. **Volodymyr Nykyforov**, Ukraine

Prof. **Tri Nguyen-Quang**, Canada

Prof. **Vasyl Petruk**, Ukraine

Prof. **Roman Petrus**, Poland

Prof. **Tamerlan Safranov**, Ukraine

Prof. **Sergiy Stepanenko**, Ukraine

Prof. **Volodymyr Shmandij**, Ukraine

Prof. **Tsitsino Turkadze**, Georgia

Prof. **Olena Voloshkina**, Ukraine

Prof. **Jolanta Warchol**, Poland

### Founders

Lviv Polytechnic National University  
Odessa State Environmental University  
Kremenchuk Mykhailo Ostohradskyi National University  
Ivano-Frankivsk National Technical University of Oil and Gas  
Vinnytsia National Technical University  
Kyiv National University of Construction and Architecture

### Address for contacts:

Lviv Polytechnic National University  
12, S. Bandery Str., Lviv, 79013, Ukraine  
e-mail: eplviv.journal@gmail.com. Web-site: <http://science.lpnu.ua/ep>

### Lviv Polytechnic Publishing House

4, F. Kolessy Str., Lviv, 79013, Ukraine  
Tel.: +38 032 258 4100  
vlp@vlp.com.ua; <http://vlp.com.ua>

### Printing Center of Lviv Polytechnic Publishing House

4, F. Kolessy Str., Lviv, 79013, Ukraine  
Tel.: +38 032 258 4100

© Lviv Polytechnic National University, 2021



Науковий журнал  
"Екологічні проблеми"  
№ 3 (21) • 2021

Виходить чотири рази на рік з 2016 року.

### Засновники

Національний університет "Львівська політехніка"  
Одеський державний екологічний університет  
Кременчуцький національний університет  
імені Михайла Остроградського  
Івано-Франківський національний технічний університет нафти і газу  
Вінницький національний технічний університет  
Київський національний університет будівництва і архітектури

### Контактна адреса:

Національний університет "Львівська політехніка"  
вул. С. Бандери, 12, Львів, 79013, Україна  
e-mail: eplviv.journal@gmail.com. Сайт: <http://science.lpnu.ua/ep>

Мова видання англійська.

<https://doi.org/10.23939/ep2021.03>

Журналу присвоєно індекс DOI <https://doi.org/10.23939/ep>

Свідоцтво про державну реєстрацію  
друкованого засобу масової інформації Серія KB № 22284-12184P

Журнал входить до переліку фахових видань України (категорія Б)  
(наказ МОН України від 17.03.2020 р. № 409)

Рекомендувала Вчена рада  
Національного університету "Львівська політехніка"  
(протокол № 70 від 23.02.2021 р.)

ISSN 2414-5955 (Print)

ISSN 2522-4417 (Online)

© Національний університет "Львівська політехніка", 2021

# CONTENTS

- 125 Iryna Rusyn, Vasyl Dyachok**  
Wetland meadows of *Carex acutiformis*  
as a source of bioelectricity
- 130 Inesa Loyeva,**  
**Salem Rabeea Bazar,**  
**Oleksii Burhaz, Olena Vladymyrova**  
Methods of comprehensive statistical analysis  
of agglomeration atmospheric air pollution
- 135 Yelizaveta Chernysh, Shtepa Vladimir,**  
**Igor Roy, Viktoriia Chubur,**  
**Polina Skvortsova,**  
**Ivlieva Anastasia, Dmitry Danilov**  
The potential of organic waste as a substrate  
for anaerobic digestion in Ukraine: trend definitions  
and environmental safety of the practices
- 145 Igor Volchyn, Liudmyla Haponych,**  
**Vladislav Bizek**  
Emissions of sulfur dioxide  
and dust at coal power plants of Ukraine
- 154 Valeriy Mykhaylenko, Ruslan Havryliuk,**  
**Mykola Blyzniuk, Mait Kriipsalu, Michael Hoffmann,**  
**Gintaras Denafas, Anastasiia Sholokhova,**  
**William Hogland, Nataliia Nauchu, Dmytro Gulevets**  
Acquiring practice in environmental and social impact  
assessment: case study of Lviv city dumpsite, Ukraine
- 168 Mariia Korbut , Myroslav Malovanyy,**  
**Kateryna Petrushka, Wojciech Lutek**  
Popularization of the organic component composting  
of household waste among the population
- 174 Margaryta Radomska, Victoria Kovalska,**  
**Grace Titilope Oyewole**  
The assessment of light pollution in the city of Kyiv
- 181 Vira Sabadash, Oksana Liuta, Jaroslaw Gumnitsky**  
Investigation of the process  
of fluoride ions adsorption by natural sorbents
- 188 Oleg Mandryk, Liubomyr Poberezhny,**  
**Liubov Poberezhna, Oksana Maniuk, Mykhailo Maniuk**  
Risk analysis of natural gas transportation processes



## ANNIVERSARY OF PROFESSOR, DOCTOR OF TECHNICAL SCIENCES J. GUMNITSKY



Professor Jaroslav Gumnytsky – Doctor of Technical Sciences, Professor of the Department of Ecology and Sustainable Environmental Management, Academician of the Ukrainian Ecological Academy of Sciences celebrates his 80<sup>th</sup> birthday. Professor J. Gumnytsky has been working at the Lviv Polytechnic University for 58 years, immediately after graduating with honours in 1963.

In 1971 he defended his dissertation, and in 1986 – his doctoral dissertation at the Moscow State Academy of Fine Chemical Technology named after M. V. Lomonosov and in 1989 he was awarded the title of professor at the Department of Processes and Apparatus of Chemical Production. In 1987 he was elected head of the Department of Processes and Apparatus of Chemical Production. He was the organizer of the opening at Lviv Polytechnic in 1991 the environmental specialty and enrollment of students in this specialty. Given the

specifics of the Department of Processes and Apparatus of Chemical Production, its scientific and pedagogical potential (7 doctors, professors), scientific and technical developments, much of which was related to environmental technologies, it was decided to organize environmental specialties at this department. The initiative of the head of the department was supported by the administration and the Ministry of Education and in 1991 the first recruitment for the specialty “Ecology and Environmental Protection” was organized. The name of the department “Processes and Apparatus of Chemical Production” was changed to “Department of Chemical Engineering and Industrial Ecology”. Scientific research of the Department of Chemical Engineering and Industrial Ecology was mainly ecological, which confirmed the correctness of the development of environmental education and science.

Prof. Gumnytsky J. M. successfully manages doctoral and postgraduate studies. Under his guidance and advice, 6 doctoral and 26 candidate dissertations were defended. He was the organizer of the opening of the specialty “Processes and equipment of chemical technology” in the specialized scientific council for the defence of doctoral and master's theses (since 1987). In 1991–1997 he was a member of the expert council of the High Attestation Commission, from 2002 to 2011 – chairman of the specialized scientific council D35.052.09. He is currently the scientific secretary of this council, and a member of the specialized scientific council K35 052.22 for the defence of PhD theses in the specialty “Environmental Safety”. For 10 years he was a member of the commission of the Ministry of Education and Science of Ukraine in the field of “Environmental Protection”.

He was awarded by Diplomas of the Minister of Education and Science of Ukraine, the award of the Rector of the Lviv Polytechnic National University for success in scientific and pedagogical work. He has the title of “Excellence in Education” (2014). In addition, he was awarded the Diploma of the Minister of Education of Poland and the Diploma and Medal of Czestochowa Polytechnic (Poland) for a series of lectures on environmental protection and the organization of the Department of Ecology.

