University of Belgrade
Technical Faculty in Bor
Mining and Metallurgy
Institute Bor

56th International October Conference on Mining and Metallurgy

PROCEEDINGS

Editors:
Ljubiša Balanović
Dejan Tanikić

IOC 2025
International October Conference

22-25 October 2025,
Bor Lake, Serbia

University of Belgrade
Technical Faculty in Bor
Mining and Metallurgy
Institute Bor

56th International October Conference on Mining and Metallurgy

PROCEEDINGS

Editors:
Ljubiša Balanović
Dejan Tanikić

IOC 2025
International October Conference

22-25 October 2025,
Bor Lake, Serbia

PROCEEDINGS,

56th INTERNATIONAL OCTOBER CONFEERNCE

on Mining and Metallurgy

Editors:

Prof. dr Ljubiša Balanović

Prof. dr Dejan Tanikić

University of Belgrade - Technical Faculty in Bor

Technical Editors:

MSc Miljan Marković

MSc Kristina Božinović

University of Belgrade - Technical Faculty in Bor

Proceedings cover design:

MSc Aleksandar Cvetković,

University of Belgrade - Technical Faculty in Bor

Publisher: University of Belgrade - Technical Faculty in Bor

For the publisher: Dean Prof. dr Dejan Tanikić

Circulation: 200 copies

Publication Place, Year: Bor, 2025

Printed by "*GRAFIKA GALEB DOO" NIŠ, 2025*

CIP - Каталогизација у публикацији Народна библиотека Србије, Београд

622(082)(0.034.2)
669(082)(0.034.2)

INTERNATIONAL October Conference on Mining and Metallurgy (56 ; 2025 ; Bor Lake)
Proceedings [Elektronski izvor] / 56th International October Conference on Mining and Metallurgy - IOC 2025, 22-25 October, 2025, Bor Lake, Serbia ; [organized by] University of Belgrade, Technical Faculty in Bor and Mining and Metallurgy Institute Bor ; editors Ljubiša Balanović, Dejan Tanikić. - Bor : University of Belgrade, Technical Faculty, 2025 (Niš : Grafika Galeb). - 1 USB fleš memorija ; 1 x 1 x 5 cm

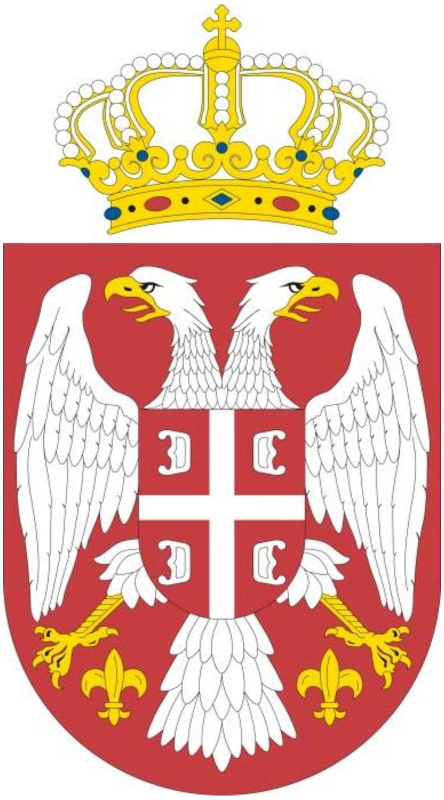
Sistemski zahtevi: Nisu navedeni. - Nasl. sa naslovne strane dokumenta. - Tiraž 200. - Preface / Ljubiša Balanović. - Bibliografija uz svaki rad.

ISBN 978-86-6305-164-5

a) Рударство -- Зборници b) Металургија -- Зборници

COBISS.SR-ID 177493257

Bor Lake, Serbia, October 22-25, 2025



The conference is financially supported by
The Ministry of Science, Technological
Development and Innovation
of the Republic of Serbia

Platinum Donors

HBIS SERBIA

SERBIA ZIJIN MINING

Gold Sponsor

DPM METALS

Gold Donors

SERBIA ZIJIN COPPER DOO BOR

Sevojno VALJAONICA BAKRA COPPER MILL

Silver Donor

MC LABOR

Exhibitions

indemak®

Labtim

KRUG
KRUG INTERNATIONAL LTD.

MERIS

Altium

metalurg

FUGRO

ANALYSIS
LABORATORY EQUIPMENT

LOLA INSTITUT

Tescan

μikrolux
www.mikrolux.hr

Trokuttest Group
Srbija

novos
partnership through science

Ruirui Tech

MDPI

ВИНАРИЈА МАНАСТИРА
БУКОВО

Donor of official opening

Epiroc

Friends of the Conference

MESSER
Gases for Life

CHINA-SERBIA
JOINT LABORATORY
ON GREEN STEEL
MANUFACTURING
HBIS and University of Belgrade

THE FOUNDATION
'B.SC. ENG. BOŠKO INJAC'

SCIENTIFIC COMMITTEE

ORGANIZING COMMITTEE

Prof. Dr Ljubiša Balanović, Full Professor (UB TF Bor) – president

Prof. Dr Radoje Pantović, Full Professor (UB TF Bor) – vice-president

Dr Ana Kostov, Principal Research Fellow (MMI Bor) – vice-president

Dr Ivana Marković, Full Professor (UB TF Bor)

Prof. Dr Jovica Sokolović, Full Professor (UB TF Bor)

Dr Maja Nujkić, Associate Professor (UB TF Bor)

Dr Žaklina Tasić, Associate Professor (UB TF Bor)

Dr Milan Gorgievski, Full Professor (UB TF Bor)

Dr Ana Radojević, Associate Professor (UB TF Bor)

Dr Тања Калиновић, Associate Professor (UB TF Bor)

Dr Dejan Petrović, Associate Professor (UB TF Bor)

Dr Jelena Ivaz, Associate Professor (UB TF Bor)

Dr Anđelka Stojanović, Associate Professor (UB TF Bor)

Dr Uroš Stamenković, Assistant Professor (UB TF Bor)

Dr Jasmina Petrović, Assistant Professor (UB TF Bor)

Dr Vladimir Nikolić, Assistant Professor (UB TF Bor)

Milan Nedeljković, Assistant (UB TF Bor)

Milijana Mitrović, Assistant (UB TF Bor)

Marina Marković, Assistant (UB TF Bor)

Kristina Božinović, Assistant (UB TF Bor)

Milica Zdravković, Assistant (UB TF Bor)

Miljan Marković, Assistant (UB TF Bor)

Pavle Stojković, Assistant (UB TF Bor)

Avram Kovačević, Assistant (UB TF Bor)

Sandra Vasković, English Lecturer (UB TF Bor)

Oliver Marković, IT service (UB TF Bor)

Bojana Janković, Accountant (UB TF Bor)

LIST OF REVIEWERS

Prof. Dr Ridvan Yamanoglu, Kocaeli University (Turkey)

Prof. Dr Peizhong Feng, School Materials Science and Physics, China University of Mining and Technology (China)

Prof. Dr Srećko Stopić, IME Process Metallurgy and Metal Recycling, RWTH Aachen University (Germany)

Prof. Dr Nebojiša Tadić, University of Montenegro - Faculty of Metallurgy and Technology (Montenegro)

Dr Aleksandra Mitovski, Engineering Dobersek GmbH (Germany)

Prof. Dr Žarko Radović, University of Montenegro - Faculty of Metallurgy and Technology (Montenegro)

Prof. Dr Ljubiša Balanović, University of Belgrade - Technical Faculty in Bor (Serbia)

Prof. Dr Milan Gorgievski, University of Belgrade - Technical Faculty in Bor (Serbia)

Prof. Dr Jan Vreštal, Masaryk University, Centre for Nanotechnology and Microtechnology (Czech Republic)

Prof. Dr Claire Utton, University of Sheffield, Department of Materials Science and Engineering (UK)

Prof. Dr Marija Petrović Mihajlović, University of Belgrade - Technical Faculty in Bor (Serbia)

Doc. Dr Jelena Ivaz, University of Belgrade - Technical Faculty in Bor (Serbia)

Prof. Dr Radoje Pantović, University of Belgrade - Technical Faculty in Bor (Serbia)

Prof. Dr Miodrag Banješević, University of Belgrade - Technical Faculty in Bor (Serbia)

Dr Danijel Kržanović, Mining and Metallurgy Institute Bor (Serbia)

Dr Predrag Stolić, University of Belgrade - Technical Faculty in Bor (Serbia)

Dr Vladan Marinković, Mining and Metallurgy Institute Bor (Serbia)

Prof. Dr Saša Stojadinović, University of Belgrade - Technical Faculty in Bor (Serbia)

Doc. Dr Ana Simonović, University of Belgrade - Technical Faculty in Bor (Serbia)

Doc. Dr Dejan Petrović, University of Belgrade - Technical Faculty in Bor (Serbia)

Dr Dragana Medić, University of Belgrade - Technical Faculty in Bor (Serbia)

Prof. Dr Milan Trumić, University of Belgrade - Technical Faculty in Bor (Serbia)

Prof. Dr Jovica Sokolović, University of Belgrade - Technical Faculty in Bor (Serbia)

Prof. Dr Ivana Marković, University of Belgrade - Technical Faculty in Bor (Serbia)

Prof. Dr Maja Trumić, University of Belgrade - Technical Faculty in Bor (Serbia)

Dr Dejan Todorović, Institute for Technology of Nuclear and Other Minerel Raw Materials (Serbia)

Prof. Dr Zoran Štirbanović, University of Belgrade - Technical Faculty in Bor (Serbia)

Prof. Dr Vesna Grekulović, University of Belgrade - Technical Faculty in Bor (Serbia)

Prof. Dr Dejan Tanikić, University of Belgrade - Technical Faculty in Bor (Serbia)

Prof. Dr Dominika Jendrzejczyk-Handzlik, AGH University of Science and Technology in Kraków, Faculty of Non-Ferrous Metals (Poland)

Prof. Dr Grozdanka Bogdanović, University of Belgrade - Technical Faculty in Bor (Serbia)

Prof. Dr Dragan Manasijević, University of Belgrade - Technical Faculty in Bor (Serbia)

Prof. Dr Milan Radovanović, University of Belgrade - Technical Faculty in Bor (Serbia)

Dr Vesna Conić, Mining and Metallurgy Institute Bor (Serbia)
Dr Marija Korać, University of Belgrade - Faculty of Technology and Metallurgy (Serbia)
Dr Sanja Martinović, University of Belgrade - Institute of Chemistry, Technology and Metallurgy (Serbia)
Doc. Dr Uroš Stamenković, University of Belgrade - Technical Faculty in Bor (Serbia)
Dr Jasmina Petrović, University of Belgrade - Technical Faculty in Bor (Serbia)
Prof. Dr Srba Mladenović, University of Belgrade - Technical Faculty in Bor (Serbia)
Prof. Dr Saša Marjanović, University of Belgrade - Technical Faculty in Bor (Serbia)
Dr Viša Tasić, Mining and Metallurgy Institute Bor (Serbia)
Prof. Dr Junxue Zhao, School of Metallurgical Engineering, Xian University of Architecture and Technology (China)
Prof. Dr Miljana Radivojević, Institute of Archaeology, University College London (UK)
Prof. Dr Milena Premović Zečević, University of Priština, Faculty of Technical Science (Serbia)
Dr Ana Alil, University of Belgrade - Institute of Chemistry, Technology and Metallurgy (Serbia)
Prof. Dr Đorđe Nikolić, University of Belgrade - Technical Faculty in Bor (Serbia)
Prof. Dr Velimir Radmilović, University of Belgrade - Faculty of Technology and Metallurgy (Serbia)
Prof. Dr Tatjana Volkov-Husović, University of Belgrade - Faculty of Technology and Metallurgy (Serbia)
Prof. Dr Žaklina Tasić, University of Belgrade - Technical Faculty in Bor (Serbia)
Prof. Dr Tanja Kalinović, University of Belgrade - Technical Faculty in Bor (Serbia)
Dr Jelena Jordanovć, University of Belgrade - Technical Faculty in Bor (Serbia)
Prof. Dr Maja Nujkić, University of Belgrade - Technical Faculty in Bor (Serbia)
Prof. Dr Milica Veličković, University of Belgrade - Technical Faculty in Bor (Serbia)
Prof. Dr Snežana Milić, University of Belgrade - Technical Faculty in Bor (Serbia)
Dr Jelena Kalinović, University of Belgrade - Technical Faculty in Bor (Serbia)
Doc. Dr Ana Radojević, University of Belgrade - Technical Faculty in Bor (Serbia)
Dr Dragana Božić, Mining and Metallurgy Institute Bor (Serbia)
Prof. Dr Dejan Riznić, University of Belgrade - Technical Faculty in Bor (Serbia)
Dr Vaso Manojlović, University of Belgrade - Faculty of Technology and Metallurgy (Serbia)
Prof. Dr Predrag Đorđević, University of Belgrade - Technical Faculty in Bor (Serbia)
Dr Emina Požega, Mining and Metallurgy Institute Bor (Serbia)
Dr Vladan Ćosović, University of Belgrade, Institute of Chemistry, Technology and Metallurgy (Serbia)
Prof. Dr Duško Minić, University of Priština, Faculty of Technical Science (Serbia)

TABLE OF CONTENTS

Plenary Lectures

Invited Lectures

Conference Papers

Geology and Mining

Mineral Processing and Recycling

Extractive Metallurgy and Process Innovations

Alloys, Composites, and Advanced Materials

Technology and Energy

Environmental Protection, Remediation and Risk Assessment

Industrial Management, Digitalization and Quality Control

Abstracts

The 56th International October Conference on Mining and Metallurgy
22-25 October 2025, Bor Lake, Bor, Serbia
www.ioc.tfbor.bg.ac.rs

DOI: 10.5937/IOC25655K
Original scientific paper

ASSESSMENT OF ELEMENT ACCUMULATION EFFICIENCY IN PLANT PARTS USING BIOLOGICAL FACTOR ANALYSIS

Jelena Kalinović[1a], Tanja Kalinović[1b], Ana Radojević[1c], Snežana Šerbula[1d], Jelena Jordanović[1e]

[1] Technical Faculty in Bor, University of Belgrade, V.J. 12, 19210 Bor, Serbia
[1a] jkalinovic@tfbor.bg.ac.rs, 0000-0003-0088-2683
[1b] tkalinovic@tfbor.bg.ac.rs, 0000-0003-0161-0065
[1c] aradojevic@tfbor.bg.ac.rs, 0000-0003-3138-154X
[1d] ssherbula@tfbor.bg.ac.rs, 0000-0001-7560-4130
[1e] jjordanovic@tfbor.bg.ac.rs, 0000-0002-8145-640X

Abstract
Understanding the processes of accumulation and translocation of potentially toxic elements through the soil-plant system is crucial for environmental protection and pollution risk assessment. The aim of this study is to investigate the possibility of accumulation and translocation of potentially toxic elements in Crataegus spp. and to assess the applicability of this plant species in phytoremediation.

***Keywords**: Crataegus spp., Biological factor analysis, potentially toxic elements*

1. INTRODUCTION

Potentially toxic elements in the environment can originate from natural sources, such as volcanic activities, weathering of metal-rich rocks, erosion and other geological processes, as well as from human activities, such as industrial processes, urban wastewaters, agriculture, etc. [1]. Mining represents a significant source of environmental pollution. Once toxic elements enter the soil, they can be accumulated by crops, including vegetables and other plants. The uptake of potentially toxic elements by plants from the soil is an important pathway by which toxic elements can enter the food chain. Understanding the translocation and accumulation of elements in soils and plants is of great importance for environmental protection [2]. Phytoremediation is an environmentally friendly strategy to improve contaminated areas [3].

This study aims to evaluate the possibility of accumulation and translocation of potentially toxic elements in different parts of *Crataegus* spp. and its potential for use in phytoremediation.

2. EXPERIMENTAL

Crataegus spp., a widespread perennial deciduous shrub, was selected for investigation. The plant material (roots and leaves) and the soil from the root zone were sampled during the plant's harvest period, before natural leaf fall (September to mid-October). The sampled plants were healthy with no visible signs of disease or pests. The total of 14 sampling sites were distributed into eight sampling zones (urban-industrial (UI), urban (U), suburban (SU), industrial (I1, I2, I3, I4 and I5), rural (R1 and R2), tourist (T), traffic (TR) and background (B)). The locations of the sampling sites were selected in relation to the copper smelter, open pits, ore waste heaps, and the flotation tailing ponds. The B zone was located in the rural settlement of Gornjane, 17 km from the copper smelter, which was not affected by anthropogenic pollution [4,5]. A detailed description of the sampling procedure and the sampling sites can be found in Kalinović *et al*. [5].

Biological factor analysis is used to assess the ability of plants to accumulate potentially toxic elements from the soil and translocate them through the plant. Biological factor analysis is crucial in revealing the remarkable capabilities of plants, such as their potential for environmental remediation. The bioconcentration factor (BCF) provides information about a plant's ability to accumulate elements from the soil in the roots. The factor is calculated using equation (1) [1,6,7]:

$$BCF = C_r/C_s \quad (1)$$

where C_r is the element concentration in the plant root (mg/kg); C_s is the element concentration in the soil (mg/kg). If the BCF value is greater than 1, the accumulation of elements in the plant roots is effective [1,6,7].

The translocation factor (TF) indicates the ability of plants to transport elements from the roots to the leaves (i.e. to allow them to enter the food chain). The factor is calculated according to the following equation (2) [1,6,7]:

$$TF = C_{wl}/C_r \quad (2)$$

where C_{wl} is the element concentration in the washed leaves (mg/kg); C_r is the element concentration in the plant root (mg/kg). If the TF value is greater than 1, the elements are effectively translocated within the plant [1,6,7].

The biological absorption coefficient (BAC) is calculated by the equation (3) [8,9]:

$$BAC = C_{wl}/C_s \quad (3)$$

where C_{wl} is the element concentration in the washed leaves (mg/kg); C_s is the element concentration in the soil (mg/kg).

Depending on the BAC values, the absorption of elements in leaves from the soil can be intensive (BAC in the range of 10–100), strong (1.0–10.0), intermediate (0.1–1.0), weak (0.01–0.10), and very weak absorption (0.001– 0.010) [10]. According to Nouri *et al*. [11], plants suitable for phytoextraction generally have the values of BCF>1 and TF>1, whereas, plants suitable for phytostabilisation have BCF>1 and TF<1.

3. RESULTS AND DISCUSSION

The BCFs for As, Cd, Cu and Pb are shown in Table 1.

Table 1. Bioconcentration factor (BCF) for As, Cd, Cu and Pb

Site	As	Cd	Cu	Pb
UI	<0.006	<0.054	0.004	<0.008
U	<0.010	<0.085	0.006	<0.011
SU	<0.014	<0.103	0.007	<0.010
I1	<0.050	<0.435	0.032	<0.030
I2	<0.024	<0,299	0.099	0.039
I3	<0.057	<0.108	0.012	<0.015
I4	<0.025	<0.255	0.007	<0.025
I5	<0.029	<0.192	0.010	<0.027
R1	<0.012	0.730	0.043	<0.026
R2	0.011	0.413	0.040	0.026
T1	<0.008	<0.048	0.005	<0.012
T2	<0.007	0.267	0.049	0.055
TR	<0.086	<0.209	0.012	<0.016
B	<0.103	/	0.079	<0.053

The BCF values with the sign "<" are obtained by replacing the missing element concentration by the limit of determination of the element in the root (the LD for As and Pb is 1 mg/kg; for Cd 0.2 mg/kg); "/" Both values are missing in the calculation of the BCF.

The BCF values for all the analysed elements were below 1 at each sampling site (except at site B for Cd), indicating that *Crateaegus* spp. have a low ability to accumulate these elements in the roots from the soil.

Regardless of this, a significant correlation between the Cu concentrations in the soil and root samples (Table 2) indicates a possible accumulation of a certain amount of Cu from the soil. It was not possible to calculate the correlation for the other elements, as their concentrations were below the limit of determination for most samples.

Table 2. Spearman correlation coefficient

Element	Soil–Root	Root–Washed leaves	Soil–Washed leaves
As	/	/	0.727*
Cd	/	/	/
Cu	0.582*	0.820**	0.749**
Pb	/	/	0.429

** Correlation is significant at the 0.01 level (2-tailed); * Correlation is significant at the 0.05 level (2-tailed);
"/" The correlation coefficient was not calculated for the elements for which the number of samples is ≤5.

The TFs for As, Cd, Cu and Pb are shown in Table 3. According to the obtained values, the TFs for the analysed elements were higher than 1 in most cases (except at the sites R1, R2 and T2 for Cd and at the site T2 for Cu). These high TF values indicate that *Crataegus* spp. effectively translocated the elements from the roots to the leaves. The significant and positive correlation between the Cu concentrations in the roots and the washed leaves is in favour of an effective translocation. However, it was not possible to calculate the correlations for the other elements as their concentrations were below the limit of determination for most samples.

Table 3. Translocation factor (TF) for As, Cd, Cu and Pb

Site	As	Cd	Cu	Pb
UI	**>29.977**	**>2.596**	**9.225**	**>28.383**
U	**>2.463**	/	**3.588**	**>5.443**
SU	**>1.524**	/	**4.272**	**>3.902**
I1	**>1.474**	/	**5.279**	**>2.222**
I2	**>1.427**	/	**1.223**	**2.325**
I3	/	/	**3.286**	**>2.224**
I4	**>1.829**	/	**5.885**	**>4.712**
I5	**>2.027**	/	**4.813**	**>4.618**
R1	**>4.868**	0.761	**2.282**	**>10.325**
R2	**6.195**	0.694	**3.128**	**18.255**
T1	**>1.705**	/	**6.583**	**>8.549**
T2	**>2.628**	<0.713	0.768	**1.522**
TR	/	/	**1.152**	**>1.775**
B	/	/	**2.143**	**>1.198**

The values given in bold represent TF>1; The TF values with the sign ">" are obtained by replacing the missing element concentration by the limit of determination of the element in the root (the LD for As and Pb is 1 mg/kg; for Cd 0.2 mg/kg); "/" Both values are missing in the calculation of TF.

The BAC values for As, Cd, Cu and Pb are shown in Table 4. The determined values show a weak to intermediate absorption of the analysed elements from the soil into the leaves. A certain amount of the elements can also be absorbed from the air via the leaves. However, the significant and positive correlations between the elements in the soil and the washed leaves (except for Cd) shown in Table 2 confirm that *Crataegus* spp. absorb elements from the soil into the leaves via the roots to a certain extent. According to Baker's classification [12], *Crataegus* spp. could be categorised as an excluder due to the BAC values for As, Cd, Cu and Pb, which were below 1. Based on the values obtained for BAC and TF, it could be said that *Crataegus* spp. is unsuitable for phytoextraction or phytostabilisation of the studied elements. However, it is the plant that has adapted to the environment with different levels of pollution.

Table 4. Bioaccumulation factor (BAC) for As, Cd, Cu and Pb

Site	As	Cd	Cu	Pb
UI	0.182	0.140	0.041	0.237
U	0.025	<0.085	0.022	0.063
SU	0.023	<0.103	0.030	0.041
I1	0.075	<0.435	0.170	0.068
I2	0.036	<0.299	0.121	0.090
I3	<0.057	<0.108	0.041	0.035
I4	0.046	<0.255	0.042	0.121
I5	0.059	<0.192	0.049	0.125
R1	0.062	0.555	0.098	0.273
R2	0.067	0.286	0.125	0.472
T1	0.015	<0.048	0.033	0.107
T2	0.021	<0.191	0.038	0.084
TR	<0.086	<0.209	0.014	0.029
B	<0.103	/	0.170	0.064

The BAC values with the sign "<" are obtained by replacing the missing element concentration with the limit of determination of the element in the washed leaves (the LD for As is 1 mg/kg; for Cd 0.2 mg/kg); "/" Both values are missing in the calculation of BAC.

4. CONCLUSIONS

In this study, the accumulation and translocation of potentially toxic elements in *Crataegus* spp. were analysed. The results showed that this plant species has a low ability to accumulate As, Cd, Cu and Pb from the soil into the roots. In addition, *Crataegus* spp. has a limited potential for the translocation of these elements to the aboveground parts of the plant. Therefore, *Crataegus* spp. is not considered suitable for phytoextraction or phytostabilisation purposes.

ACKNOWLEDGEMENTS

The authors are grateful to the Ministry of Education, Technological development, and Innovations of the Republic of Serbia for financial support, within the funding of the scientific research at the University of Belgrade, Technical Faculty in Bor (No. 451-03-137/2025-03/ 200131).

REFERENCES

[1] A. Cakaj, K. Drzewiecka, A. Hanć, M. Lisiak-Zielińska, L. Ciszewska, M. Drapikowska, Environ. Res., 256 (2024) 119222.
[2] Z.J. Shen, D.C. Xu, Y.S. Chen, Z. Zhang, Ecotoxicol. Environ. Saf., 143 (2017) 19-27.
[3] X. Yan, J. An, Y. Yin, C. Gao, B. Wang, S. Wei, Sci. Total Environ., 803 (2022) 149871.
[4] J.V. Kalinovic, S.M. Serbula, A.A. Radojevic, J.S. Milosavljevic, T.S. Kalinovic, M.M. Steharnik, Environ. Monit. Assess., (2019) 191:15.
[5] J.V. Kalinović, S.M. Šerbula, T.S. Kalinović, A.A. Radojević, J.S. Jordanović, Hem. Ind., 78 (3) (2024) 265-279.
[6] Y. Du, Z. Tian, Y. Zhao, X.Wang, Z. Ma, C. Yu, J. Environ. Manage., 351 (2024) 119838.
[7] M. Haseeb, S. Iqbal, M. B. Hafeez, H. Baloch, N. Zahra, M. Mumtaz, G. Ahmad, E. M. Fatima, Jahanzaib, S. Raza, A. Raza, M. S. Saddiq, J. Agr. Food Res. 14 (2023) 100741.
[8] S. Bravo, J. A. Amorós, C. Pérez-de-los-Reyes, F. J. García, M. M. Moreno, M. Sánchez-Ormeño, P. Higueras, J. Geochem. Explor., 174 (2017) 79-83.
[9] Kabata-Pendias, A. Trace Elements in Soils and Plants, CRC Press, Boca Raton, (2011).
[10] P.J.C. Favas, J. Pratas, M.N.V. Prasad, Int. J. Environ. Sci. Technol., 10 (2013) 809-826.
[11] J. Nouri, B. Lorestani, N. Yousefi, N. Khorasani, A. H. Hasani, F. Seif, M. Cheraghi, Environ. Earth Sci., 62 (2011) 639-644.
[12] A.J.M. Baker, J. Plant Nutr., 3 (1-4) (1981) 643-654.

IOC M&M 2025

УНИВЕРЗИТЕТ У БЕОГРАДУ
ТЕХНИЧКИ ФАКУЛТЕТ У БОРУ
1961

INSTITUT
BOR

ISBN-978-86-6305-164-5