

EMEC21

21st European Meeting on Environmental Chemistry
November 30 – December 3, 2021, Novi Sad, Serbia

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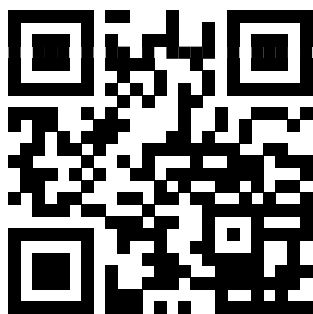
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BOOK OF ABSTRACTS





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Publisher

Serbian Chemical Society
Karnegijeva 4/III, Belgrade, Republic of Serbia

For the publisher

Dušan Sladić
President of the Serbian Chemical Society

Editors

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Vladimir P. Beškoski
Aleksandra Šajnović

Cover page photo

Branko Lučić

Design and prepress

Beoživković, Belgrade

Printed by

RIS Studio, Belgrade

Circulation

150

ISBN

978-86-7132-078-8

Year

2021

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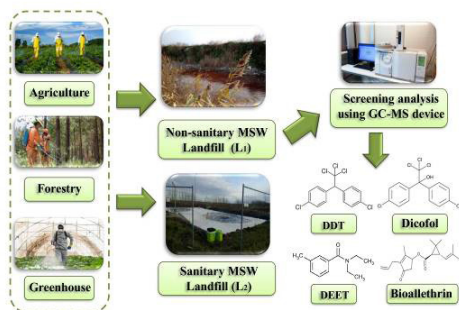
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Identification of Banned Pesticide Residues in Municipal Solid Waste Landfills Leachate from Vojvodina Region

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Introduction

Pesticides are widely used in agriculture and forestry, and in other plant production such as in greenhouses and gardens [1]. As a consequence of the above mentioned, they occur frequently in domestic and organic waste. The handling and unselective application of pesticides may create an important waste fraction going to landfills, with the potential for transferring its residues into the environment, thus causing contamination [2].

Materials and methods

Leachate sampling campaigns were carried out in the autumn of 2019, at one non-sanitary (L₁) and one sanitary (L₂) municipal solid waste landfill in the region of Vojvodina. A total of 2 L of leachate were collected at each location for the purpose of the screening analysis. The samples were prepared by liquid-liquid extraction and concentrated in the Kuderna-Danish apparatus or evaporator. Previously prepared internal standard, Fenantren D10, concentration of 15 ppm in methanol, was applied, while dichloromethane was used as a solvent agent. P2010-Ultra GC-MS, Shimadzu, and Agilent HP-5ms column (30 m × 0.25 mm × 0.25 μm) were used for the screening analysis.

Results and Discussion

By performing screening analyses of leachate samples, two pesticides, pyrethroid ester, Bioallethrin, and organochlorine pesticide, Dichlorodiphenyltrichloroethane (DDT), were detected in the sample L₁,

and other two, organochloride acaricide, Dicofol, and N,N-Diethyl-m-toluamide (DEET), were detected in the sample L₂.

According to the Pesticide Action Network (PAN), International Consolidated List of Banned Pesticides issued in March 2021, the application of Bioallethrin is banned in Switzerland. DDT and metabolites are banned in 144 countries worldwide, while Dicofol is banned in 50 countries worldwide. Since 2017, 100% of DEET products were withdrawn from the European market and are no longer available due to the EU Biocidal Products Regulations 528/2012 (BPR). Utilization of remaining stocks of banned pesticides on agricultural lands nearby landfill site L₁, as well as lack of primary separation of waste fractions on landfill sites L₁ and L₂, are some of the main reasons of contamination and pesticide residues identification in landfill leachate samples.

Conclusion

Due to long-range transport capacity, carcinogenic and endocrine-disrupting characteristics, pesticides can, adversely affect human health, livestock, and wildlife. In order to replace conventional pesticides with less toxic and easily biodegradable ones, preferably biological pesticides with high efficiency, farmers' awareness needs to be improved and enhanced. The development and selection of safe, on-farm disposal/treatment technique for agricultural pesticides is paramount for environmental protection.

Acknowledgments

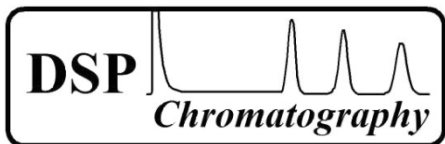
This research has been supported by the Ministry of Education, Science and Technological Development through the project no. 451-03-68/2020-14/200156: "Innovative scientific and artistic research from the FTS (activity) domain".

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the EMEC21**





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CIP - Каталогизacija у публикацији
Народна библиотека Србије, Београд

502/504(048)

EUROPEAN Meeting on Environmental Chemistry (21 ; 2021 ; Novi Sad)
Book of abstracts / 21st European Meeting on Environmental Chemistry, EMEC 21, November
30 - December 3, 2021, Novi Sad, Serbia ; [editors Ivana Ivančev-Tumbas, Vladimir P. Beškoski,
Aleksandra Šajnović]. - Belgrade : Serbian Chemical Society, 2021 (Belgrade : RIS Studio). - 197
str. : ilustr. ; 25 cm

Tekst štampan dvostubačno. - Tiraž 150. - Str. 5: Predgovor / Branimir Jovančičević. - Bibliografi-
ja uz većinu apstrakata. - Registar.

ISBN 978-86-7132-078-8

a) Животна средина -- Апстрактни

COBISS.SR-ID 52064521