

9. SIMPOZIJUM
HEMIJA I ZAŠTITA
ŽIVOTNE SREDINE

ENVIROCHEM2023

9th SYMPOSIUM
CHEMISTRY AND ENVIRONMENTAL PROTECTION

ENVIROCHEM2023

KNJIGA IZVODA

4-7. jun 2023. godine, KLADOVO, SRBIJA

KNJIGA IZVODA

BOOK OF ABSTRACTS

9. simpozijum
Hemija i zaštita životne sredine
EnviroChem2023
sa međunarodnim učešćem



9th Symposium
Chemistry and Environmental Protection
EnviroChem2023
with international participation

KNJIGA IZVODA
BOOK OF ABSTRACTS

Kladovo 4-7. jun 2023. godine

ENVIROCHEM2023

KNJIGA IZVODA

9. simpozijum Hemija i zaštita životne sredine

Kladovo, 4-7. jun 2023.

BOOK OF ABSTRACTS

9th Symposium Chemistry and Environmental Protection

Kladovo, 4-7th June 2023

Izdaje/Published by

Srpsko hemijsko društvo/Serbian Chemical Society

Karnegijeva 4/III, 11000 Beograd, Srbija

tel./fax: +381 11 3370 467; www.shd.org.rs, E-mail: office@shd.org.rs

Za izdavača/For Publisher

Dušan Sladić, predsednik Srpskog hemijskog društva

Urednici/Editors

Sanja Živković, Branka Lončarević, Minja Bogunović, Gordana Gajica

Slika sa naslovne strane/Photo from cover page

Foto Video Boce

Priprema za štampu i štampa/Prepress and printing

Razvojno-istraživački centar grafičkog inženjersva Tehnološko-metalurškog fakulteta,
Beograd

Tiraž/Circulation

150 primeraka/150 copies

ISBN 978-86-7132-082-5

Informacije i stavovi izneti u ovoj publikaciji su provizorni. Srpsko hemijsko društvo, urednici i naučni odbor nisu odgovorni za interpretacije, eventualne posledice i štamparske greške. The information and the opinions given in this publication are provisional. Serbian Chemical Society, Editors or Editorial Board are not responsible for any interpretations, their consequences or typographical errors.

were frozen before analysis and measured after homogenization. The content of polychlorinated biphenyls is expressed as the amount of micrograms of PCB on wet fish in order to comply with the units (ng/g of wet weight) prescribed by the regulation. The presence of tested PCBs was not confirmed in the tested tuna samples.

Table 1. Basic validation data for selected polychlorinated biphenyl obtained by using GC/MS

Congener	Equation	R ²	LOQ, ($\mu\text{g}/\text{kg}$)	Recovery \pm (RSD) % spike 10 $\mu\text{g}/\text{kg}$	Single to noise S/N (10 $\mu\text{g}/\text{kg}$)
PCB 28	$y=1.7187x+8.1233$	0.9968	2.8	112.5 \pm (12.8)	181.4
PCB 52	$y=0.9286x-1.0346$	0.9999	3.6	118.9 \pm (14.1)	90.7
PCB 101	$y=1.0429x-5.2194$	0.9988	2.5	98.2 \pm (11.6)	88.6
PCB 153	$y=0.6871x+14.507$	0.9984	3.8	97.7 \pm (9.7)	98.1
PCB 138	$y=0.7099x-2.3009$	0.9981	3.6	108.9 \pm (16.8)	51.6
PCB 180	$y=0.5010x+3.2130$	0.9974	3.5	119 \pm (14.2)	52.6

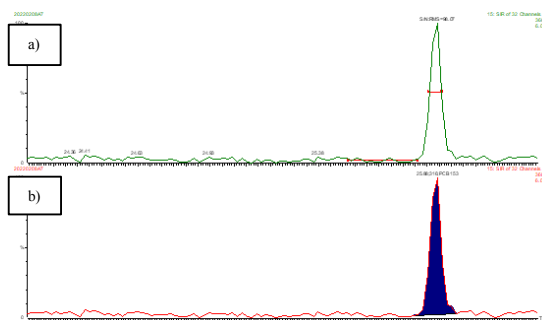


Figure 1. Chromatograms of PCB 153 in SIM mode. Spiked blank tuna fish sample after addition of 10 $\mu\text{g}/\text{kg}$ standard of congener, extraction and clean-up. a) Estimation of ratio single to noise (S/N) b) Peak area

The validated method can also be applied to routine analysis and monitoring of processed tuna fish products on the Serbian market and improve food safety.

References

1. EC (European Commission), 2021, SANTE 11312/2021- Analytical quality control and method validation procedures for pesticide residues analysis in food and feed.
2. Kalachova, K., Pulkrabova, J., Drabova, L., Cajka, T., Kocourek, V., Hajslova, J. *Anal. Chim. Acta* 707 (2011) 84-91.
3. Beyer, A., Biziuk, M. *Food Res. Int.* 43 (2010) 831-837.

Acknowledgment - The study was funded by the Serbian Ministry of Science, Technological Development and Innovation (Contract No: 451-03-47/2023- 01/200026 and Contract No. 451-03-47/2023-01/200030).

Organic acids as solvents for leaching PAHs out of impregnated wood

Ž. Nikolić¹, D. Milovanović¹, M. Marčeta Kaninski¹, V. Nikolić¹, A. Radulović¹, A. Tasić^{2,*}

(1) Institute of General and Physical Chemistry, Studentski trg 12/V, 11000 Belgrade, Serbia, (2) Scientific Institute of Veterinary Medicine of Serbia, Janisa Janulisa 14, Belgrade, Serbia;

*alekstasic79@gmail.com

Polycyclic aromatic hydrocarbons (PAHs) are a group of hydrophobic organic compounds, which are ubiquitous in the environment. Some of them exhibit toxicity, mutagenicity, and carcinogenicity [1]. There is a high PAH content in creosote impregnated wood [2].

Creosote impregnated wood which was used and discarded becomes hazardous waste. Concentration of PAHs in used impregnated wood can be reduced by leaching with suitable solvent systems. Thus, the aim of this study was to compare different organic acids solvent systems for leaching PAHs out of impregnated wood to obtain non-hazardous waste. Leaching tests on impregnated wood were performed with 15 % water solution of urea, concentrated formic acid, 15 % solution of urea in formic acid and glacial acetic acid [3]. Concentration of PAHs in extracts was measured by GC-FID technique. Polycyclic aromatic hydrocarbons that were determined are naphthalene, 1-methylnaphthalene, acenaphthene, fluorene, phenanthrene, anthracene, fluoranthene, pyrene, benzo[a] anthracene and chrysene.

Table 1. Relative concentration of PAHs in four different extracts from creosote impregnated wood.

Relative concentration	15 % water solution of urea	Concentrated formic acid	15 % solution of urea in formic acid	Glacial acetic acid
naphthalene	0.09	0.45	0.55	1
1-methylnaphthalene	0.05	0.68	0.68	1
acenaphthene	0.01	0.65	0.67	1
fluorene	0.01	0.59	0.61	1
phenanthrene	0.003	0.59	0.59	1
anthracene	0.005	0.43	0.45	1
fluoranthene	0.001	0.56	0.57	1
pyrene	0.002	0.59	0.57	1
benzo[a] anthracene	n.d.	0.50	0.50	1
chrysene	n.d.	0.64	0.57	1

n.d.- Not detected

Data presented in Table 1. show that water solution of urea had the lowest extraction ability according to PAHs among tested solvent systems. Concentrated formic acid and solution of urea in concentrated formic acid indicated similar extraction ability according to

PAHs which was higher than previous. Glacial acetic acid showed the highest extraction ability according to PAHs among all solvent systems.

References

1. Majd, M., Nojavan, S. *Microchem. J.* 171 (2021) 106852.
2. Ikarashi, Y., Kaniwa, M., Tsuchiya, T. *Chemosphere* 60 (2005) 1279-1287.
3. Dhapte, V., Mehta, P. *St. Petersburg Polytechnical University Journal: Physics and Mathematics* 1 (2015) 424-435.

Acknowledgement - This study was financed by the Ministry of Education, Science and Technological Development of the Republic of Serbia (Contract number: 451-03-47/2023-01/200051).