



WeBIOPATR 2021

The Eighth International WEBIOPATR
Workshop & Conference
Particulate Matter: Research and Management

Abstracts of Keynote Invited Lectures and Contributed Papers

Milena Jovašević-Stojanović,
Alena Bartoňová,
Miloš Davidović and Simon Smith, Eds

Vinča Institute of Nuclear Sciences
Vinča, Belgrade 2021

**ABSTRACTS OF KEYNOTE INVITED LECTURES AND
CONTRIBUTED PAPERS**

The Eighth WeBIOPATR Workshop & Conference
Particulate Matter: Research and Management

WeBIOPATR 2021

29th November to 1st December 2021

Vinča, Belgrade, Serbia

Editors

Milena Jovašević-Stojanović

Alena Bartoňová

Miloš Davidović

Simon Smith

Publisher

Vinča Institute of Nuclear Sciences

Prof. Dr Snežana Pajović, Director

P.O.Box 522

11001 Belgrade, Serbia

Printed by

Vinča Institute of Nuclear Sciences

Number of copies

150

ISBN 978-86-7306-164-1

© Vinča Institute of Nuclear Sciences

Vinča, Belgrade 2021.

www.vin.bg.ac.rs/

Organizers



Vinča Institute of Nuclear Sciences, University of Belgrade, National Institute of the Republic of Serbia, Serbia

Public Health Institute of Belgrade, Serbia

NILU Norwegian Institute for Air Research, Norway

*The 8th WeBIOPATR Workshop and Conference,
Particulate Matter: Research and Management, WEBIOPATR2021
is supported by:*



Virtual centre for
Distributed atmospheric
Sensing for reduction of pollution pressures

*EC H2020 Framework Program for Research and Innovation,
area “Spreading excellence and widening participation”,
VIDIS project (2020-2023) coordinated by Vinča Institute of Nuclear Sciences,
Grant agreement number 952433.*



Ministry of Education, Science and Technological Development of the Republic of Serbia

11.14 CHARACTERISATION OF FINE PARTICULATE MATTER LEVEL, CONTENT AND SOURCES OF A KINDERGARTEN MICROENVIRONMENT IN BELGRADE CITY CENTER

M. Živković (1), M. Jovašević-Stojanović(1), A. Cvetković (2), I. Lazović (1), M. Davidović (1), I. Gržetić (3)

Vinča Institute of Nuclear Sciences, National Institute of the Republic of Serbia, University of Belgrade, Belgrade, Serbia, (2) Public Health Institute of Belgrade, Belgrade, Serbia, (3) Faculty of Chemistry,

University of Belgrade, Belgrade, Serbia

marija@vin.bg.ac.rs

In the present work, we investigated a data set of indoor and outdoor PM_{2.5} from 80 samples collected in the microenvironment of a kindergarten located in Belgrade city centre during weekdays in a period crossing over from the heating to non-heating season, from March to May 2010.

Taking into account results from European cohorts and other studies (Strak et al, 2021), WHO recently published new 24-hour AQG guidelines (AQG) levels for main pollutants including fine particulate matter. 24-hour AQG for PM_{2.5} in ambient air are now lower, these are changed from 25 µg/m³ to 15 µg/m³ (WHO, 2021). The results indicated that the outdoor and indoor PM_{2.5} daily mean values were much higher than 25 µg/m³, 82.5% and 75%, respectively, and even much more when taking in account newly-established WHO AQG. The I/O ratio ranged between 0.47 and 1.88 for PM_{2.5} (mean 0.91).

The most abundant detected elements were Al, Fe, Ba, Cr, Cu, Zn and Pb, and the most abundant detected macro-components were Ca, Na, NO₃ and SO₄²⁻. In this study, Se was the most enriched metal (EF values > 1000), followed by Sb, Cd, As and Pb (EF values > 100). In addition, Cd and Pb, classified in Group 1A by the IARC (carcinogenic to humans), never exceeded standard annual outdoor levels of 5 ng/m³ and 0.5 µg/m³, respectively, settled by actual EU legislation (Directive 2008/50/EC, 2008). On the other hand, As and Ni, also classified as carcinogenic to humans, exceeded standard annual outdoor levels of 6 and 20 ng/m³: 3 days for As and 1 day for Ni in outdoor air, out of total 40 analysed samples collected during weekdays.

Indoor/outdoor ratios of individual PAHs and ΣPAH were less than 1 which indicated that indoor PAHs originated mainly from the outdoor environment. BgP, Ind, BaP, BbF, BkF and Chy were most abundant, especially in outdoor particles.

Principal component analyses (PCA) with Varimax rotation were applied to the data sets consisting of elemental and total PAH concentrations of indoor and outdoor PM_{2.5} fractions. The PCA analysis suggested six potential sources of both indoor and outdoor PM_{2.5} fractions. The factor profiles are very similar between indoor and outdoor datasets. PCA identified separate factors relating to pyrogenic and petrogenic sources of PAHs, traffic emission, coal combustion, building materials, industrial activities, and secondary aerosols.

Acknowledgements: The author acknowledges the funding provided by the Vinča Institute of Nuclear Sciences through the grants by H2020 VIDIS project “Virtual Centre for Distributed Atmospheric Sensing for Reduction of Pollution Pressures”, Grant Agreement 952433 and the Ministry of Education, Science and Technological Development of the Republic of Serbia, Theme no 100210.

REFERENCES

- European Commission, 2008. Directive 2008/50/EC of the European Parliament and of the Council of 21 May 2008 on ambient air quality and cleaner air for Europe, Official Journal of the European Union, L152 (2008), pp. 1-44
- Wu Y et al, 2019 Seasonal Variations, Source Apportionment, and Health Risk Assessment of Heavy Metals in PM_{2.5} in Ningbo, China. *Aerosol and Air Quality Research*, 19: 2083–2092
- Strak M et al, 2021 Long term exposure to low level air pollution and mortality in eight European cohorts within the ELAPSE project: pooled analysis. *BMJ*. 2021;374:n1904, <https://doi.org/10.1136/bmj.n1904>
- WHO, 2021. WHO global air quality guidelines, Particulate matter (PM_{2.5} and PM₁₀), ozone, nitrogen dioxide, sulfur dioxide and carbon monoxide, <https://apps.who.int/iris/handle/10665/345329> (Accessed, November 2021)

CIP - Каталогизација у публикацији
Народна библиотека Србије, Београд

502.3:502.175(082)(0.034.2)

613.15(082)(0.034.2)

66.071.9(082)(0.034.2)

INTERNATIONAL WeBIOPATR Workshop Particulate Matter: Research and Management (8 ; 2021 ; Vinča) Abstracts of keynote invited lectures and contributed papers [Elektronski izvor] / The Eighth International WEBIOPATR Workshop & Conference Particulate Matter: Research and Management, WeBIOPATR 2021, 29th November to 1st December 2021 Vinča, Belgrade, Serbia ; [organizers Vinča Institute of Nuclear Sciences, University of Belgrade, National Institute of the Republic of Serbia [and] Public Health Institute of Belgrade, Serbia [and] NILU Norwegian Institute for Air Research, Norway] ; Milena Jovašević-Stojanović ... [et al.], eds. - Belgrade : Vinča Institute of Nuclear Sciences, 2021 (Belgrade : Vinča Institute of Nuclear Sciences). - 1 elektronski optički disk (DVD) ; 12 cm

Systemski zahtevi: Nisu navedeni. - Nasl. sa naslovne strane dokumenta. - "... Conference ... as a combination of online and face-to-face event." --> Preface. - Tiraž 150. - Preface / Milena Jovašević-Stojanović and Alena Bartoňová. - Bibliografija uz većinu apstrakata. - Registar.

ISBN 978-86-7306-164-1

1. International Conference Particulate Matter: Research and Management (8 ; 2021 ; Vinča)

а) Ваздух -- Контрола квалитета -- Зборници

б) Здравље -- Заштита -- Зборници

в) Отпадни гасови -- Штетно дејство -- Зборници

COBISS.SR-ID 53342985

ISBN 978-86-7306-164-1

