LANDAUER EUROPE

IUPAP

2014

RAD

Second International Conference on Radiation and Dosimetry in Various Fields of Research

CEI
CENTRAL EUROPEAN INITIATIVE

www.rad2014.elfak.rs

May 27 - 30, 2014 | Faculty of Electronic Engineering | Niš | Serbia

BOOK OF ABSTRACTS

RAD 2014

Second International Conference on Radiation and Dosimetry in Various Fields of Research

www.rad2014.elfak.rs

May 27 - 30, 2014 | Faculty of Electronic Engineering | Niš | Serbia

PUBLISHER: University of Niš, Faculty of Electronic Engineering
P.O.Box 73, 18000 Niš, Serbia
www.elfak.ni.ac.rs
FOR THE PUBLISHER: Prof. Dr. Dragan Tasić
EDITOR: Prof. Dr. Goran Ristić
COVER DESIGN: Vladan Nikolić, M.Sc.
TECHNICAL EDITING: Sasa Trenčić and Vladan Nikolić
PROOF-READING: Saša Trenčić, MA
PRINTED BY: Nais Print, Niš
PRINT RUN: 350 copies
ISBN 978-86-6125-100-9

The Second International Conference on Radiation and Dosymetry in Various Fields of Research (RAD 2014) and *the Second East European Radon Symposium (SEERAS)* were financially supported by:

- Central European Initiative (CEI)
- International Union of Pure and Applied Physics (IUPAP)*
- Ministry of Education, Science and Technological Development

*To secure IUPAP sponsorship, the organisers have provided assurance that RAD 2014 Conference will be conducted in accordance with IUPAP principles as stated in the IUPAP resolution passed by the General Assembly in 2008. In particular, no bona fide scientist will be excluded from participation on the grounds of national origin, nationality, or political considerations unrelated to science.

CIP - Каталогизација у публикацији
Народна библиотека Србије, Београд

539.16(048)

INTERNATIONAL Conference on Radiation and Dosimetry in Various Fields of Research (2nd ; 2014 ; Niš)
Book of Abstracts / The Second International Conference on Radiation and Dosimetry in Various Fields of Research, RAD 2014, May 27-30, 2014, Niš, Serbia ; [editor Goran Ristić]. - Niš : Faculty of Electronic Engineering, 2014 (Niš : Nais Print). - 450 str. ; 30 cm

Nasl. str. prištampanog teksta: Book of Abstracts / Second East European Radon Symposium SEERAS, May 27-30, 2014, Niš, Serbia. - Oba rada štampana u međusobno obrnutim smerovima. - Tiraž 350. - Bibliografija uz pojedine apstrakte.

ISBN 978-86-6125-100-9

a) Јонизујуће зрачење - Дозиметрија - Апстракти
COBISS.SR-ID 207273996

RAD

The Second International Conference on Radiation and Dosimetry in Various Fields of Research

www.rad2014.elfak.rs

MAY 27 - 30, 2014 | FACULTY OF ELECTRONIC ENGINEERING | NIŠ | SERBIA

Gold sponsor

LANDAUER EUROPE

Silver sponsor

RCA

SEERAS
WELCOME
ABOUT CONFERENCE
FIRST CALL
TOPICS
RAD 2012
VENUE | CONTACT
APL
ABSTRACTS
TITLE LIST
SCHEDULE
PROGRAM
STATISTICS
PAPERS
IMPORTANT DATES
SCIENTIFIC COMMITTEE

SCIENTIFIC COMMITTEE

- Olivera Ciraj Bjelac, Vinča Institute, Serbia
- Rodolfo Cruz Suarez, IAEA, Austria
- Daniele Giuffrida, EC Joint Research Centre, Italy
- Aleksandar Jakšić, Tyndall National Institute, Ireland
- Vladimir Jurišić, University of Kragujevac, Serbia
- Ines Krajcar Bronić, Ruđer Bošković Institute, Croatia
- Gregor Kramberger, Jožef Štefan Institute, Slovenia
- Ahmed Meghzifene, IAEA-VIC, Austria
- Michael Moll, CERN, Switzerland
- Alberto Palma, University of Granada, Spain
- Tatjana Paunesku, Northwestern University, USA
- Ioana Pintilie, NIMP Bucharest, Romania
- Guenther Reitz, DLR, Germany
- Anatoly Rozenfeld, University of Wollongong, Australia
- Goran Ristić, University of Niš, Serbia
- Miroslav Vesković, University of Novi Sad, Serbia
- Ali Zadeh, ESA-ESTEC, The Netherlands
- Marko Zavrtanik, Jožef Štefan Institute, Slovenia

RAD 2014

NATURAL RADIONUCLIDES IN SOIL SAMPLES IN THE SURROUNDING OF THE CITY OF SKOPJE, MACEDONIA

Aleksandra Todorovik, Risto Uzunov, Zehra Hajrulai-Musliu, Elizabeta Dimitrieska-Stojkovik, Biljana Dimzoska-Stojanovska

Food Institute, Faculty of Veterinary Medicine, Skopje, Republic of Macedonia

Soil acts as a potential source of radionuclides through which they can enter the food chain and end up in people. Radioactive materials that naturally occur in soil are one of the components of the external exposure to gamma rays to which people are regularly exposed. So the soil acts as a potential source of the radionuclides, through which they can enter the food chain and up in people. The natural radioactivity of the environment and the related external exposure due to gamma radiation primarily depends on the geological and geographical conditions and they exist at different levels in the soils from every region of the world. Taking into consideration the importance of the distribution and the transfer of radionuclides in the soil, an attempt was made in this work, to determine the concentration of ^{226}Ra, ^{232}Th, ^{40}K and ^{137}Cs in the same.

In order to determine the activities of the natural and the artificial radionuclides in the soil, samples of uncultivated soil were taken, from locations in the surrounding of Skopje. The sampling from the soil was performed in the months of May and June in 2013. The area was divided into 14 locations. The sampling was performed from 0-15cm with an increment of 5cm. The locations selected for sampling were flat land where the vegetation was removed. The homogenized samples of the soil were packed in plastic containers which had the same geometry as the one for the reference materials and upon ensuring time balance between the successors of ^{238}U and ^{232}Th series (60 days), these sealed samples were prepared for an analysis. The radiometric analysis of these samples was performed by using a system based on a personal computer, with gamma spectrometry with high resolution that consists of germanium with high purity (HPGe), coaxial detector (relative efficiency: 30%, active volume: 180 cubic centimeters with a beryllium window in the end and FWHM: 2.0 keV at 1332 KeV for ^{60}Co. The calculation was performed for 65000 seconds for the reference materials and the soil samples. The spectrums were analyzed by a commercially available software GENIE-2000 obtained from Canberra Packard, which provides identification of radionuclides and assessment of their activity.

It was determined that the activity levels follow the recorded normal distribution.

The values are between 19,20Bq/kg to 40,00Bq/kg for ^{226}Ra, from 25,49Bq/kg to 25,49Bq/kg and from 399,02Bq/kg to 666,10Bq/kg, respectively. The concentrations of these radionuclides are compared with the available data from the other countries. Data shows that the average value of activity of ^{232}Th is higher than the one of ^{226}Ra which may be due to the longer half-life of ^{232}Th in relation to ^{226}Ra. The concentration of activity of ^{40}K in the soil has a value that is higher than the one of ^{232}Th and ^{226}Ra for all soils. Also the measured values of concentration of activity of the radionuclides ^{40}K, ^{226}Ra and ^{232}Th in all soils that are being examined, are within the global range specified by the international organizations.

Key words: Radioactivity, soils, analysis, gamma spectrometry, results