



**NINTH INTERNATIONAL
CONFERENCE ON RADIATION
IN VARIOUS FIELDS OF RESEARCH**

June 14 - 18, 2021 | Hunguest Hotel Sun Resort | Herceg Novi | Montenegro

**BOOK OF
ABSTRACTS**

rad-conference.org



TABLE OF CONTENTS

Click on the title of the abstract to access it

BIOCHEMISTRY

Šaćira Mandal, Adlija Čaušević, Sabina Semiz, Plasma leptin concentrations and lipid profile in Bosnian healthy and Type 2 diabetic individuals1

Iliana Koleva, Veselin Ivanov, Yanka Karamalakova, Galina Nikolova, C-reactive protein and ROS promote chronic ochratoxin-induced H nephrotoxicity in mice 2

Yanka Karamalakova, Ekaterina Georgieva, Tzvetelin Georgiev, Bilyana Tacheva, Muhammad Akram, Veselin Ivanov, Galina Nikolova, Lemna minor L. extract ameliorates the intracellular C-reactive protein and ROS levels in progressive bleomycin-induced pulmonary fibrosis 3

Anna A. Oleshkevich, Specific features of change in enzyme activity in the acoustic field 4

Aušra Nemeikaitė-Čėnienė, Violeta Jonušienė, Lina Misevičienė, Audronė Marozienė, Narimantas Čėnas, The use of rate constants of flavoenzyme-catalyzed single-electron reduction of nitroaromatics in the analysis of their cytotoxicity mechanisms 5

Aušra Nemeikaitė-Čėnienė, Jonas Šarlauskas, Violeta Jonušienė, Lina Misevičienė, Audronė Marozienė, Mindaugas Lesanavičius, Narimantas Čėnas, QSARs in prooxidant aerobic cytotoxicity of heteroaromatic *N*-oxides: Role of flavoenzyme-catalyzed single-electron reduction 6

Safija Herenda, Edhem Hasković, Denis Hasković, Ena Hasković, Inhibitory effect of terpenes on acetylcholinesterase activity 7

BIOENGINEERING

Svetozar Stoichev, Avgustina Danailova, Ivan Iliev, Inna Sulikovska, Velichka Strijkova, Kirilka Mladenova, Tonya Andreeva, Effect of graphene oxide incorporation into polymeric matrix of polysaccharide multilayered microcapsules 8

BIOINFORMATICS

Ivan P. Scheglakov, Anna A. Oleshkevich, Yulia L. Gordeeva, Comparative analysis of indicators of homeostasis in domestic animals (dogs) 9

BIOMATERIALS

Milica Jeremic Knezevic, Aleksandar Knezevic, Daniela Djurovic Koprivica, Aleksandra Maletin, Bojana Milekic, Tatjana Puskar, Analysis of elastic properties of dental impression materials 10

Oksana Kadyseva, Vladimir Bykov, Olga Strelova, Alexander Grebenyuk, Determination of physical and chemical parameters that can be used to predict the hemostatic activity of chitosan without conducting <i>in vivo</i> experiments	11
Monica Vidotto, Timor Grego, Ina Erceg, Božana Čolović, Maja Dutour Sikirić, Nadica Maltar-Strmečki, Effects of saline solution and simulated body fluid on ion substituted hydroxyapatites EPR spectra	12
Tatiana Tozar, Mihai Boni, Simona Nistorescu, Mihail Lucian Pascu, Angela Staicu, Hydrogels photo-crosslinking by 266 nm pulsed laser radiation.....	13
Roxana Cristina Popescu, Mihaela Tudor, Diana Savu, Nanoparticle radiosensitization experiments at IFIN-HH, Romania	14

BIOMEDICAL ENGINEERING

Tihomir Georgiev, Zhivko Bliznakov, Nikolay Dukov, Kristina Bliznakova, Use of X-ray contrast materials with inkjet printing for creation of breast anthropomorphic phantoms	15
Mirjana R. Cvijović, Milorad M. Murić, Vladica V. Čudić, Ana P. Čudić, Mirjana M. Petrović, Marina M. Kremlić, Multi-stage filters improved solution for air pollutants accelerating cardiopulmonary diseases in Zlatibor District	16

BIOMEDICINE

Gordana Šošić, Mirjana Varjačić, Nikola Jović, Tanja Novaković, Predictors of the basal frequency of micronucleus, nucleoplasmic bridges and nuclear buds at the beginning of pregnancy in a population of healthy pregnant women and pregnant women with thrombophilia	17
Ingrida Domarkienė, Gabriele Zukauskaitė, Ausra Matuleviciene, Justas Arasimavicius, Vaidutis Kucinskas, Laima Ambrozaityte, ADAPT – genomic initiative to analyse adaptation in the group of Lithuanian Chernobyl liquidators.....	18
Gabrielė Žukauskaitė, Ingrida Domarkienė, Aušra Matulevičienė, Evelina Marija Vaitėnienė, Justas Arasimavičius, Vaidutis Kučinskas, Laima Ambrozaitytė, Genome association study of the Lithuanian Chernobyl catastrophe liquidators indicates potentially protective alleles for multifactorial diseases.....	19
Darko Grujičić, Ljiljana Mirkov, Kristina Virijević, Nikola Pivljaković, Dragoslav Marinković, Olivera Milošević-Djordjević, Homozygous-recessive characteristics (HRCs) and biochemical parameters as biomarkers of cardiovascular disease risk	20
Elena I. Yarygina, Vita Laga, Anna A. Oleshkevich, Antibody isolation technique from chicken egg yolks	21
Aleksandra Maletin, Milica Jeremic-Knezevic, Daniela Djurovic-Koprivica, Tanja Veljovic, Bojana Ramic, Bojana Milekic, Jovana Laban-Terzija, Forming of peri-implant soft tissue in dental implant prosthetic	22
Iliana Koleva, Yanka Karamalakova, Maria Angelova, Galina Nikolova, C-reactive protein levels and oxidative stress markers as predictors of spontaneous preterm birth in women from South Bulgaria	23

Iliana Koleva, Maria Angelova, Galina Nikolova, Yanka Karamalakova, Relationship between maternal inflammatory and oxidative disturbances in spontaneously declared preterm births.....	24
Daniela Djurovic Koprivica, Tatjana Puskar, Milica Jeremic Knezevic, Bojana Milekic, Aleksandra Maletin, Jovana Laban Terzija, Materials for taking impressions in implant prosthetic dentistry	25
Dejana Milojevic, Aleksandar Milojevic, The use of bioidentical hormone therapy and the quality of women's health after the reproductive period	26
Donika Ivanova, Zvezdelina Yaneva, Investigation of the dependence between ROS production and apoptosis induction in leukemia lymphocytes after the application of redox-modulators in low concentrations	27
Igor Belyaev, Biological and health effects of non-ionizing radiation that is used by 5G	28

BIOPHYSICS

Yuriy Volkov, Boris Roshchin, Aleksandr Nuzhdin, Viktor Asadchikov, Yuriy Ermakov, Alexey Tikhonov, Veijo Honkimäki, Structural effects in phospholipids monolayers in presence of poly-D-lysines	29
Nia Petrova, Svetla Todinova, Stefka Taneva, Dimitrina Koleva, Petar Petrov, Violeta Velikova, Sashka Krumova, Functional and structural consequences of foliar application of single-walled carbon nanotubes on photosynthetic membranes	30
Avgustina Danailova, Sashka Krumova, Ariana Langari, Regina Komsa-Penkova, Georgi Golemanov, Ina Gyosheva, Emil Gartchev, Kameliya Kercheva, Alexey Savov, Stefka Taneva, Svetla Todinova, Thermal stability of red blood cell and plasma proteins derived from women with miscarriages: Microcalorimetric approach	31
Anna A. Oleshkevich, Svetlana Komarova, Photo-redox effect of alkaline hydrolysates of wool from small cattle	32
Ariana Langari, Svetla Todinova, Velichka Strijkova, Tonya Andreeva, Sashka Krumova, Stefka Taneva, Regina Komsa-Penkova, Georgi Golemanov, Galya Georgieva, Ultrastructural alteration of platelets and erythrocytes derived from women with spontaneous abortions: Atomic force microscopy study	33
Arvi Freiberg, Kõu Timpmann, Margus Rätsep, Liina Kangur, Color-tuning in Ca ²⁺ -binding photosynthetic bacteria.....	34
Charilaos Xenodochidis, Milena Draganova, Milena Georgieva, George Miloshev, Plamen Zagorchev, Development of a system for <i>in vitro</i> irradiation of biological objects with electromagnetic radiation	35
Mina Raileanu, Mihaela Bacalum, Liviu Craciun, Tiberiu Esanu, Ioana Porosnicu, 3D tumour spheroids for the prediction of the effects of radiation and treatment with antimicrobial peptides	36

CANCER RESEARCH

Irma Ivette Santana Martinez, Kristof Zarschler, Stephan Holger, Michael Bachmann, Bispidines as versatile bifunctional chelators for ⁶⁴ Cu-labeling of biomolecules	37
---	----

Wojciech Szymanowski, Kamila Buzun, Anna Szymanowska, Agnieszka Gornowicz, Roman Lesyk, Krzysztof Bielawski, Anna Bielawska, The cytotoxic potential of a novel 2-thioxo-4-thiazolidinone derivative used with anti-HER2 antibodies in AGS gastric cancer cells	38
Anna Szymanowska, Kamila Buzun, Wojciech Szymanowski, Robert Czarnomysy, Agnieszka Gornowicz, Mariusz Mojzych, Anna Bielawska, Krzysztof Bielawski, The pro-apoptotic effect of novel pyrazolo[4,3- <i>e</i>]tetrazolo[4,5- <i>b</i>][1,2,4]triazine derivatives in HT-29 colon cancer cells	39
Kamila Buzun, Agnieszka Gornowicz, Robert Czarnomysy, Roman Lesyk, Krzysztof Bielawski, Anna Bielawska, The pro-apoptotic effect of new 2-thioxo-4-thiazolidinone derivative Les-3331 on MCF-7 and MDA-MB-231 cell lines	40
Dominika Radomska, Dominik Radomski, Robert Czarnomysy, Krzysztof Bielawski, Anticancer activity of novel selenoesters in MCF-7 and MDA-MB-231 human breast cancer cells	41
Dominik Radomski, Dominika Radomska, Anna Szymanowska, Robert Czarnomysy, Krzysztof Bielawski, Anna Bielawska, Evaluation of pro-apoptotic activity of novel derivatives of 1,2,4-triazine sulfonamides in DLD-1 colon cancer cells	42
Donika Ivanova, Zvezdelina Yaneva, Empirical modelling of the antiproliferative activity of palbociclib on leukemia lymphocytes	43
Milena Georgieva, Zlatina Gospodinova, Milena Keremidarska-Markova, Trayana Kamenska, Galina Gencheva, Natalia Krasteva, PEGylated nanographene oxide-based nanoparticles as smart nanocarriers for colon cancer photothermal therapy	44
Milena Georgieva, Zlatina Gospodinova, Trayana Kamenska, Galina Gencheva, Natalia Krasteva, PEGylated graphene oxide nanoparticles as a tool for the regulation of cancer cell invasion and growth	45
Margarita Pustovalova, Lina Alhaddad, Taisia Blokhina, Andreyan Osipov, Sergey Leonov, Irradiation-surviving NSCLC cells exhibit partial EMT-program activation and altered DNA damage response depending on their p53 status	46
Katia R.B. Melo, Fabio D. Nascimento, Mariana S. Araujo, Marcela M.P. Alvarez, Renan P. Cavalheiro, Carlos M.V. Palomino, Maria Aparecida S. Pinhal, Helena B. Nader, Ivarne L.S. Tersariol, Guacyara Motta, Interaction of plasma kallikrein-kinin system proteins with breast cancer cells	47
Simona-Cristina Anghelina, Mihaela Temelie, Liviu Crăciun, Diana Savu, Investigating proton irradiation effects on glioblastoma cell lines	48

COVID 19

Nikolay Kokodii, Ihor Krasovskyi, Stanislav Pogorelov, Vladimir Timaniuk, Dmytro Kuzmin, Katerina Ivanova, About the mathematical models of the Covid-19 epidemic	49
Roisin Brennan, Michaela Davis, An investigation into occupational burnout among radiographers in Ireland due to the COVID-19 pandemic and the strategies used to cope with it	50
Mitko Mitev, Multiple thromboses as late complications in a patient with pneumonia caused by the COVID-19 infection	51

Jozef Sabol, Otakar Mika, Use of previous experience and knowledge from protection against CBRN to protection against COVID-19 pandemic.....	52
--	----

ENVIRONMENTAL CHEMISTRY

Inga Zinicovscaia, Alexey Safonov, Evaluation of biosorption and bioaccumulation capacity of cyanobacteria <i>Arthrospira (Spirulina) Platensis</i> for radionuclides	53
Dmitrii Grozdov, Inga Zinicovscaia, Nikita Yushin, Metal removal from zinc-containing effluents using <i>Shewanella xiamenensis</i> biofilm formed on zeolite	54
Gheorghe Sarbu, Constantin Popa, On numerical solution of nonlinear parabolic multicomponent convection-diffusion problems	55
Ivana Rasic Misic, Snezana Tosic, Emilija Pecev-Marinkovic, Jelena Mrmosanin, Stefan Petrovic, Testing the effectiveness of removing toxic elements by clinoptilolite	56
Grzegorz Boczkaj, Kirill Fedorov, Elvana Cako, Zhila Honarmandrad, Advanced treatment of water and wastewater by hybrid technologies utilizing cavitation phenomenon.....	57
Jędrzej Proch, Przemysław Niedzielski, Multi-mode Sample Introduction System (MSIS) as an interface between high performance liquid chromatography (HPLC) and inductively coupled plasma optical emission spectrometry (ICP OES) in arsenic speciation analysis.....	58

ENVIRONMENTAL PHYSICS

Jan Kisiel, Kinga Polaczek-Greluk, Agata Walencik-Łata, Katarzyna Szkliniarz, Underground laboratories in the Baltic Sea Region – EUL Project	59
Dragana Baturan, Selenia Samardžić, Robert Lakatoš, Uranija Kozmidis Luburić, Measurements of the effective illumination in the conference hall and the questionnaire survey about the lighting perceptions of participants	60
Konstantin Lovchinov, Gergana Alexieva, Miroslav Petrov, Hristo Nitchev, Nikolay Tyutyundzhiev, Sensitivity of electrochemically deposited ZrO ₂ layers on a quartz resonator	61
Yuriy Kyliivnik, Svyatoslav Vuchkan, Ihor Syika, Hanna Vasylyeva, Olexander Sych, Purification of aqueous solutions from strontium ions by natural and synthetic sorbents under increased radiation background	62
Margarita Kuqali, Dhurata Kuqi, Ramadan Firanj, A preliminary study of the electromagnetic field exposure of the population living near high voltage power lines of 110 kV and 220 kV in Tirana City, Albania.....	63
Mirjana Radenkovic, Dusan Topalovic, Tatjana Trtic Petrovic, Visa Tasic, Srboljub Stankovic, Vojislav Stanic, Evaluation of black carbon in fine atmospheric particulate matter on various filter types by multi-wavelength light absorption technique	64
A.S. Doroshkevich, V.A. Alexandrov, A.I. Lyubchyk, B.L. Oksengendler, A.K. Kirillov, T.A. Vasilenko, T.E. Konstantinova, A.V. Shilo, N.N. Nikiforova, A.A. Nabiyeu, M.A. Balasoui, D. Mardare, C. Mita, V.I. Bodnarchuk, D. Chicea, S.I. Lyubchyk, Advanced adsorption energy generating systems based on polarized substrates	65

ENVIRONMENTAL POLLUTION

Konstantin Vergel, Inga Zinicovskaia, Nikita Yushin, Assessment of atmospheric deposition in Central Russia, Vladimir and Yaroslavl regions, using moss biomonitors, neutron activation analysis and GIS technologies	66
Emina Ramic, Jasna Huremovic, Sabina Zero, Estimating the impact of acid pH solution on the metal desorption from lichen <i>Evernia prunastri</i> (L.) Ach.....	67
Dušan Topalović, Mirjana Radenković, Viša Tasić, Vojislav Stanić, Predrag Božović, Optimization of the source apportionment solution using the rotational tools in US EPA PMF 5.0 software	68

FOOD SAFETY AND HEALTH

Yanka Karamalakova, Ekaterina Georgieva, Veselin Ivanov, Galina Nikolova, EPR characterization of the ROS-associated toxicity in gamma irradiated <i>Lemna minor</i> L.....	69
Emilija Pecev-Marinković, Snežana Tošić, Aleksandra Pavlović, Ivana Rašić Mišić, Jelena Mrmošanin, Stefan Petrović, ICP–OES method for determination of selected elements in infant formulas and cereals based baby food.....	70
Ulyana Bliznyuk, Polina Borshchegovskay, Timofey Bolotnik, Victoria Ipatova, Alexander Konstantinov, Michael Yemelyanov, Igor Rodin, Felix Studenikin, Oleg Khmelevsky, Alexander Chernyaev, Oleg Shinkarev, Dmitry Yurov, Research of changes in the chemical properties of food products as a result of exposure to ionizing radiation at different doses	71
Ivana D. Rašić Mišić, Snezana B. Tošić, Aleksandra N. Pavlović, Emilija T. Pecev-Marinković, Jelena M. Mrmošanin, Health risk estimation of potentially toxic elements in complementary fruit-based food	72
Daria Petrukhina, Ibragim Medzhidov, Vladimir Kharlamov, Mariya Pomyasova, Oxana Tkhorik, Sergei Gorbato, Valentin Shishko, Aleksandr Shesterikov, Victor Tikhonov, Alexander Tikhonov, Igor Ivanov, Experience in the modernization of a non-thermal plasma source for pre-sowing seed treatment.....	73
Ralitsa Mladenova, Katerina Aleksieva, Nikolay Solakov, Kamelia Loginovska, Study of gamma radiation effects on free radicals generation and antioxidant potential of beebread.....	74
Egon Andoni, Enkeleda Ozuni, Majlind Sulce, Dorjana Beqiraj, Albana Munga, Pellumb Zalla, Evaluation of heavy metals in different tissues of red mullet.....	75

HEALTH AND ENVIRONMENT

Tatiana Plakhova, Maria Vyshegorodtseva, Anastasia Konyukhova, Irina Seregina, Roman Svetogorov, Anna Romanchuk, Vladimir Ivanov, Stepan Kalmykov, Nanoceria solubility in simulated biological systems: The key mechanisms and analogy to actinide dioxides.....	76
Agna Nadine Maia de Sena Carvalho, João Pedro, Gabriel Luís Miguel, Physical-chemical and isotopic characterization ($\delta^{18}\text{O}$, $\delta^2\text{H}$ and ^3H) of surface and groundwater in the Luanda Region for the integrated management of water resources	77
Irena Stoilova, Radostina Madzharova, Maya Krastanova, Physical factors in the treatment of occupational spine injuries	78
Vedada Čeljo, The role of pharmacists in the health care team in hospital practice	79



Research of changes in the chemical properties of food products as a result of exposure to ionizing radiation at different doses

**Ulyana Bliznyuk¹, Polina Borshchegovskaya¹, Timofey Bolotnik²,
Victoria Ipatova¹, Alexander Konstantinov³, Michael Yemelyanov³,
Igor Rodin², Felix Studenikin¹, Oleg Khmelevsky¹,
Alexander Chernyaev^{1,4}, Oleg Shinkarev¹, Dmitry Yurov⁴**

¹ M.V. Lomonosov Moscow State University, Physics Department, Moscow, Russia

² M.V. Lomonosov Moscow State University, Chemistry Department, Moscow, Russia

³ Federal Center for Hygiene and Epidemiology, Moscow, Russia

⁴ Skobeltsyn Institute of Nuclear Physics of Lomonosov Moscow State University, Moscow, Russia

<https://doi.org/10.21175/rad.abstr.book.2021.13.3>

Today, one of the most important challenges around the world is to ensure the appropriate quality and safety of food products which involves extending the shelf life of foodstuffs without detriment to their nutritional qualities and taste.

Food processing with ionizing radiation is becoming an increasingly efficient and environmentally friendly method to extend the shelf life of food items/ the time of storage. However, irradiation causes/triggers the appearance of free radicals, which, in turn, affect complex organic compounds: proteins, fats, and carbohydrates. Therefore, it is important to study the chemical properties of processed food products.

Our research team is conducting research to assess the effect of ionizing radiation at different doses on the chemical properties of bulk materials and vegetable and meat products.

For example, the electron beam with an energy of 1 MeV in the dose range from 0.25 to 6 kGy influences the organoleptic and chemical characteristics of chilled turkey meat. The concentration of viable microorganisms decreases non-linearly with an increase in the radiation dose. It was found that at range doses of 0.25-2 kGy, there are no changes in the appearance, taste, and smell of the samples. At doses above 3 kGy, the color, consistency, and smell of the product are different compared to those of the unirradiated control samples.

Observations of oxidation as a result of irradiation at doses up to 10 kGy of 25 saturated and unsaturated fatty acids contained in turkey meat have shown that at range doses not exceeding 3-4 kGy, the content of fatty acids remains almost unchanged. At doses of 10 kGy, the content of most acids decreases by 1.6-1.8 times. Method of Gas Chromatography-Mass Spectrometry (GC-MS) has been used to identify volatile substances (alcohols, aldehydes, and ketones) and their concentration in irradiated turkey samples with high accuracy. It was found that the concentration of volatile substances (alcohols, ketones) decreases with an increase in the radiation dose according to an exponential law. Also, acetone was chosen as a marker, since its concentration increases linearly depending on the absorbed dose. The Fingerprint method using spectra, chromatograms, and various data from electrochemical sensors processed by image recognition methods did not reveal statistically significant differences between irradiated and non-irradiated turkey samples.

The study on the effects of ionizing radiation on the concentration of reducing sugars in potato tubers performed to determine the dose required to stop germination of potato tubers during different storage periods, suggests that the concentration of sugars depends on the time of storage of potatoes before irradiation. The earlier the treatment is carried out, the smaller the dose that inhibits germination is, and the smaller the fluctuations in the concentration of reducing sugars is relative to the initial control values during the subsequent storage period.

Acknowledgments: This research has been supported by the Interdisciplinary Scientific and Educational School of Moscow University "Photonic and Quantum technologies. Digital medicine".

TITLE: Book of Abstracts

EDITOR: Prof. Dr. Goran S. Ristić

PROOF-READING: Saša Trenčič, MA

TECHNICAL EDITING: Saša Trenčič, MA

COVER DESIGN: Vladan Nikolić, PhD

YEAR OF PUBLISHING: 2021

PUBLISHER: RAD Centre, Niš, Serbia

FOR THE PUBLISHER: Prof. Dr. Goran S. Ristić

CD BURNING AND COPYING: RAD Centre, Niš, Serbia

PRINT RUN: Electronic edition - 50 CDs (CD-R)

ISBN: 978-86-901150-2-0

www.rad-conference.org

CIP - Каталогизација у публикацији - Народна библиотека Србије,
Београд

539.16(048)(0.034.2)

57+61(048)(0.034.2)

INTERNATIONAL Conference on Radiation in Various Fields of
Research (9 ;2021 ; Herceg Novi)

Book of abstracts [Elektronski izvor] / Ninth International Conference
on Radiation in Various Fields of Research, R9, [RAD 2021], June 14 -
18, 2021, Herceg Novi, Montenegro ; [editor Goran S. Ristić]. - Niš :RAD
Centre, 2021 (Niš : RAD Centre). - 1 elektronski optički disk (CD-ROM) ;
12 cm

Sistemska zahteva: Nisu navedeni. - Nasl. sa naslovne strane dokumenta.
- Tiraž 50.

ISBN 978-86-901150-2-0

a) Јонизујуће зрачење - Дозиметрија - Апстракти b) Биомедицина -
Апстракти

COBISS.SR-ID 43884041

