

2022

4th YOUNG SCIENTISTS' DAY

Faculty of Agrobiotechnical Sciences Osijek

BOOK OF ABSTRACTS

ORGANISERS



PTF OS





Young Scientists' Conference

October 7th 2022, Osijek, Croatia

BOOK OF ABSTRACTS

Znanstveni skup mladih istraživača

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07. listopada 2022. godine, Osijek, Hrvatska
October 7th 2022, Osijek, Croatia

Blanka Bilić Rajs

10:00h – 10:10h

"Određivanje zemljopisnog podrijetla hrvatskog meda pomoću stabilnih izotopa, mineralnih tvari i kemometrije" / "Geographical Origin Determination of Croatian Honey by Using Stable Isotopes, Mineral Elements and Chemometrics" – **Faculty of Food Technology Osijek**

Jozo Ištuk

10:10h – 10:20h

"Utjecaj β -glukana na bioraspoloživost polifenola voća ispitivanjem kinetičkih modela simuliranih probavnih procesa" / " β -glucan influence on the fruit polyphenol bioaccessibility by studying kinetic models of simulated digestive processes" – **Faculty of Food Technology Osijek**

10:20h – 10:30h – Pauza

Break

10:30h – 11:20h – Druga sekcija predavanja

Second section of lectures

Moderatori: izv.prof. dr.sc. Ana Stupin, prof. dr. sc. Martina Smolić

Silvija Šafranko

10:30h – 10:40h

"Priprema i karakterizacija N-dopiranih/hibridnih ugljikovih kvantnih točaka i njihova primjena u detekciji metalnih iona" / "Preparation and Characterization of N-Doped/Hybrid Carbon Quantum Dots and Their Application in Metal Ion Detection" – **Faculty of Food Technology Osijek**

Nenad Čekić

10:40h – 10:50h

"Utjecaj prehrane majke i međugeneracijske izmjene tipa prehrane na morfologiju jajnika potomaka štakora" / "Influence of maternal diet and intergenerational change in diet type on ovarian morphology in rat offspring" – **Faculty of Medicine Osijek**

Tijana Pandurović

10:50h – 11:00h

"Komparacija radioloških metoda u procjeni invazije karotidnih arterija u pacijenata s malignim tumorom glave i vrata" / "Comparison of radiological methods in the assessment of invasion of carotid arteries in patients with malignant tumors of the head and neck" – **Faculty of Medicine Osijek**

Priprema i karakterizacija N-dopiranih/hibridnih ugljikovih kvantnih točaka i njihova primjena u detekciji metalnih iona

Preparation and Characterization of N-Doped/Hybrid Carbon Quantum Dots and Their Application in Metal Ion Detection

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Carbon quantum dots (CQDs) represent a new class of efficient carbon photoluminescent nanomaterials that have attracted the attention of many scientists over the past decade, especially due to their excellent chemical and optical properties. In general, carbon dots are defined as zero-dimensional carbon-based nanoparticles with a diameter less than 20 nm, while the specific applicability mostly depend on the nanoparticle size, shape, composition, and surface features. Their high chemical and photo-stability, biocompatibility/low toxicity, tunable emission, water solubility and optical efficiency represent a huge potential for a wide range of applications in biomedical research and nanotechnology. This work presents a comparative

study of the CQDs preparation from *Citrus clementina* peel and citric acid. In order to obtain best performing hybrid nanoparticles (CQD@hybrid), pre-optimization regarding synthetic conditions, type and quantity of added amino acids has been performed. The main aim of this study was to enhance quantum yield (QY) of prepared samples, also to improve their bioactivity, and to achieve selective response toward Fe³⁺ ions. The highest quantum yield was determined with CQD@hybrid obtained with the addition of amino acid leucine (Leu), treated at temperature of 200°C for 12 hours, and this sample was further investigated for the Fe³⁺ ion sensing. The developed model was described by an exponential function with a suitable coefficient of determination of $R^2 = 0.9851$, while the linear range was determined in the concentration range from 0.5 $\mu\text{mol dm}^{-3}$ to 15 $\mu\text{mol dm}^{-3}$ with a determined limit of detection of LOD = $2.72 \pm 0.39 \mu\text{mol dm}^{-3}$ and limit of quantification of LOQ = $9.06 \pm 1.29 \mu\text{mol dm}^{-3}$. The developed model has been tested for the Fe³⁺ ions detection in real sample systems of well water samples. These presented results are indicative of a good preparative approach toward obtaining highly fluorescent CQDs, showing also good stability in aqueous media with significant differences in optical properties, while showing great potential for the studies in biological systems and water monitoring.

Keywords: Carbon quantum dots, nanoparticle functionalization, metal ion detection, bioactivity