

26th Young Investigators' Seminar on Analytical Chemistry
June 24 – 27, 2019, Pardubice, Czech Republic

YISAC 2019
Book of Abstracts

Edited by Radovan Metelka

Edition of the YISAC 2019 Book of abstracts was supported by the Department of Analytical Chemistry, Faculty of Chemical Technology, University of Pardubice.

Copyright © University of Pardubice, 2019

Pardubice, Czech Republic

ISBN 978-80-7560-224-4

*Dedicated to Prof. Karel Vytřas (1944–2019) and Prof. Valerija Gužvanj (1975–2019),
great scientists, colleagues and friends.*

Scientific Committee

University of Graz, Austria

Kurt Kalcher (kurt.kalcher@uni-graz.at)

Kevin Francesconi (kevin.francesconi@uni-graz.at)

Walter Goessler (walter.goessler@uni-graz.at)

Doris Kühnelt (doris.kuhnelt@uni-graz.at)

Martin Mittelbach (martin.mittelbach@uni-graz.at)

Astrid Ortner (astrid.ortner@uni-graz.at)

Georg Raber (georg.raber@uni-graz.at)

Graz University of Technology, Austria

Ernst Lankmayr (lankmayr@tugraz.at)

Torsten Mayr (torsten.mayr@tugraz.at)

Ingo Klimant (klimant@tugraz.at)

University of Ljubljana, Slovenia

Mitja Kolar (mitja.kolar@fkkt.uni-lj.si)

Boris Pihlar (boris.pihlar@fkkt.uni-lj.si)

Helena Prosen (helena.prosen@fkkt.uni-lj.si)

Polonca Trebše (polonca.trebse@zf.uni-lj.si)

Marjan Veber (marjan.veber@fkkt.uni-lj.si)

National Institute of Chemistry, Ljubljana, Slovenia

Samo Hočevar (samo.hocevar@ki.si)

Irena Grgič (irena.grgic@ki.si)

Božidar Ogorevc (bozidar.ogorevc@ki.si)

Slovenian Institute of Hop Research and Brewing

Iztok Košir (iztok.kosir@ihps.si)

Institute Jožef Stefan, Ljubljana, Slovenia

Vekoslava Stibilj (vekoslava.stibilj@ijs.si)

University of Maribor, Slovenia

Darinka Brodnjak-Vončina (darinka.brodnjak@uni-mb.si)

Maša Islamčević Razboršek (masa.islamcevic@um.si)

Matjaž Finšgar (matjaz.finsgar@um.si)

University of Nova Gorica, Slovenia

Mladen Franko (mladen.franko@ung.si)

University of Pardubice, Czech Republic

Radovan Metelka (radovan.metelka@upce.cz)

Ivan Švancara (ivan.svancara@upce.cz)

University of Venice, Italy

Ligia Maria Moretto (moretto@unive.it)

Paolo Ugo (ugo@unive.it)

Salvatore Daniele (sig@unive.it)

University of Szeged, Hungary

Zoltán Kónya (konya@chem.u-szeged.hu)

AGH University of Science and Technology, Kraków, Poland

Andrzej Bobrowski (gcbobrow@cyf-kr.edu.pl)

Agnieszka Krolicka (krolicka@agh.edu.pl)

University of Lodz, Poland

Sławomira Skrzypek (skrzypek@uni.lodz.pl)

Mariola Brycht (brychtmariola@gmail.com)

University of Novi Sad, Serbia

Biljana Abramović (biljana.abramovic@dh.uns.ac.rs)

Božo Dalmacija (bozo.dalmacija@dh.uns.ac.rs)

Sanja Lazić (sanjal@polj.uns.ac.rs)

Srdan Rončević (srdjan.roncevic@dh.uns.ac.rs)

University of Belgrade, Serbia

Dalibor Stanković (dalibors@chem.bg.ac.rs)

University of Sarajevo, Bosnia

Emir Turkusic (turkusic@gmail.com)

University Zagreb, Croatia

Sanja Martinez (sanja.martinez@fkit.hr)

University of Split, Croatia

Mario Buzuk (mario.buzuk@gmail.com)

Josipa Giljanovic (josipa@ktf-split.hr)

University of Prishtina, Kosovo

Tahir Arbnesi (tahirarbnesi@hotmail.com)

UBT-Higher Education Institution, Kosovo

Eda Mehmeti (eda_mehmeti@hotmail.com)

Chairmen

Kurt Kalcher

Božidar Ogorevc

Local Organizing Committee

Radovan Metelka

Tomáš Mikysek

Milan Sýs

Michaela Janečková

Amir Shaaban Farag

Granit Jashari

<http://yisac2019.upce.cz>

<https://www.facebook.com/yisac2019>

Location and Date

The lectures of YISAC 2019 conference will take place in the CI lecture hall, located in the first floor of building HA in Faculty of Chemical Technology, University of Pardubice, Studentská 573, Pardubice, from June 24 to June 26, 2019.

ENZYMATIC POLYPHENOL INDEX BIOSENSOR BASED ON GRAPHENE NANOPATELETS DECORATED WITH MnO₂ NANOPARTICLES. PREPARATION, CHARACTERIZATION AND ANALYTICAL APPLICATION

Djurdjic S.¹, Vukojevic V.², Vlahovic F.³, Ognjanovic M.⁴, Kalcher K.⁵, Mutic J.¹, Stankovic D.⁴

¹University of Belgrade, Faculty of Chemistry, Studentski trg 12-16, 11000 Belgrade, Serbia

²University of Belgrade, Institute of Chemistry, Technology and Metallurgy, Njegoseva 12, 11000 Belgrade, Serbia

³University of Belgrade, Innovation Center of the Faculty of Chemistry, Studentski trg 12-16, 11000 Belgrade, Serbia

⁴University of Belgrade, The Vinca Institute of Nuclear Sciences, POB 522, 11001 Belgrade, Serbia

⁵Karl-Franzens University Graz, Institute of Chemistry-Analytical Chemistry, A-8010 Graz, Austria

sladjanadj@chem.bg.ac.rs

A nanocomposite formed from graphene nanoplatelets (GNP) and manganese oxide (MnO₂) nanoparticles (GNP/MnO₂) was proposed as a novel and suitable support for enzyme immobilisation. The performances of screen-printed carbon electrodes (SPCEs) was highly improved after modification with GNP/MnO₂ (SPCE/GNP/MnO₂). The polyphenol index biosensor was prepared by surface modification of SPCE/GNP/MnO₂ with drop coating of the laccase (from *Trametes Versicolor*) and Nafion[®].

All electrochemical measurements were carried out in acetate buffer, pH=4.60. The developed laccase biosensor shows fast and reliable amperometric response toward caffeic acid, as model compound, at operating potential of +0.40 V (vs. Ag/AgCl), with a linear range from 5 μmol L⁻¹ to 2.75 mmol L⁻¹ ($r^2 = 0.9997$), with detection limit of 2.38 μmol L⁻¹. Moreover, effects of possible interfering compounds were investigated.

The developed procedure was successfully applied for the determination of total polyphenol content in red and white wine samples. In order to validate the proposed method, the polyphenol content in wine samples, under optimized parameters, was determined using a glassy carbon electrode. Recovery tests (95.7-97.5%) shows satisfactory accuracy and precision of the developed method, concluding that proposed construction of biosensor can offer fast, stable and reproducible determination of the polyphenol index.