Volume 61 | Supplement 5 | 2015

ACTA MEDICA MARISIENSIS

OFFICIAL PUBLICATION OF THE
UNIVERSITY OF MEDICINE AND PHARMACY OF TÂRGU MUREŞ

ACTA MEDICA MARISIENSIS

Volume 61 | Supplement 5 | 2015

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13-18 July 2015

**BOOK OF ABSTRACTS**

ISSN-L 2068-3324
ISSN 2068-3324

www.ammjournal.ro

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*Acta Medica Marisiensis* is the official publication of the Târgu Mureş University of Medicine and Pharmacy. We publish editorials, original research, systematic reviews, case reports, brief communications, guidelines and recommendations of national and international scientific associations, book reviews and announce events on a broad range of topics related to general medicine, dentistry and pharmacy.


*Acta Medica Marisiensis* (ISSN: 2068-3324) is published by University Press Târgu Mureş.


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Unindexed supplement

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# FOREWORD

It is our great honor to welcome you to the 15th International Symposium and Summer School on Bioanalysis (15th ISSSB) that will be held between July 13 – 18, 2015 at University of Medicine and Pharmacy of Tg. Mureș.

The event is organized in the frame of CEEPUS CIII-RO-0010-09-1415 network, and takes part of the series of events organized under "UMF 70". The 15th ISSSB provides an overview of a broad range of interdisciplinary subjects in bioanalysis. Its main purpose is to offer an opportunity for young researchers to learn more about the current progress in the analytical techniques.

The symposium will focus on the application of bioanalytical methods in chemical and pharmaceutical research, and related topics. The scientific program will include oral lectures and poster presentations as well as practical courses on bioanalysis.

Gabriella Donath-Nagy,

Symposium chair

# ORAL PRESENTATIONS

## L-20 / ELECTROCHEMICAL DETECTION OF β-LACTAM ANTIBIOTICS

Bogdan Feier*, Cecilia Cristea, Robert Săndulescu

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Antibacterial drugs have revolutionized the treatment of infectious diseases, but there are different problems associated with the use of antibiotics: antibiotic overuse, infection control, surveillance for resistance, antibiotic use in animals and crops, environmental contamination with antibiotics. The use and misuse have resulted in the development and spread of antibiotic resistance, a major health problem for the modern world, each year in the European Union alone, over 25 000 people dying from infections caused by antibiotic-resistant bacteria (1). For these reasons, there is a need for developing new analytical sensors, capable to detect selectively low concentrations of antibiotics from different matrices.

The purpose of this study was the development of an electrochemical sensor for the analysis of different penicillins and cephalosporins. For the detection of these β-lactam antibiotics we employed the peak obtained by the electrochemical oxidation of the β-lactam ring. Several electrode materials were used and the best results were obtained with the boron-doped diamond electrode. We investigated the influence on the electrochemical signal of the structure of each molecule of antibiotic and the results showed that the lateral chain plays an important role on the oxidation peak. The analytical method was optimised in terms of analysis conditions (pH, pre-treatment conditions, electrochemical parameters), selectivity and of sensitivity and it was applied to real samples.

**References**: (1) WHO, Tackling antibiotic resistance from a food safety perspective in Europe, 2011: http://www.euro.who.int/__data/assets/pdf_file/0005/136454/e94889.pdf

**Acknowledgement**: The research was supported by the European Social Found, Human Resources Development Operational Programme 2007–2013, Project No. POSDRU/159/1.5/S/136893.

**Keywords**: β-lactam antibiotics; boron-doped diamond electrode; electrochemical oxidation

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## L-21 / CHARACTERIZATION OF VOLATILE COMPOUNDS IN MACEDONIAN EDIBLE OILS

Violeta Ivanova-Petropulos[1*], Sasa Mitrev[1], Erich Leitner[2], Ernst Lankmayr[2], Barbara Siegmund[2], Trajce Stafilov[3]

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Flavour compounds in vegetable oils are important constituents that influence the quality of oils and may have positive or negative characteristics. Their presence or absence can be used as a marker to identify adulteration of edible oils. In this study, the volatile flavour compounds of selected Macedonian edible oils, including sunflower, pumpkin seed, flax, rapeseed and sesame seeds, were analyzed. For that purpose, a headspace solid phase microextraction (HS-SPME) with a PDMS/Carboxen/DVB fibre was used for flavour extraction, followed with gas chromatography–mass spectrometry (GC–MS) analysis. In total, 102 flavour compounds were identified belonging to different groups: acids, alcohols, aldehydes, alkanes, alkenes, cyclo alkanes, esters, furans, pyrazines, sulfur compounds and terpenes. Among them, aldehydes presented highest proportion of overall volatiles in rapeseed (76.8 % of total volatiles), followed by sesame (25 % of total volatiles), pumpkin seed (5.45% of total volatiles), flax (2.5 % of total volatiles) and sunflower oil (0.95% of total volatiles). Terpenes (40 detected) were the dominant compounds in sunflower and pumpkin seed oils (93.9 and 87.8 % of total terpenes, respectively), followed by flax (47.6 % of total terpenes), sesame (21.5 % of total terpenes) and rapeseed (10% of total terpenes). Pyrazine derivatives, which are responsible for the flavour of pumpkin seed oils, were identified only in the pumpkin seed oil including methyl pyrazine, ethyl pyrazine, 2,3- dimethyl pyrazine, 2,5-dimethyl pyrazine, 2-ethyl-3-methyl pyrazine, 2-ethyl-2,5-dimethyl pyrazine and 2-allyl-3-methyl pyrazine 9 [1]. The Student–Newman–Keuls test has been applied to ascertain possible significant differences between the studied oils, and Principal Component Analysis has been employed, showing separation and grouping of the oils according to their variety.

**Keywords**: volatile compounds; edible oils; gas chromatography-mass spectrometry.

**Acknowledgement**: This work was supported by a grant from the CEEPUS, CII-HU-0010-03-0809 Network, covering the study stay of Violeta Ivanova-Petropulos at the Institute of Analytical Chemistry and Food Chemistry, Graz University of Technology, Graz, Austria, where the analyses of oils were performed.

**References**: Siegmund B., Murkovic M. (2004). Changes in chemical composition of pumpkin seeds during the roasting process for production of pumpkin seed oil (Part 2: volatile compounds). Food Chemistry, 84, 367–374.