BOOK of ABSTRACTS

25th Congress of Chemists and Technologists of Macedonia

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OHRID, R MACEDONIA

CXTM

Сојуз на хемичарите и технолозите на Македонија

Society of Chemists and Technologists of Macedonia

25th Congress of SCTM
with international participation

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19–22 September 2018
Metropol Lake Resort
Ohrid, R. Macedonia

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Society of Chemists and Technologists of Macedonia

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The 25th Congress of SCTM is a EuChemS European Chemical Society **recognized event.**

Dear Colleagues,

Welcome to the 25th Congress of the Society of Chemists and Technologists of Macedonia. Although this is our silver jubilee, our society is celebrating more than 50 years of scientific meetings. The first conference, one of the first activities of our society, was organized in the 1960-ties and was a meeting between the faculties of the Institute of Chemistry at Faculty of Sciences and Mathematics and the Faculty of Technologists, both at the Ss. Cyril and Methodius University in Skopje. They gradually grew into biennial meetings and attracted participants outside of Macedonia. Beginning from the 18th Congress in 2004 all our meetings are held in the exceptional setting of Lake Ohrid. In 1994 our society started to organize students' scientific meetings and now the two alternate, so there is a congress organized by our society every year.

Since 2012 we have been using the Open Journal System to manage the editorial process of the *Macedonian Journal of Chemistry and Chemical Engineering* published by our society. In order to streamline the technical management of this congress and future such meetings, we have undertaken for the first time to implement the Open Conference System. You are all now familiar with the whole process of registering, submitting the abstracts etc. – at times you/we did encounter problems but overall we are satisfied with this platform and plan to use it in the future. For all of you who have smart phones, you will find the abstracts and schedule online which can be searched by various criteria. Furthermore, in line with the digital age we live in, for the first time we will not have a printed Book of Abstracts but only an electronic one. A draft version with all submitted abstracts along with the conference program was uploaded to the platform three weeks ago. The final version will be available after the conference and only the presented contributions will be included. Another first at this conference will be a Skype presentation on Saturday. We hope in the future to further improve the technical capabilities by streaming at least some of the lectures online.

Next year the world will be celebrating 150 years of Mendeleev's Periodic table of the chemical elements. Our society was involved from the very beginning two years ago – we immediately contacted our representative to UNESCO to give our full support for this important event marking one of the few discoveries in science that has withstood such a long test of time. It is nice to see the world united in a scientific achievement despite the extreme polarization in other areas. I believe you share my opinion that we are so fortunate to have chosen to pursue chemistry, the ever evolving science. Whenever I hear divisive undignified debates that take place so often now, the words of Sir Humphrey Davy in his discourse delivered at the Royal Society, in November 1825 echo in my ears: *Fortunately science, like that nature to which it belongs, is neither limited by time nor by space. It belongs to the world, and is of no country and of no age. The more we know, the more we feel our ignorance; the more we feel how much remains unknown; and in philosophy, the sentiment of the Macedonian hero can never apply, – there are always new worlds to conquer.*

From the more than 250 contributions given in this book we have a truly diverse body of researchers in many fields of chemistry. But more important than the number is the quality of the scientists presenting their new results: we have two exceptional keynote speakers, 10 invited speakers, 49 oral presentations and 195 poster presentations. Due to the traditional environment of tolerance in Macedonia, it is a truly unique regional conference bringing together the scientists from a very wide area.

I would like to thank sincerely the presidents of the Organizing and Scientific Committees, Prof. Viktor Stefov and Prof. Trajče Stafilov. Also, I must mention Assistant Prof. Jasmina Petreska-Stanoeva and Prof. Marina Stefova. I think this is the best team we could put together to make a really flawless organization. Furthermore, I would like to thank the Ministry of Education and Science of Macedonia, the Ss. Cyril and Methodius University in Skopje and the Goce Delčev University in Štip for their financial support, as well as the commercial sponsors that are given at the end of this book for their financial support and/or support in their products.

I do hope you will enjoy the scientific program of this congress, the interactions with colleagues from other institutions and countries and will build new relationships and collaborations. Most of all I would like to ask you to spend some time with the young researchers and students present here – for one of our main goals is also to build on the nexus between education and research and inspire and energize the young in the intricacies of the science of chemistry. I know I do not need to tell you to enjoy this magnificent lake, for us the most beautiful lake in the world, the inspirational crammed with extraordinary churches city of Ohrid and its unique heritage to world civilization.

Prof. Zoran Zdravkovski, president
Society of Chemists and Technologists of Macedonia

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SPECTROPHOTOMETRIC ZINC(II) BASED DETERMINATION OF QUERCETIN IN PHARMACEUTICAL FORMULATIONS

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Flavonoids are a group of polyphenolic compounds widely present in the herbal world representing an important part of human diet. Quercetin, which is a flavanol, makes 70% of total daily intake of flavonoids. Because of the characteristic chemical structure, quercetin has the ability of complexing metals and antioxidative ability.

Using equimolar solution variation method it was determined that quercetin makes a complex with zinc(II)-ion in acidic environment (pH 5.25), in stoichiometric relation quercetin:zinc(II)-ion = 2:1, with absorption maximum on λmax=363 *nm*. The ability of quercetin to make complex compounds with zinc(II)-ion was used to develop simple, precise and accurate assay to determine the content of quercetin in various samples of heterogeneous composition.

The proposed indirect spectrophotometric method can selectively determine quercetin in concentrations ranging from 0.1 to 6.0 mg/L. *LOD* and *LOQ* were derived from the calibration curve and estimated as 0.03 *mg/L* and 0.1 *mg/L* respectively. Developed method is reproductive and accurate, as indicated by high value of correlation coefficient *R*=0.99996 and low value of *SD*=0.00122. Method was successfully used to determine quercetin content in dietary supplement tablets. Dietary supplements, proscribed for therapeutic and/or profilactic pruposes, usualy content quercetin combined with other flavonoids and ascorbic acid. Therefore, it was necessary to test the selectivity of proposed method.

The reliability of the method was checked out by newly developed RP-HPLC/UV method for capsules with direct determination of quercetin after separation. The good agreement between the two methods indicates the applicability of the proposed spectrophotometric method for quercetin determination in dietary supplement tablets with high reproducibility, and enables direct and simple determination without its prior extraction from samples.

In addition, the antioxidative ability of quecetin and zinc(II)-quercetin complex was determined using oxidation-reduction standardized methods *DPPH* and *FRAP*. The same samples were tested for antimicrobial activity against seven laboratory control strains of bacteria and one yeast. As a result of those tests, there are no obstacles to combine quercetin and zinc in the same formulation.

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Keywords: quercetin; complex, zinc(II)-ion, antioxidative ability, spectrophotometry.