The 3rd Advances in Green Chemistry

BOOK OF ABSTRACTS

Poznan, Poland

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Poznan 2022

About 3rd Advances in Green Chemistry

The aim of our conference is to create a place where leading scientists, both from Poland and Europe, will be able to share their latest achievements in five key research areas related to green chemistry, i.e., the area of ionic liquids, materials research, electrochemistry, catalysis and biosciences. The conference is to provide an impulse for scientists to discuss current research in these areas, initiate a discussion on the implementation and commercialization potential of the results, and be a platform for the emergence of new research ideas. This international meeting will create an environment which will promote the formation of new research partnerships between scientists from around the world, using their specialized knowledge and experience in specific areas. Special mention at **3rd AGChem** will have the technology of modern ecological materials, i.e., polymers, as well as the results of research on technologies for obtaining and recovering raw materials for their production. The thematic areas of the conference constitute of an entirety of research on green technologies, combining catalytic processes of production or processing of raw materials with application in electrochemistry (energy storage, energy acquisition) or biosciences. We would like to strongly emphasize the importance of research on ionic liquids as substances with versatile possibilities and great potential in virtually every thematic area of the conference. Ionic liquids are significant in the industry of the future; therefore they have their own thematic area at **AGChem 2022**. Close relationship between basic research and industrial exploitation of the results is the main idea behind this conference. International cooperation is the motto that should define this conference. We want the technologies and research presented by scientists to show the possibilities that they will provide to the society, what processes they improve and, most importantly, how they affect the environment. Everything that will be discussed at the conference will concern broadly understood term of green chemistry. These will include waste recycling technologies and their reuse or improvement of production processes, in which the impact on the natural environment will be reduced. In addition, we want to present the results of research on technologies dedicated to the circular economy and how research concepts are created in these areas "from idea to implementation". Another issue is the production of bio-based materials and biomaterials, considering environmental aspects and adapting new technologies to the changing global pro-ecological policy. Important, from the point of view of the end recipients - society, research in the areas of biosciences and agriculture will be presented, where we want to put special emphasis on research and implementation works on technologies that eliminate the use of plant protection products, for which there is no longer a place in the sustainable economy of the future. **AGChem 2022** is a conference that aims to show the scientific community and industry where we are in the areas of green chemistry, what we are currently working on and what research directions we have in global terms and present what we have already implemented.

Marcin Śmiglak
Conference Chair

Abstracts

in alphabetical order by name of the author

Biomass-based residues valorization for the removal of sertraline from waters by adsorption

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Pharmaceutical drugs reach the environment through several anthropogenic sources being scattered and accumulated across flora, fauna and all types of aquifers. Many of these compounds are intensively worldwide medical prescribed for the relief of most common diseases related with modern society, such as hormones, antidepressants, analgesics, antibiotics, anti-inflammatories, among others. Sertraline is a pharmaceutical drug used for the relief of depressive severe situations. Recent studies refer that some compounds belonging to this pharmaceutical class of drugs, despite of its very low level of concentration in water can be responsible for several and severe side-effects in the environmental fauna and flora based on toxicity and risk predictions [1-4]. Moreover, there are some published studies reporting that traditional wastewater treatment plants do not are able to handle with the degradation and/or removal of the majority of micropollutants. Although great advances have been made in the detection and analysis of trace pollutants during recent decades, more efforts must be focus on the degradation and/or removal of micropollutants in water.

Adsorption equilibrium studies between the adsorbent and sertraline will be presented using the batch method. Different models will be used to estimate the experimental kinetics of adsorption of sertraline in activated carbon previously prepared using olive stones. After optimizing the pH value and adsorption time, the most relevant adsorption parameters are optimized and the experimental equilibrium adsorption isotherms are fitted to different adsorption models, such as the Langmuir or Freundlich models for liquid phase adsorption. In this work several experimental results will be presented for the removal of sertraline using different activated carbon materials were obtained from olive stones, namely the original granulated olive stones and chemical activated and carbonized. Several experimental results will be presented, including the equilibrium time for adsorption, the kinetics study and the effect of temperature, sertraline/adsorbent ratio and pH value on the equilibrium adsorption isotherms. Olive stones, traditionally a residue obtained from Portuguese and Mediterranean olive industry can be used as a promising and low coast material source for the production of adsorbent materials with great potential to adsorb antidepressant pharmaceutical drugs, such sertraline, from water.

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References:

[1] J. Ortega, M. Tejeda, C. Jimenez. J Hazar. Mat., 444, (2013) p. 451.

[2] M. Kuzmanovic, J. Lopez, N. Castro, Sci. Tot. Environm., 540, (2016) p. 324.

[3] A. Mole, B. Brooks, Environm. Pollut., 250, (2019) p. 1019.

[4] V. Machado, Instituto Politécnico de Bragança, Master Dissertation (2021).