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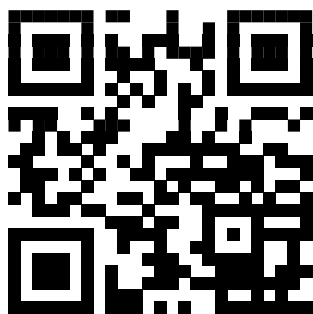
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BOOK OF ABSTRACTS





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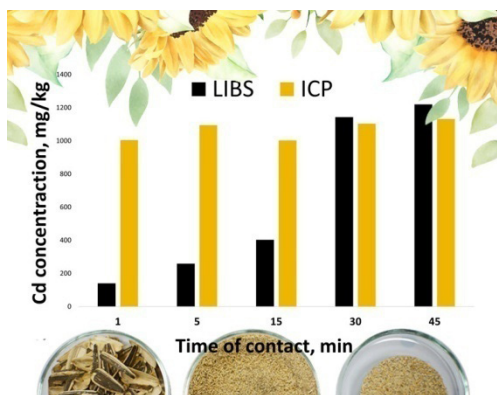
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Comparative Study of Removal Efficiency for Ni and Cd from Industrial Wastewater and Aqueous Solution by Sunflower Husk Using ICP-OES and LIBS

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With the growth of the industrial world and the rise of anthropogenic activities, environmental challenges have also increased. Wastewater, especially from industrial sources can contain a wide variety of heavy metals [1]. The presence of heavy metals in water resources is a cause for concern due to their toxicity and tendency to bioaccumulation, which leads to significant problems for the environment as well as for animals and humans [2]. There are various conventional treatment technologies that are used for the removal of heavy metals from wastewater such as reverse osmosis, electrodialysis, ultrafiltration, industrial ion exchange process, and chemical precipitation. These techniques have some drawbacks such as being expensive due to high reagent and energy requirements, incomplete metal removal at low concentrations of heavy metals and generation of sludge [1]. Therefore, biosorption has been the subject of research by scientists for almost 70 years in order to find efficient, effective, and low-cost biomaterials for wastewater treatment [3]. In this study, a sunflower husk treated with 1% hydrochloric acid was used to evaluate removal efficiency for Ni from real wastewater samples, as well as to estimate the adsorption capacity as a function of contact time between the heavy metal ions such as Cd in the aqueous solution and the sunflower husk as a biosorbent. Two techniques were used for quantitative

analysis, Inductively Coupled Plasma Optical Emission Spectrometry (ICP-OES) as a standard reference method and laser-induced plasma spectroscopy (LIBS) as an innovative non-standard analytical method. What makes the LIBS superior from the other standard optical techniques is that it allows fast multi-elemental analysis without prior sample preparation, leads to minimal sample damage, and is considered almost non-destructive, this method is also by the principles of green analytical chemistry, which means that it does not use toxic reagents and therefore no chemical waste [4]. The results of these two methods were compared, to examine the possibility of using laser-induced plasma spectroscopy as an alternative green analytical technology for quantitative analysis of sunflower husk as a biosorbent and evaluation of biosorption efficiency as a function of contact time.

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