

Evaluation of Utilizing Sulfonated Barely Straw and Coconut Shell Bio-Adsorbents in Removal of Methylene Blue Dye from Aqueous Solutions

تقييم استخدام المواد الماصة الحيوية لقشرة قش الشعير وقشر جوز الهند في إزالة صبغة الميثيلين الزرقاء من المحاليل المائية

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ABSTRACT

In this study, bio-adsorbent from barley straw and coconut shell were used as bio-adsorbent to remove methylene blue (MB) from wastewater, which were prepared by refluxing barely straw (BS) and coconut shell (CS) in concentrated sulfuric acid, and have a specific surface area 1.165 and 11.759 m²/g for BS-SO₃H and CS-SO₃H respectively. Several parameters are studied such as pH and initial concentration of dye in wastewater, and it is found that the adsorption capacity is improved in the basic medium; also, it is directly proportional to the initial concentration. The results from the adsorption process were found to be more fitted with Langmuir isotherm than the Freundlich isotherm for both adsorbents, so it confirmed that the adsorption process is monolayer. The maximum adsorption capacity was found to be 256.4, and 344.8 mg/g for barley straw and coconut shell respectively, and the design parameters of packed bed column were calculated for batch adsorption process.