

Produce High-Quality Activated Carbon with a Large Surface Area from Date Seeds Biomass for Water Treatment

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Abstract : Physico-chemical activation method was used to produce high-quality activated carbon (AC) with a large surface area of about 2000 m²/g from low-cost and abundant biomass wastes in Qatar, namely date seeds. X-Ray diffraction (XRD), scanning electron spectroscopy (SEM), energy dispersive X-Ray spectroscopy (EDS), and Brunauer-Emmett-Teller (BET) surface area analysis were used to evaluate the AC samples. AC produced from date seeds have a wide range of the pores available, including micro- and nano-pores. This type of AC with a well-developed pore structure may be very attractive for different applications, including air and water purification from micro and nano pollutants. Heavy metals iron (III) and copper (II) ions were removed from wastewater using the AC produced using a batch adsorption technique. The AC produced from date seeds biomass wastes show high removal of heavy metals such as iron (III) ions (100%) and copper (II) ions (97.25%). The highest removal of copper (II) ions (100%) with AC produced from date seeds was found at pH 8, whereas the lowest removal (22.63%) occurred at pH 2. The effect of adsorption time, adsorbent dose, pH on the removal of heavy metals were studied.

Keywords : activated carbon, date seeds, biomass, heavy metals removal, water treatment

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