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CACTUS JUICE PREPARATIONS AS BIOFLOCCULANT: PROPERTIES, CHARACTERISTICS AND APPLICATION

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Abstract

In this study, the flocculating properties of different cactus juice preparations were assessed using synthetic and real industrial and leachate wastewaters. It was found that the crude CJ had a flocculating activity (FA) of 89 ± 2.2% which is significantly higher than that of a powdery sample derived from a 60°C oven-dried CJ sample and which was about 37.8 ± 2.5%. Interestingly, both crude and dried samples showed the ability to flocculate kaolin suspensions within a wide pH range from 3 to 11. The flocculating activity was found to increase with the presence of divalent and trivalent cations. The enhancement is more significant in the case of the 60°C oven-dried sample. Crude bioflocculant showed to be thermally stable. Both crude and dried CJ removed COD in petrochemical and leachate wastewaters at efficiencies of 72±2.5% (with crude CJ), 69±3.0% (with dried CJ), 88±2.5% (with crude CJ) and 82±2.7% (with dried CJ), respectively. Flocculation reduced also the SS by 85±3.0% (with crude CJ), 75±1.5% (with dried CJ), 91±2.0% (with crude CJ) and 85±1.7% (with dried CJ), respectively for petrochemical and leachate wastewaters. The removal efficiency of an emerging pollutant (naproxen) from the kaolin suspension, did not exceed 32%. Physico-chemical analysis revealed that the bioflocculant is mainly composed of polysaccharide. Nevertheless, the elemental composition and the microstructure of the samples, obtained by SEM, may explain the variability of the flocculating activity of the CJ preparation.

Key words: bioflocculant, cactus juice, Opuntia, flocculating activity, emerging pollutant, naproxen

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