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Development of sodium alginate-guar-gum-tannic acid based nanocomposite hydrogel beads for removal of malachite green dye

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Abstract

Here in, we synthesized porous hydrogel beads as an effective adsorbent for removal of organic dye pollutant malachite green. The hydrogel beads were made of Sodium alginate (Ala), Guar Gum (GG) and Tannic acid (TA) reinforced with Graphene oxide (GO) prepared via crosslinking with Cu<sup>2+</sup>(aq) metal ions. The mechanical, textural, spectroscopic and morphological characterisation were carried out using rheometry, texture analysis (TA), FTIR and SEM analysis. Adsorbent dosage, pH, initial dye concentration and temperature are some of the adsorption parameters investigated for their influence on removal of malachite green from the aqueous water. The Freundlich and Langmuir isotherm was used to determine the adsorption equilibrium process. Under optimized experimental conditions, a maximum adsorption capacity of 203 mg/g for Ala-GG-TA-GO at initial dye concentration of 70ppm was attained for malachite green dye. Therefore, prepared hydrogel beads may be favourable materials towards dye

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