Supplementary materials

Efficient removal of Cu (II) from wastewater using chitosan derived from shrimp shells: kinetic, thermodynamic, optimization and modeling study

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The IR spectrum of the prepared chitosan sample was recorded using an ATR-IR spectrophotometer (Nicolet iS5, Thermo Fisher Scientific, Waltham, WA, USA) over the range of 4000–400 cm^{-1} with a resolution of 4 cm^{-1}. This analysis was conducted to identify the functional groups present in the deacetylated chitosan powder and to investigate possible interactions between hydroxyl and amide groups, which play a key role in determining the degree of deacetylation (DD).

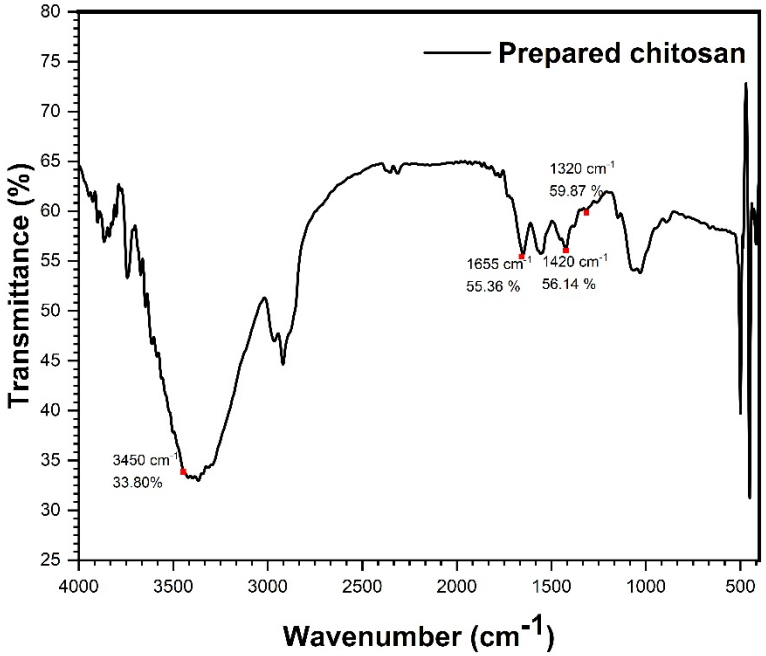


Figure S1. FTIR spectra of prepared chitosan.

According to the equation of Sabnis and Block (1997) [1];

$$DD = 97.67 - \left(26.486 * \frac{A_{1655cm^{-1}}}{A_{3450cm^{-1}}}\right)$$

According to the assay method, the synthesized chitosan exhibited a degree of deacetylation (DD) of 76.47% as determined by conductometric titration. This result was further confirmed by infrared (IR) spectroscopy, which estimated the DD to be 83.2% using an equation based on transmittance values (Fig. S1). The close agreement between the two methods (76.47% and 83.2%) confirms that the chitosan is highly deacetylated. A DD greater than 70% is generally

[1] Sabnis, S., & Block, L. H. (1997). Improved infrared spectroscopic method for the analysis of degree of N-deacetylation. Polymer Bulletin, 39, 67–71.