Investigation on adsorptive removal of basic dye by seaweed-derived biosorbent: considering effects of sorbent dosage, ionic strength and agitation speed

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ABSTRACT

Discharge of dyes from industries such as textile, cosmetic, paint and ink is one of the main concerns around the world nowadays. In the present study, locally available brown seaweed, *Sargassum binderi* was used to remove a basic dye – Basic Yellow 11 (BY11) – from aqueous solution. In batch sorption process, affecting parameters such as sorbent dosage, ionic strength and agitation rate were investigated for the optimum removal of BY11. The optimal sorption of BY11 (with more than 80% of uptake) was attained by contacting 1 g of dried *S. binderi* at 200 rpm in 100 mg/L of BY11 solution containing 500 mmol/L NaCl. By considering the effect of sorbent dosage, the adsorption mechanisms complied well with the Freundlich model ($R^2 = 0.94$) which suggested that the adsorption of BY11 could be attributed to the functional groups on the cell wall via the multiple layer adsorption process. Value of an important Freundlich constant (n) is 1.27, indicating a favourable adsorption process. The results of present study highlighted the practicability and potential of marine seaweeds as a low cost biosorbent in treating dye-contaminated wastewater.

Keywords: Seaweed; *Sargassum binderi*; Basic Yellow 11; Freundlich isotherm; Langmuir isotherm

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