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Original Research Article

Extraction characterization and application of bio-coagulant for treating dyes containing solution using *aristeus antennatus* and *aristaeomorpha foliacea* red shrimps

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Chitosan is a biopolymer having huge possibilities when it comes to chemical and mechanical structural changes. These physicochemical properties confer to the polymer numerous areas of applications, in particular in the area of water treatment. From the environmental point of view, this will result in a much lower risk of toxicity for the treated waters. In addition, the sludge produced would be in lesser quantity, with a better biodegradability and a low metal content. Shells of red shrimp (*Aristeus antennatus* and *Aristaeomorpha foliacea*) fished locally 45 km to the west of Algiers, were used as raw materials for the extraction of chitosan by deproteinization, demineralization and deacetylation. The final product was characterized by different methods (FTIR, potentiometric titration, SEM, DRX); the deacetylation degree of chitosan was found to be around 75%, which was compared in the rest of this study with commercial chitosan at 95% deacetylation degree. In most cases, this polymer is used as adsorbent in its solid form, but it can also be used in the dissolved state in the coagulation-flocculation process. This work is concerned with the use of dissolved chitosan for the removal of sulfonated azo dyes. Amongst the important parameters affecting the coagulation-flocculation process are the coagulant dose and the initial pH. The best removal rates were found to be between 50% and 55% in acidic media around pH 3. The dye coagulation mechanism appears to be governed by charge neutralization. The dye sulfonic groups being attracted to protonated amino groups of chitosan in the colored solution.

Key words: Red shrimp, chitosan, characterization, coagulation-flocculation, sulfonated azo dyes.

INTRODUCTION

In recent years, great attention has been paid to the bioactivity of natural products obtained from plant, animal and in addition of marine origin, mainly to the concern on the environmental problems regarding the disposal of marine processing shellfish wastes consisting of crustacean exoskeletons. Chitin is a major component of the carapaces, crusts and shells of crustaceans such as shrimps and crabs, its estimated consumption is 4 million tons per year (planetoscope.com). Chitin and chitosan are of commercial interest because of their high nitrogen content (6.89%) and their excellent properties such as biocompatibility, biodegradability, non-toxicity and adsorptive abilities (Majeti et al., 2000 and Muzzarelli et al., 2005). Recently, however, chitosan has come back into the