The Effect of Natural Chitosan on the Removal of Azo Dyes from Water

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The purpose of this experiment was to determine if the properties of chitosan were significant factors in removing Azo dye from solution. Congo Red – a dangerous azo dye – is commonly found in the waste waters of textile manufacturing areas such as Southeast Asia, Eastern Africa, and the Mediterranean. The easy access to water in these areas makes chitosan a plentiful source as it is abundant in the shells of crustaceans. It was hypothesized that if pure, chitosan powder was mixed in Congo Red dye solutions, then the greatest amount of dye would be removed from the most concentrated solution. The 0 M solution's average absorbance was measured at 0, 5.740 x 10-6 M was at 0.325, 1.378 x 10-5 M was at 0.519, and 2.871 x 10-5 M was at 0.989. Following, 1.00 gram of chitosan powder was mixed into each solution and allowed to stir for an hour. At 15, 30, 45, and 60 minutes respectively, a sample of solution was removed, filtered, and the remaining contents' absorbance were measured. The final absorbance levels were, with respect to the lowest to highest concentration solutions, 0.004, 0.002, 0.003, and 0.007 – which supports the initial hypothesis. Furthermore, the data was entered into a One-Way ANOVA test that produced a p-value of 0.01182 with a significance factor of 0.05, which concludes that the introduction of chitosan led to the significant removal of Congo Red dye from solution.

Awards Won:

Spectroscopy Society of Pittsburgh: Third Award of $750.00