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Efficient removal and separation of anionic dyes from aqueous medium by the application of reverse micelles of cationic surfactants

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ABSTRACT

A new protocol based on liquid/liquid extraction using reverse micelles is proposed. The recovery of solvent and reuse of dye and surfactant, after extracting the dye molecules from the core of reverse micelles of surfactant is related to the economic viability of the process. Experiments were conducted by mixing a known quantity of dye in aqueous phase and solvent-containing surfactants in a simple mixer. The separation of solvent phase, containing encapsulated dye in reverse micelles, from aqueous phase due to gravity results in separation of dye from water. The removal of different anionic dyes (methyl orange, congo red and aniline blue) from aqueous phase in amyl alcohol solvent using different cationic surfactants was studied. The percentage removal of dye depends upon the size of the reverse micelle of the surfactant. The solvent used for the dye removal can be recovered by distillation method and can be reused. The dye is separated from reverse micelles by lowering the temperature below the Kraft point by using the solvent depending upon the solubility of the two. Hence all the components of the experiment can be recovered and reused.

Keywords: Cationic surfactants; Solvent extraction; Dye removal; Reverse micelles; Anionic dyes

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