



## Effect of chitosan addition on phenanthrene solubilization in anionic or cationic surfactant solutions

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### ABSTRACT

The solubility of solid phenanthrene (PHE) powder in aqueous solutions of surfactant and chitosan (CS) was evaluated by varying the composition of aqueous mixtures. Cetyltrimethyl ammoniumbromide (CTAB) and sodium dodecyl sulfate (SDS) were used as model cationic and anionic surfactants, respectively. CS at a particular concentration in the mixture especially above the CMC value of the anionic surfactant exhibited somewhat higher PHE solubility values than surfactant itself. CS (20 mg/l)-SDS (20 g/l) solution showed higher PHE solubility (422.05 mg/l) than that of 20 g/l SDS (377.92 mg/g). However, CS-CTAB did not show any additional enhancing effect on PHE solubilization, and CS (5 mg/l)-CTAB (10 g/l) solution showed almost similar PHE solubility (867.23 mg/l) of 10 g/l CTAB (865.25 mg/g). The maximum increase in absorbance value of a 20 ml CS solution (5, 20 and 100 mg/l) at 540 nm with stepwise addition of SDS (10 g/l) was found at a SDS concentration much less than its CMC value (2.33 g/l) in the mixture, indicating strong complex formation between CS and SDS because of oppositely charged molecules in the experimental conditions.

*Keywords:* Phenanthrene; Surfactant; Chitosan; Critical micelle concentration; Soil washing; Solubilization

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