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Removal of an Acid Dye from Water Using Cloud Point Extraction and Investigation of Surfactant Regeneration by pH Control

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Abstract : This work concerns the coacervate extraction of industrial dye, namely BezanylGreen - F2B, from an aqueous solution by nonionic surfactant “Lutensol AO7 and TX-114” (readily biodegradable). Binary water/surfactant and pseudo-binary (in the presence of solute) phase diagrams were plotted. The extraction results as a function of wt.% of the surfactant and temperature are expressed by the following four quantities: percentage of solute extracted, E%, residual concentrations of solute and surfactant in the dilute phase (Xs,w, and Xt,w, respectively) and volume fraction of coacervate at equilibrium (Φc). For each parameter, whose values are determined by a design of experiments, these results are subjected to empirical smoothing in three dimensions. The aim of this study is to find out the best compromise between E% and Φc. E% increases with surfactant concentration and temperature in optimal conditions, and the extraction extent of TA reaches 98 and 96 % using TX-114 and Lutensol AO7, respectively. The effect of sodium sulfate or cetyltrimethylammonium bromide (CTAB) addition is also studied. Finally, the possibility of recycling the surfactant is proved.

Keywords : extraction, cloud point, non ionic surfactant, bezanyl green
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