

Study of the Effects of Polar Organic solvent and Temperature on the Micellization of Cationic Surfactants with different hydrophobic groups

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INTRODUCTION: Surfactants are amphiphilic compounds with remarkable ability to influence the properties of the surfaces and interfaces. They are widely used in various industrial fields such as detergents, textile, and herbicides formulations. In many of these applications, the use of surfactant mixtures in some organic solvents improves significantly the performance over the single monomeric surfactant system.

AIM: The study aims at establishing the extent of ideality or otherwise in the mixed micelles of tetradecyltrimethylammonium bromide (TTABr) and cetyltrimethylammonium bromide (CTABr) in water (AQ) and water-monoethanolamine (AQ-MEA) media at different mole fractions (1.0 to 0.6) and temperatures (298.1 to 313.1 K)

METHOD: conductance measurements.

RESULTS: The critical micelle concentration values (CMC₁₂) obtained in water was slightly lower than that obtained assuming an ideal mixing system. Substantial deviation from ideality was observed in the presence of AQ-MEA at all temperatures, suggestive of more favourable association in the mixed micelle at elevated temperatures. The values of the CMC₁₂ was analyzed in the context of Rubingh's model. The values of the composition of the mixed micelles (χ_1) showed that CTABr was dominant and the values of the interactions parameters (β_{12}) were negative in AQ and AQ-MEA media with the values being more favourable in the latter case. The values of the activity coefficients (f_1, f_2) were below unity. Further, the

results of the energetics of micellization also showed that the process was spontaneous, and feasible.

CONCLUSION: Enhancement of hydrophobic interactions occurred in AQ-MEA especially at 1.0: 0.9 mole fractional ratio.

KEYWORD: Surfactant, Temperature and solvent