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Solution properties of phenothiazine drug promazine hydrochloride with cationic hydrotropes in aqueous/electrolyte solution at different temperature

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Abstract

The current work deals with the mixed micellization phenomena of surface active promazine hydrochloride (PMZ) drug with cationic hydrotropes (para-toluidine hydrochloride and ortho-toluidine hydrochloride) in absence and occurrence of 50mmolkg⁻¹ NaCl at five different temperature (293,15-313,15K). PMZ is an amphiphilic phenothiazine drug and employed for the cure of mania and schizophrenia. Conductometry measurement was employed to gain a detailed picture of the interactions between drug and hydrotrope molecules. The experimental data were analyzed according to different mixing models within the outline of the pseudophase separation model. The evaluated values of critical micelle concentration (cmc) were found to be inferior than cmc(id) values signifying attractive interactions involving the both components in the solutions, NaCl further reduces the cmc of pure amphiphiles and their mixed systems as a result of screening of the electrostatic repulsion between the polar head groups. The micellar mole fractions (X-1) of hydrotropes evaluated by various proposed models were constantly more than ideal values (X-1(id)) signifying high involvements of hydrotrope in mixed micelles. Activity coefficients (f(1)(Rub) and f(2)(Rub)) were always below one in all cases signifying synergism in mixed micelles. Thermodynamic parameters favor the process of micellization which is found to be entropy driven. The negative values of free energies of mixing demonstrated the stability of the mixed systems of drug and hydrotrope. Copyright (c) 2016 John Wiley & Sons, Ltd.

Keywords

Author Keywords: critical micelle concentration (cmc); enthalpy; mixed micelles; promazine hydrochloride (PMZ); stability

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