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Aggregation behavior of amphiphilic drug promazine hydrochloride and sodium dodecylbenzenesulfonate mixtures under the influence of NaCl/urea at various concentration and temperatures

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Abstract

Micellization (aggregation) phenomenon of amphiphilic phenothiazine drug promazine hydrochloride (PMZ) and sodium dodecylbenzenesulfonate (SDBS) mixtures in absence and attendance of 50mmol.kg(-1) NaCl (salt)/300mmol.kg(-1) urea was investigated conductometrically at five various temperatures (293.15-318.15K) at gaps of T=5K. PMZ is employed for the cure of mania and schizophrenia. The critical micelle concentration (CMC) values have been evaluated and defined in terms of hydrophobicity and hydrophilicity of PMZ and SDBS in aqueous and nonaqueous solutions. With increasing the temperature, the CMC first increases then decreases. At 303.15K, the maximum CMC values were obtained in absence and presence of NaCl/urea. NaCl reduces the CMC of pure amphiphiles and their mixtures while urea increases. Various physicochemical parameters such as CMCid (ideal critical micelle concentration), micellar mole fraction of SDBS (X-1) (calculated by different proposed models), and interaction parameter have been evaluated and discussed in detail. The values of degree of dissociation (g) and CMC of the micelles were utilized to evaluate the different thermodynamic parameters. Activity coefficients (f(1) and f(2)) and excess free energy of micellization (G(ex)) values were also evaluated. All outcomes obtained herein show attractive interactions in the mixtures of PMZ and SDBS. Copyright (c) 2016 John Wiley & Sons, Ltd.

Keywords

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