Available online at **www.joac.info**

ISSN: 2278-1862

Journal of Applicable Chemistry

2016, 5 (1): 191-203

(International Peer Reviewed Journal)

Micellar Properties of Benzyl Dimethyl Dodecyl Ammonium Bromide in Aqueous Non Polar Organic Additives

Anita D. Mudawadkar[1]* and Tryambak J. Patil[2]

1. Department of Chemistry, K V P's Kisan Arts, Commerce and Science College, Parola, Dist Jalgaon 425111 (M.S), **INDIA**
2. Department of Chemistry, JET's Z. B. Patil College, Dhule 424002, (M.S.), **INDIA**

Email: tjpatil123@rediffmail.com

Accepted on 2nd December 2015

ABSTRACT

The micellar properties of benzyl dimethyl dodecyl ammonium bromide have been studied by conductivity method. The micellization process of cationic surfactant BDDAB in aqueous medium by conductivity method in the presence of additives such as urea and acetamide at different temperatures ranging from 303.15 to 318.15 K has been investigated. From the conductivity data the critical micelle concentration (CMC) and the effective degree of counter-ion binding (β), were obtained at various temperatures using a simple non-linear function obtained by direct integration of a Boltzmann-type sigmoidal function. The thermodynamics of micellization i.e. Gibbs free energy (ΔG^0_m), enthalpy (ΔH^0_m) and entropy (ΔS^0_m) have also been determined. The thermodynamic parameters were estimated from the temperature dependence of the equilibrium constants for the micellization of surfactant using the phase separation model. The stability of the micellization process for this surfactant is both enthalpy and entropy controlled. The resulting ΔH^0_m Vs $T\Delta S^0_m$ plots showed significant correlation, an indication of enthalpy-entropy compensation in the micellization process. The increase of critical micelle concentration of BDDAB with additives has been discussed on the basis of water structure, solvent properties and hydrophobic interaction. In the present studies, micellization behavior of benzyl dimethyl dodecyl ammonium bromide, BDDAB has been studied in the aqueous solution, containing 0.2, 0.4 and 0.6M urea and acetamide as a solvent, using specific conductance's (κ), in the temperature range 30–45°C at an interval of 5°C. The CMC of BDDAB was determined from the plots of specific conductance (κ) of BDDAB in aqueous and in non-polar organic additive solution. The CMC values of surfactant increase with increase in temperature but they decrease linearly with increase in the concentration of the additives. By using CMC data various thermodynamic parameters have also been evaluated.

Keywords: Micellization, electrical conductivity, BDDAB, urea, acetamide.