Surface Properties of Amphiphilic Drugs in Presence of Cationic Surfactants

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Abstract — Surface properties of two amphiphilic drugs i.e. amitriptyline and imipramine have been studied in the absence and presence of some cationic surfactants i.e. alkyltriphenylphosphonium bromide [R = 16 (CTPB), R = 14 (TTPB)] and alkyldiethylcthanolammonium bromide [R = 16 (CDEEAB), R = 14 (TDEEAB)] by surface tension measurement at 300 K. The critical micelle concentration (CMC), maximum surface excess concentration at the air/water interface ($\Gamma_{\text{max}}$), minimum area per surfactant molecule at the air-water interface ($A_{\text{min}}$) and the surface pressure at the CMC ($\pi_{\text{CMC}}$) have been determined. $\Gamma_{\text{max}}$ value increases and CMC/\pi_{\text{CMC}} decrease & with an increasing mole fraction of surfactants. The solubility of amphiphilic drugs in cationic surfactant systems has also been studied.

Keywords : Amphiphilic drug, additives, cationic surfactant, surface properties, surface tension

INTRODUCTION

The micellar and interfacial properties of amphiphilic drugs are very useful in the pharmaceutical science. Many drug molecules are amphiphilic and self-associate in aqueous environment to form small aggregates, above their critical micelle concentration (CMC) [1]. This surface-active behavior among many diverse classes of drugs has been reported and attempts have been made to correlate surface and biological activities [1–3]. The aggregation of the above drugs follows the same