CHAPTER II
LITERATURE SURVEY

Folmer *et al.* (1997) studied the influence of concentration of the amphoteric surfactant sodium N-(hydroxydodecyl)sarcosinate on surface tension for enzyme-surfactant solution. At low pH the amphoteric surfactant is positively charged, the surface tension in the presence of enzyme remains at an almost constant value until a relatively high surfactant concentration is reached before it decrease steeply. This behavior is indicative of aggregate formation between the enzyme and the positively charged surfactant at surfactant concentrations below the critical micelle concentration. Extensive surfactant packing at the air-water interface with a concommittant decrease in surface tension will not occur until the enzyme, both in solution and at the surface, is saturated with surfactant molecules.

Kamenka *et al.* (1995) studied The binding Br^- ions to zwitterionic micelle by measuring the decrease of the pyrene fluorescence intensity due to quenching by Br^- as a function of the surfactant and salt concentration, keeping the molar concentration ratio [surfactant] / [KBr] ≈ 1, as in electrical conductivity measurements. A decrease of intensity was observed for the systems in the presence of KBr, which can be attributed to the quenching of the pyrene fluorescence associated to the binding of Br^- to the zwitterionic micelles. The addition of Br^-ions to a micellar solution containing solubilized pyrene changed the fluorescence intensity only when the Br^- ions binded to the micelles. Therefore, addition of NaBr to micellar solutions of sodium dodecyl sulfate had no effect on the fluorescence intensity of micelle-solubilized pyrene because the Br^- ions were repelled by negatively charged micelle surface, whereas such additions to a micellar solution of dodecyltrimethyl- ammonium chloride resulted in a decrease of the fluorescence intensity, as Br^- ions binded to the positively charged. Evidence is presented for the binding of cations and anions to zwitterionic micellar aggregates. The degree of binding has been obtained for Na^+, Ca^+ and Cl^- ions; it is always larger for the anions.

Zwitterionic surfactants may interact differently with anionic surfactants than cationic surfactants. A zwitterion that can acquire a proton, can eliminate its negative charge and effectively become positively charged. It can then interact more strongly with anionic surfactants. On the other hand, a zwiitterion that can donate a proton can become negatively charged and can then interact more strongly than cationic surfactants. The acquisition of a positive or negative charge by a zwitterion depends both on the solution pH and on the surfactant with which it is mixed.

Shiloach and Blankschtein (1997) studied effect of pH on the interaction of binary surfactant containing zwitterionic surfactant solutions. They found that in both case of mixture DTAB and $C_{12}SO_3Na$, the zwitterionic surfactant is C_{12}BMG. The carboxylic acid group on this surfactant can accept a proton, thus neutralizing some of the negative charge and, in effect, acquiring a partial positive charge. The amount of positive charge acquired depends on solution condition such as pH. The partially positively-charged surfactant then interacts much more strongly with the anionic $C_{12}SO_3Na$ ($\beta_{AB}^{exp} = -4.5$) than with the cationic DTAB ($\beta_{AB}^{exp} = -1.3$), β_{AB} is the interaction parameter which reflects interactions between the two surfactants (A and B) at the micellar level. In fact, because the low experimental β_{AB} parameter indicates weaker attractive interactions in the DTAB mixture, we can infer an electrostatic repulsion.

Yamaguchi *et al.* (1997) found that the TDMAO surfactant is mainly adsorbed to saponite in the zwitterionic form and only fraction in the protonated form. In the saturated state the saponite adsorb as much nonionic surfactant as zwitterionic surfactant.