Chapter IV

Conclusions
IV. CONCLUSIONS

The conclusions, which have been drawn on the basis of the results of the entire work undertaken, are summarized below.

A preferred incorporation of alcohols into the interfacial head group region lowers the partition equilibrium constant, $K_p$, initially up to surfactant to alcohol w/w ratio of 1:1 for SDS and 1:2 for SDBS in both micellar solutions and benzene-SDS-alcohol-water o/w microemulsions. The $K_p$ increases as the ratio exceeds the values corresponding to the minima due to increased solubilization of the alcohol in the hydrocarbon chain region of the surfactants in the oil-water interface. At a given volume fraction of oil, the partition equilibrium constant increases in the order propan-2-ol < propan-1-ol < butan-2-ol < butan-1-ol < pentan-3-ol < pentan-2-ol < pentan-1-ol. The trend can be attributed to synergistic surface activity between the surfactant and the alcohols. The equilibrium constant for partition of PR between oil-water interface and bulk water increase with increase in the oil fraction at fixed surfactant-alcohol ratio. This happens because the dye is incorporated to the hydrocarbon region of the interface when the droplet curvature decreases with increase in the oil fraction.

The partition of the dye into the micelles or the o/w interface was higher in the case of SDBS than in SDS, which was due to the higher hydrophobicity of SDBS than SDS.

The partition constant for partition of PR between oil-water interface and bulk water increases quite linearly with increase in the oil fraction at fixed pH. The
equilibrium constant increases with increase in the oil fraction at fixed pH due to incorporation of the dye in the hydrocarbon region of the interface with decreasing droplet curvature. In Tris buffer system, the organic buffer component competes with the dye for incorporation to the oil-water interface around the oil droplets.

The method for calculation of droplet size predicted droplet radius in the benzene-SDS-(butan-1-ol)-water o/w microemulsions within expected range and increase with increase in the oil fraction. The value of $p$ has been found to be a power function of $(|S| - CAC)$, of the type $P = a (|S| - CAC)^b$, with good correlation, where, $a$ and $b$ are two constants characteristic of the oil fraction, surfactant, cosurfactant and their ratio.

Partition of an organic buffer component, viz., formic acid between oil and aqueous pseudophase plays a crucial role in acid-base equilibria and partition of BPB in buffered o/w microemulsions. The spectral evidences indicate that the pH of the buffered aqueous pseudophase is increased due to the passage of the organic buffer component into the oil of the droplets and the oil-water interface.

BPB is partitioned between oil-water interface and buffered water of the droplets of the w/o microemulsions of toluene/water/AOT. The $K_p$ decreases with increase in water fraction due to increase in the oil-water interfacial area. The $K_p$ decreases with increase in the pH due to lower tendency of the base form of the dye for association with the anionic oil-water interface compared to that of the acid form. The negative charge density at the droplet surface increases with increase in the pH.