

Physicochemical Studies of Some Single and Mixed Microemulsion Systems. I : Phase Behaviour of Surfactant/Cosurfactant/Oil/Water Systems and the Effect of Temperature, Additives and Oil.

RAJIB K. MITRA AND BIDYUT K. PAUL*

Geological Studies Unit, Indian Statistical Institute, 203 Barrackpore Trunk Road, Kolkata 700108.

Abstract - Phase behaviours of pseudo-ternary systems containing surfactants (single and mixed)/ cosurfactant(s)/ oil(s)/water have been studied at 30°C. The influence of charge types (cationic, anionic and nonionic) of surfactants along with their chain lengths, structure and mixing ratios, type of cosurfactants and oils (hydrocarbon, nonhydrocarbon, ester of myristic acid, plant/vegetable) on the extent of monophasic domain in the phase diagrams has been investigated. Role of cosurfactant of different lipophilicities vis-a-vis structures has been explained for microemulsions using hydrocarbon (iso-octane) and plant oil (eucalyptus). Development of microemulsions (both single and mixed surfactant types, nonionic -anionic, nonionic -cationic) with specific properties, namely, large monophasic domain using both hydrocarbon as well as plant/vegetable and biocompatible type of oils (clove, saffola, eucalyptus, isopropyl myristate) in single and mixed proportion, has been emphasized. In addition, some representative phase studies of single (CPC, CTAB, SDS and SDBS) and also mixed with nonionic surfactant (Brij-35) at different mass proportions using cosurfactants (1-butanol and 2-butanol) in four different types of oils (cyclohexane, heptane, isobutyl benzene and isopropyl myristate) have been carried out with a nonaqueous polar solvent (formamide) for comparison with water. The effect of temperature and additives (sodium chloride, urea and glucose) on the stability as well as on the extent of monophasic domain of single and mixed microemulsion systems has been explored. A data-base comprising large monophasic domain with high solubilization power and other characteristic features has been developed.
