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Micellization Behaviour of Sodium Dodecylsulfate and Dioctyl Sulfosuccinate in the presence of Sodium Salicylate

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Abstract Critical micelle concentrations of sodium dodecylsulfate (SDS) and dioctyl sulfosuccinate (AOT) were determined at 25 °C in aqueous medium as a function of sodium salicylate (NaSa) concentration by surface tension and EMF methods. In the case of SDS, conductance method was also used. Salicylate ion is found to affect the critical micelle concentrations of SDS and AOT when the concentration of NaSa becomes > 0.03 and 0.02 mol kg^{-1} , respectively. In the presence of NaSa, the counter ion binding constant for AOT has a single value equal to 0.47 and that for SDS is equal to 0.56. The higher value of the counter ion binding constant equal to about 0.8 observed earlier for AOT in sodium chloride, sodium acetate, sodium propionate and sodium butyrate solutions above $0.015 \text{ mol kg}^{-1}$ of salt concentration has not been observed in NaSa solution. The effect of salicylate ion on the critical micelle concentration of SDS and AOT and on the counter ion binding constant of AOT is attributed to mixed micelle formation of salicylate with the anionic surfactants. It is considered that the salicylate ions reside just outside the Stern layer of the anionic micelles and form ion pairs with the sodium ions bound to the micelles. Salicylate ion does not seem to have significant influence on the surface activity of SDS and AOT. Standard free energies of micellization and adsorption of SDS and AOT in the presence of NaSa were also evaluated.

Keywords : Sodium dodecylsulfate, dioctyl sulfosuccinate, sodium salicylate, surface tension, emf, electrical conductance, critical micelle concentration, counter ion binding constant, surface excess, free energy of micellization, free energy of adsorption.
