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Adsorption Kinetics and Equilibria at an Air-Liquid Interface of Biosurfactant and Synthetic Surfactant

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Abstract : The adsorption of anionic biosurfactant (surfactin) and anionic synthetic surfactant (sodium dodecylbenzenesulphonate, abbreviated as SDOBS) from phosphate buffer containing high concentrations of co- and counter-ions to the air-buffer interface has been investigated. The self-assembly of the two surfactants at the interface has been monitored through dynamic surface tension measurements. The equilibrium surface pressure-surfactant concentration data in the premicellar region were regressed using Gibbs adsorption equation. The predicted surface saturations for SDOBS and surfactin are and, respectively. The occupied area per an SDOBS molecule at the interface saturation condition is while that occupied by a surfactin molecule is. The surface saturations reported in this work for both surfactants are in a very good agreement with those obtained using expensive techniques such as neutron reflectometry, suggesting that the surface tension measurements coupled with appropriate theoretical analysis could provide useful information comparable to those obtained using highly sophisticated techniques.

Keywords : adsorption, air-liquid interface, biosurfactant, surface tension
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