

Evaluation of Naphthalene Bioavailability in Micellar Phase of Nonionic Surfactant

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Abstract

Surfactants above their critical micelle concentration can solubilize hydrophobic contaminants into their micelles. This process enhances the apparent solubility of contaminants. Conceivably in the absence of any inhibitory effects, such surfactants enhance the biodegradation of the contaminants. However, all contaminants in liquid phase cannot affect directly to microorganisms, because contaminants in liquid phase exist in 2 parts: aqueous and micellar pseudophase. Therefore, the bioavailability of the contaminants in the micellar phase is an important factor that affects the overall biodegradation rate in surfactant/water systems. A mathematical model was developed for estimating the partitioning of the contaminants and their enhanced solubility by adding surfactants. The standard ISO microbial toxicity assay was applied to measure the toxicity of hydrophobic contaminants in water samples. The luminescent bacteria, *Vibrio fischeri*, were used for the measurement of toxicity. Naphthalene as a model contaminant and Brij 30 as a nonionic surfactant were used. The effective micellar-phase contaminant measured by microbial toxicity assays was compared with the reference bioavailability data.

References

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