Biocompatible Microemulsions: Formulation, Interfacial Properties and Applications

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Biocompatible and biodegradable microemulsions are of growing interest to the food, cosmetic and pharmaceutical industry as solubilization media of hydrophilic, hydrophobic and amphiphilic reactive molecules. In the present study we propose the use limonene and olive oil as the non-polar solvent, lecithin as surfactant and 1,2-pentanediol as co-surfactant for the formulation of biocompatible (W/O) microemulsions. The choice of the compositions of the microemulsions used was based on the pseudo-ternary phase diagrams of the four-component system determined at 25° C for different weight ratios of the components.

Electron Paramagnetic Resonance (EPR) spectroscopy using the spin-labeling technique was undertaken to study the interfacial properties of the surfactant monolayer in biocompatible (W/O) microemulsions (1). The spin-labeled fatty acid 5-doxyl stearic acid (5-DSA) is a long amphiphile molecule having the tendency to align with the surfactant molecules. EPR spectra of the interfacial located spin probe reflect the mobility of the probe and the rigidity of its environment. To express the rigidity quantitatively, the order parameter *S* was calculated (2). The mobility of the spin probe in the membrane is reflected by the rotational correlation time, τ_R (3). By varying the water content of the system both mobility of the probe and membrane rigidity were affected.

The use of biocompatible (W/O) microemulsions as reaction media for the enzymatic synthesis of esters with potential application in the food industry was studied. Lipases from *Candida rugosa* and *Rhizomucor miehei* were solubilized in the microemulsion systems mentioned above and various esterification reactions were followed (4).

References

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