Preparation of microemulsions using polyglycerol fatty acid esters as surfactant for the delivery of protein drugs.

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Abstract

Phase diagrams containing the microemulsion region were constructed for pseudo-ternary systems composed for polyglycerol fatty acid ester/cosurfactant/Captex 300/water. It was found necessary to add ethanol, 1-propanol, 1-butanol as cosurfactant to produce microemulsions. The results also demonstrated microemulsions were only able to form when employing polyglycerol fatty acid esters with hydrophile-lipophile balances (HLBs) between 8 and 13, such as MO500, MO750, SO750, and ML310. Most microemulsions were determined to be Winsor type IV by dilution and dye solubility tests. Microemulsions stored at ambient temperature maintained constant viscosity, indicating that the system was thermodynamically stable for long periods. Further, several microemulsion formulations were demonstrated to be promising for oral delivery of insulin based on the results of stability tests and acid-protection efficiency.