

Preparation of O/I₁-Type Gel Emulsions Encapsulating UV Absorbing Agents

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Oil-in-cubic phase (O/I₁) emulsions encapsulating cosmetic UV absorbing agents, 2-ethylhexyl 4-methoxycinnamate (EHMC), 2-ethylhexyl 2-cyano-3,3-diphenylacrylate (OCR) and 1-(4-tert-butylphenyl)-3-(4-methoxyphenyl)-1,3-propanedione (TBMP), were prepared by vortex mixing accompanied with a heating-cooling process. A ternary phase diagram in a water/C₁₂EO₂₅/EHMC system at 25°C was constructed and a two-phase equilibrium of an oil phase and an I₁ phase, which is necessary to prepare the O/I₁-type emulsions, was confirmed. Also melting of the I₁ phase into fluid micellar solution phase was confirmed, allowing emulsification with a heating-cooling process. The O/I₁-type emulsions were formulated in the ternary system as well as a four-component system containing, in addition, a cosolvent (isopropyl mylistate), which can reduce the composition of EHMC having a poisonous nature with keeping low surfactant concentration. Formulation of the O/I₁-type emulsions with other UV absorbing agents (OCR and TBMP) was also possible by the same emulsification method. UV absorbability of the O/I₁-type emulsions encapsulating UV absorbing agents was confirmed by UV absorption spectra. We have also studied the formulation and UV absorbability of the S/I₁-type dispersions obtained by substituting isopropyl mylistate with tripalmitin.