

**Effects of nonionic surfactants and polymers on O/W/O emulsion and silica particles encapsulating retinol**

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Retinol has been used widely for cosmetics and pharmaceuticals because it has an influence on the wrinkles and the skin aging. Besides, the deficiency of this compound causes roughening of the skin and degeneration of mucous membranes. However, retinol is very unstable against light, heat and oxygen. Many studies have been attempted to reduce a denaturalization of retinol through the encapsulation of retinol within particles or the addition of antioxidants.

In this study, we performed the emulsification of retinol and the preparation of silica particles encapsulating retinol using O/W/O multiple emulsion. Tween20 and Span80 are used as surfactants and PEG, PVP, and Pluronic P123 are used as stabilizers of retinol. The morphology of emulsion and the size distribution were studied by optical microscopy and the phase separation of O/W/O emulsion was investigated. Encapsulation efficiency of retinol was determined from HPLC and FE-SEM was used to observe the morphology and the size of particles.