Fabrication of fucoxanthin-loaded microsphere (F-LM) by two steps double-emulsion solvent evaporation method and characterization of fucoxanthin before and after microencapsulation

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Abstract

Microencapsulation is a promising approach in drug delivery to protect the drug from degradation and allow controlled release of the drug in the body. Fucoxanthin-loaded microsphere (F-LM) was fabricated by two step w/o/w double emulsion solvent evaporation method with poly (L-lactic-coglycolic acid) (PLGA) as carrier. The effect of four types of surfactants (PVA, Tween-20, Span-20 and SDS), homogenization speed, and concentration of PLGA polymer and surfactant (PVA), respectively, on particle size and morphology of F-LM were investigated. Among the surfactants tested, PVA showed the best results with smallest particle size (9.18 μm) and a smooth spherical surface. Increasing the homogenization speed resulted in a smaller particle size from 9.18 to 4.86 μm. Fucoxanthin characterization before and after microencapsulation was carried out to assess the success of the microencapsulation procedure. Thermo gravimetry analysis (TGA), glass transition (Tg) temperature of F-LM and fucoxanthin measured using DSC, ATR-FTIR and XRD indicated that fucoxanthin was successfully encapsulated into the PLGA matrix, while maintaining the structural and chemical integrity of fucoxanthin. © 2016 by Japan Oil Chemists’ Society.

Author keywords

Fucoxanthin; Microencapsulation; Microsphere; Solvent evaporation method; W/o/w double emulsion

Indexed keywords

Engineering controlled terms: Chemical analysis; Controlled drug delivery; Emulsionification; Evaporation; Fluorine; Glass transition; Microencapsulation; Microspheres; Morphology; Solvents; Surface active agents

Controlled release; Double emulsion-solvent evaporation; Double emulsions; Fucoxanthin; Mean particle size; Particle size and morphologies; Solvent evaporation method; Spherical surface

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MeSH: Drug Carriers; Drug Compounding; Emulsions; Lactic Acid; Microspheres; Particle Size; Polyglycolic Acid; Solvents; Surface Properties; Surface-Active Agents; Volatilization; Xanthophylls

Medline is the source for the MeSH terms of this document.