β-Carotene nanodispersions: preparation, characterization and stability evaluation

ABSTRACT

The aim of the present study was to investigate the preparation of ϐ-carotene nanodispersions as potential active ingredients for food formulations. Nanodispersions containing ϐ-carotene were obtained by a process based on an emulsificationï evaporation technique. The preparation method consisted of emulsifying an organic solution of ϐ-carotene in an aqueous solution containing emulsifier using two different homogenizers (a conventional homogenizer and a microfluidizer), followed by direct solvent evaporation under reduced pressure. The influence of different homogenizing conditions (pressure and cycle) and two organic/aqueous phase ratios on particle size parameters and content of ϐ-carotene was investigated. In addition, the stability of ϐ-carotene nanodispersions was carried out at a storage temperature of 4 °C. The particle size distribution of ϐ-carotene in nanodispersions was demonstrated with a laser diffraction particle size analyzer and the retention of ϐ-carotene in the prepared nanodispersions was studied by high-pressure liquid chromatography. In general, homogenization pressure and cycle had significant ($P < 0.05$) effects on various particle size parameters. A volume-weighted mean diameter (D4,3) of ϐ-carotene nanoparticles, ranging from 60 to 140 nm, was observed in this study.

Keyword: Emulsification-evaporation; ϐ-carotene; Nanodispersion; High-pressure homogenization; Particle size analysis