

Effects of selected polysorbate and sucrose ester emulsifiers on the physicochemical properties of astaxanthin nanodispersions.

ABSTRACT

The effects of selected nonionic emulsifiers on the physicochemical characteristics of astaxanthin nanodispersions produced by an emulsification/evaporation technique were studied. The emulsifiers used were polysorbates (Polysorbate 20, Polysorbate 40, Polysorbate 60 and Polysorbate 80) and sucrose esters of fatty acids (sucrose laurate, palmitate, stearate and oleate). The mean particle diameters of the nanodispersions ranged from 70 nm to 150 nm, depending on the emulsifier used. In the prepared nanodispersions, the astaxanthin particle diameter decreased with increasing emulsifier hydrophilicity and decreasing carbon number of the fatty acid in the emulsifier structure. Astaxanthin nanodispersions with the smallest particle diameters were produced with Polysorbate 20 and sucrose laurate among the polysorbates and the sucrose esters, respectively. We also found that the Polysorbate 80- and sucrose oleate-stabilized nanodispersions had the highest astaxanthin losses (i.e., the lowest astaxanthin contents in the final products) among the nanodispersions. This work demonstrated the importance of emulsifier type in determining the physicochemical characteristics of astaxanthin nano-dispersions.

Keyword: Nanodispersion; Astaxanthin; Emulsification-evaporation; Emulsifier; Polysorbates; Sucrose esters.