

Preparation and Characterization of Sucrose Fatty Acid Esters Stabilized Water-Soluble Phytosterols Nanodispersion

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Phytosterols are functional lipid well known for their cholesterol lowering effect. However, due to their water insoluble nature, phytosterols fortification is limited to high fats food products. This work demonstrated the preparation of sucrose fatty acid esters (SEs) stabilized water-soluble phytosterols nanodispersion using emulsification- evaporation technique. SEs are nonionic emulsifiers consisting natural occurring substance which are human and environmental friendly. The emulsifying performance of sucrose stearate, sucrose palmitate, sucrose laurate and sucrose oleate was compared. Phytosterol nanodispersions were successfully stabilized by sucrose laurate and sucrose palmitate with a monomodal particle size distribution and particle size as small as 5.0 nm and 6.5 nm, respectively. The effects of different homogenization conditions (homogenization pressure and cycle) were investigated. High pressure homogenization improves the particle size distribution of SEs stabilized phytosterols nanodispersion. However higher number of homogenization cycles was not related to further reduction in the particle size. It is interesting to note that though SEs are non- ionic emulsifiers, sucrose laurate stabilized phytosterols nanodispersions were measured with zeta potential at more than -30 mV, which is adequate to maintain the stability of nanodispersion by electrostatic repulsion. The produced stable water soluble phytosterols nanodispersion is predicted to have better hypocholesterlemic effect due to their small particle size. It is applicable to a wider range of food products included low fat and low calories food products.

Keywords: phytosterols, nanodispersion, sucrose fatty acid esters (SEs), particle size, high pressure homogenization.