Palm-based functional lipid nanodispersions : preparation, characterization and stability evaluation.

ABSTRACT

The objective of the present study was to investigate the effect of high-pressure homogenization conditions, namely pressure (20–80 MPa) and number of cycles (1–3 cycles), on the properties of palm-based functional lipids. Nanodispersions prepared with palm-based functional lipid and Tween 20 were characterized by monitoring their physicochemical and morphological properties. The results showed that high-pressure homogenizer was an efficient emulsification technique producing small emulsion droplets with narrow size distribution. In general, the results showed that different homogenization conditions had significant ($p < 0.05$) effect on the size distribution of prepared nanodispersions. Average particles ranging from 95 to 130 nm and 140 to 210 nm were obtained for the nanoemulsions containing palm-based tocopherol–tocotrienol and carotenoid, respectively. However, this study indicated that increasing the energy input beyond moderate pressures (20–80 MPa) and cycles (1–3) led to "over-processing" of droplets. The nanodispersions proved to be physically stable and showed good stability during 12 weeks of storage.

Keyword: Emulsification-evaporation; Emulsion stability; Functional lipids; High-pressure homogenization; Morphological property; Nanodispersion.