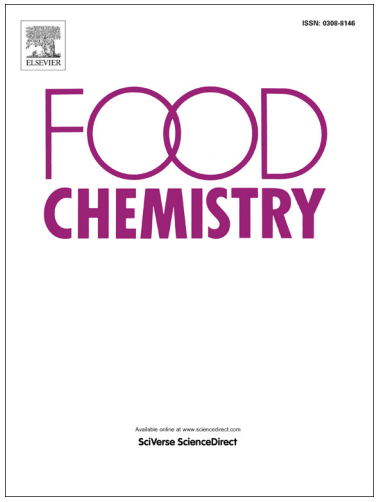

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Physical, thermal and thermodynamical study of high oleic palm oil nanoemulsions

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Abstract

Nanoemulsions are useful for encapsulating nutritionally compounds of the high oleic palm oil (HOPO) including β-carotene and tocopherols. However, some nanoemulsions can be thermodynamically unstable. For this reason, it is important to understand the thermal and thermodynamic stability of nanoemulsions and to investigate both the parameters that cause, and the mechanisms associated with, the destabilization. In this sense, the DSC, TGA and destabilization analysis were used. In this work, the average droplet size (ADS) and zeta potential (ζ) had a significant influence over HOPO nanoemulsions stability. The range of ADS and ζ were between 162 to 839 nm and -9 to -40 mV, respectively. Furthermore, the HOPO nanoemulsions were establish until temperatures of 80 °C, showing lower loss of weight when the ADS was higher. Additionally, the destabilization of nanoemulsions occurred by the Ostwald ripening mechanism. The Ostwald ripening rate was provided as stability parameter which increased to nanoemulsions with ADS higher between 5×10^{-23} to 8×10^{-23} m^3/s.