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DEVELOPMENT OF OIL-IN-WATER TURTLE OIL NANOEMULSION LOADED IN HYDROGELS FORMULATION FOR COSMETIC APPLICATION

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ABSTRACT

The purpose of this study was to develop turtle oil hydrogel-thickened nanoemulsion through spontaneous emulsification method using sucrose monoester (SME) and carboxymethyl cellulose (CMC). Nanoemulsions were prepared at 70°C; hot purified water was slowly added to the heated oily phase containing the melted surfactants with gentle agitation. The effects of different composition of surfactants, water phase and oil phase on mean droplet size, polydispersity index (PDI), stability of nanoemulsion and formulation over emulsion properties were evaluated. A stable nanoemulsion with droplet size of 210 ± 2.5 nm with a narrow size distribution has been produced using the optimum composition created. This indicates that the droplet size and size distribution of nanoemulsion are strongly influenced by percentage of sucrose monostearate (SMS) over sucrose monolaurate (SML) and percentage of the oil over the surfactants. Percentage of SMS has a linear correlation with particle size and PDI. The optimized formulation was obtained in formulation F1, which consisted of 13.12%, 15%, 85%, 13.12% and 65% of turtle oil, SMS, SML, glycerol and purified water, respectively. By employing the sensory analyses to evaluate the texture of the hydrogel-thickened nanoemulsion (HNE) formulation which composed of formulation F1 loaded in microcrystalline cellulose and sodium carboxymethyl cellulose (Avicel® CL-611), it was found that formulation R4 20%, which composed of 45:55 of formulation F1: Avicel® CL-611 (20%) to be the closest texture character to commercial formulation, L'Oreal® gel. Thus, it can be concluded that the developed turtle oil hydrogel-thickened nanoemulsion has great potential for further development and utilization in the future.

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