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Characterization and stability assessment of Ocimum gratissimum leaves extract loaded nanostructured lipid carrier

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Abstract
In the last few decades, several nanoparticles technologies of actives delivery systems have emerged in the formulation of personal care products. The purpose of this study is to formulate the nanostructured lipid carrier loaded with Ocimum gratissimum leaves extract (OGNLC) and to characterize the chemical and physical properties of the OGNLC formulation. Ultrasound-Assisted Extraction (UAE) method are used in this study to obtain O. gratissimum extract with the determination of the TPC, while melt emulsification homogenization conjoined with ultrasonic homogenization method are used to prepare OGNLC samples. Two types of surfactants (Tween 80 and soy lecithin) are incorporated in the formulation to form OGNLC with various compositions (%) to determine the best formulation. The effect of varying compositions of surfactants in OGNLC samples on the mean particle size (MPS), polydispersity index (PDI), zeta potential (ZP) and encapsulation efficiency (EE%) of OGNLC are characterized. The best formulation also was analyzed by FTIR spectroscopy, and the encapsulation efficiency are determined. The stability of OGNLC particle size was also assessed after 30 days of exposure under low and room temperature (4°C, 25°C). An optimal OGNLC consists of 2.0% O. gratissimum extract, 2.0% GMS, 10.0% VCO, and varying surfactant compositions of 2.0% of Tween 80, and 1.0% of soy lecithin by a mean particle size of 155.73 ± 1.53 nm, a PDI value of 0.203 ± 0.007, zeta potential of |−37.2| ± 0.95 mV, and encapsulation efficiency (%) of 95.70% ± 6.256%. The stability assessment of OGNLC showed that the obtained formulation is at least stable for more than 30 days. This study concludes that the composition of surfactants are important factors affecting the size and stability of the OGNLC. This is the first study to report on the synthesis of nanostructured lipid carrier loaded with O. gratissimum. © 2023 Wiley Periodicals LLC.

Author Keywords
characterization; formulation; nanostructured lipid carrier; Ocimum gratissimum extract; stability

Index Keywords
biochemical composition, herb, lipid, nanoparticle, particle size, plant extract, stability analysis, surfactant

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