Characterization of Nigella sativa L. essential oil-loaded solid lipid nanoparticles.

ABSTRACT

Problem statement: Seeds of Nigella sativa L., commonly known as black seed, have been used in traditional medicine by many Asian, Middle Eastern and Far Eastern Countries to treat headache, coughs, abdominal pain, diarrhea, asthma, rheumatism and other diseases. The seeds of this plant are the most extensively studied, both phytochemically and pharmacologically. The aqueous and oil extracts of the seeds have been shown to possess especially nowadays in pharmaceutical antioxidant, anti-inflammatory, anticancer, analgesic, antimicrobial activities and medicinal and cosmetic applications, sanitary, cosmetic, agricultural and food industries. Approach: The aim of this study was to formulate a new delivery system for dermal and cosmetic application by the incorporation of Nigella sativa essential oil into solid lipid nanoparticles SLN. SLN formulations were prepared following the high-pressure homogenization after starring and ultra-trax homognization techniques using hydrogenated palm oil Softisan 154 and N. sativa essential oil as lipid matrix, sorbitol and water as surfactants. The SLN formulation particle size was determined using Photon Correlation System (PCS). Results: The change of particle charge was studied by Zeta Potential (ZP) measurements, while the melting and re-crystallization behavior was studied using Differential Scanning Calorimetry (DSC). Data showed a high physical stability for both formulations at various storage temperatures during 3 months of storage. In particular, average diameter of N. sativa essential oil-loaded SLN did not vary during storage and increased slightly after freeze-drying the SLN dispersions. Conclusion: Therefore, obtained results showed that the studied SLN formulations are suitable carriers in pharmaceutical and cosmetic fields.

Keyword: High pressure homogenization; Nigella sativa; Palm oil; Solid lipid nanoparticles; Supercritical fluid extraction.