

Optimization, Characterization and Stability of *Trachyspermum copticum* Essential Oil Loaded in Niosome Nanocarriers

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Abstract : Niosomes are non-ionic surfactant vesicles in aqueous media resulting in closed bilayer structures that can be used as carriers of hydrophilic and hydrophobic compounds. The use of niosomes for encapsulation of essential oils (EOs) is an attractive new approach to overcome their physicochemical stability concerns include sensibility to oxygen, light, temperature, and volatility, and their reduced bioavailability which is due to low solubility in water. EOs are unstable and fragile volatile compounds which have strong interest in pharmaceutical due to their medicinal properties such as antiviral, anti-inflammatory, antifungal, and antioxidant activities without side effects. *Trachyspermum copticum* (ajwain) is an annual aromatic plant with important medicinal properties that grows widely around Mediterranean region and south-west Asian countries. The major components of the ajwain oil were reported as thymol, γ -terpinene, p-cymene, and carvacrol which provide antimicrobial and antioxidant activity. The aim of this work was to formulate ajwain essential oil-loaded niosomes to improve water solubility of natural product and evaluate its physico-chemical features and stability. Ajwain oil was obtained through steam distillation using a cleverger-type apparatus and GC/MS was applied to identify the main components of the essential oil. Niosomes were prepared by using thin film hydration method and nanoparticles were characterized for particle size, dispersity index, zeta potential, encapsulation efficiency, in vitro release, and morphology.

Keywords : *trachyspermum copticum*, ajwain, niosome, essential oil, encapsulation

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