Enhancing the Antioxidant and Anticancer Potential of *Lavandula angustifolia* Essential Oil through Nanoformulation and Storage Evaluation

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Lavandula angustifolia, commonly known as lavender, is a well-known medicinal plant with numerous therapeutic benefits. Its essential oil is rich in bioactive compounds, including antioxidants and phytochemicals that exhibit promising anticancer/cytotoxic activities.
The study aims to optimize the therapeutic efficacy of *L. angustifolia* essential oil by employing a nanoformulation approach (liposomes and nanoemulsions). Nanoformulations have gained considerable attention in recent years due to their ability to enhance the bioavailability and stability of therapeutic agents. By encapsulating the essential oil within nanoparticles, its bioactivity can be preserved, and potential issues such as volatility and degradation can be minimized.
The presentation discusses the nanoformulation of *L. angustifolia* essential oil-loaded nanoparticles using biocompatible and biodegradable materials. Various characterization techniques, including particle size analysis, zeta potential determination, and encapsulation efficiency evaluation, were employed to assess the physicochemical properties and stability of the nanoformulation. Additionally, *in vitro* human cancer cells viability studies were conducted to investigate the controlled release behaviour of the essential oil from the nanoparticles.
Furthermore, the storage stability of the nanoformulation was evaluated under different conditions to assess its long-term stability. The changes in particle size, zeta potential and encapsulation efficiency of the essential oil were monitored over time to determine the impact of storage conditions on the nanoformulation.
The results indicate that the nanoformulation successfully encapsulated *L. angustifolia* essential oil, preserving its antioxidant and anticancer potential. Moreover, the stability studies revealed the importance of proper storage conditions to maintain the integrity and bioactivity of the nanoformulation.
Overall, this oral presentation highlights the potential of nanoformulation as a strategy to enhance the antioxidant and anticancer properties of *L. angustifolia* essential oil. The findings contribute to the development of innovative and efficient delivery systems for natural products, opening new avenues for their therapeutic applications in the field of cancer treatment and prevention.

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