Exploring encapsulation of berberine into nanoparticles utilizing microfluidic technique

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Berberine, an isoquinoline alkaloid present in various plant species including Berberis, offers diverse health benefits, albeit hindered by poor aqueous solubility, limited absorption, and low bioavailability. To surmount these challenges, the application of nanotechnology has been contemplated. In order to encapsulate this substance, the microfluidic technique was employed. In our efforts to encapsulate berberine in liposomes, we have conducted measurements for size, polydispersity index (PDI), count, intensity, zeta potential, and encapsulation efficiency (EE) to better track our progress in this project. The liposomes produced using the microfluidic technique had an average size of 115.41 +/- 9.17, indicating a relatively uniform particle size, a polydispersity index (PDI) of 0.293 +/- 0.02 suggests a wide range of particle sizes within the formulation. Furthermore, the encapsulation efficiency was measured at 76%, signifying the effectiveness of the liposomes in encapsulating the desired substances. In conclusion, the encapsulation of berberine in liposomes has demonstrated success through the implementation of the microfluidic technique. This method offers precise control and uniformity in the encapsulation process, potentially contributing to advancements in drug delivery and the bioavailability of berberine.

Keywords: berberine, poorly water-soluble, encapsulation, nanoparticles, liposomes, microfluidic technique.

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