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Abstract

Development of Letrozole-Loaded Magnetic Nanoemulsion Used for Breast Cancer Treatment †

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Introduction: Emulsions are attractive delivery systems for hydrophobic drug molecules compared to hydrophilic drug molecules. An emulsion is a biphasic liquid preparation, containing two immiscible liquids. In the delivery of therapeutically active compounds, nanoemulsions have gained considerable interest because approximately 50% of new chemical entities are hydrophobic. Nanoemulsions are a group of dispersed particles which are used as pharmaceutical biomedical aids and vehicles that show great promise for the future of cosmetics, diagnostics, drug therapies, and biotechnologies. To achieve targeted drug delivery and to reduce side effects, we have prepared a magnetic nanoemulsion.

Methods: Using both high-and low-energy methods, we will prepare the nano emulsion. Microfluidization, ultrasonication, and high-pressure homogenization are examples of high-energy methods, whereas we will also use low-energy techniques like the phase inversion emulsification method and the self-nanoemulsification method. We also may use the self-nanoemulsification method for the preparation and formulation of letrozole magnetic nanoemulsion.

Results: The pseudo ternary phase diagram explains the optimal concentration of excipients. The studies reported that the formulation was stable under the magnetic field. In vitro characterization studies have reported that the average globule size of the LMNEs was 49.63 nm, with a charge of 26.9 eV and a polydispersity index of 0.428. FT-IR results showed that citric acid successfully stabilized the magnetic nanoparticles and confirmed that interaction between the drug and liposomes. The report also found the rheological properties of LMNEs .

Conclusion: The nanoemulsion formulation parameters were evaluated to indicate that the results were obtained within an acceptable range. From in vitro data, it can be concluded that the developed magnetic nanoemulsion has great potential with better pharmaceutical and therapeutical properties. Letrozole magnetic nanoemulsion is a suitable module used for controlled and targeted drug delivery in order to combat breast cancer. The formulation of a letrozole-loaded magnetic nanoemulsion was performed and in vitro cell line studies and pre-clinical studies may be performed in the future.

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