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Formulation of letrozole nanoparticles by salting out technique using ethyl cellulose as polymer

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Objective: Letrozole (LTZ), an aromatase inhibitor used for the treatment of hormonally positive breast cancer in postmenopausal women. It has poor water solubility, rapid metabolism and a range of side effects. In this study, polymer-based nanoparticles (NPs) incorporating the drug have been formulated and evaluated, aimed to control the release, potentially maximize the therapeutic efficiency and minimize the side effects of the drug.

Methodology: The drug is incorporated into the polymer by employing the salting out technique by varying drug-polymer concentrations and organic to aqueous phase ratios. Total Six formulations were prepared and evaluated for % yield, % drug content and in vitro drug release studies and characterized for mean particle diameter and zeta potential.

Results: Among all the formulations F5EC 1:2 was considered to be the best formulation with minimum particle size of 194.55nm, zeta potential value of -18.6mV, drug content of 90.28%, Entrapment efficiency of 92.36% and invitro drug release of 95% within 12 hours. The drug release kinetic studies of the best formulations indicated that the release of drug followed Zero order kinetics and showed non-fickian diffusion mechanism. Based up on the evaluation and characterization of the formulations, the best formulation prepared by salting out technique (F5EC 1:2) was considered for the determination of anti-cancer activity invitro in MCF-7 Breast cancer cell line by MTT assay. The results indicated that the prepared formulation exhibited anti-cancer activity with an IC50 value of 49.63 nanogram.

Conclusion: Finally, by comparing results, Ethyl cellulose (EC) was considered to be most suitable for the preparation of Letrozole Nanoparticles by Salting Out Technique. The Entrapment Efficiency of Letrozole Nanoparticles was improved up to 92.36% by using Salting Out Technique.