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Development and characterization of self-micro-emulsified drug delivery systems for Cisplatin

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Cancer, today, is one of the most threatening diseases to society. Ovarian cancer is the 9th most common cancer in women and the most lethal gynecologic cancer. Cisplatin is indicated in primary, advanced stage and refractory ovarian cancer. Classical drug application routes in chemotherapy are oral and intravenous. There are some disadvantages of these methods. Absorption of the drugs used for the oral route is not complete. The aim of this study is to develop a new self microemulsion drug delivery system (SMEDDS) for cisplatin to enhance the oral bioavailability of drug. In this study, isopropyl myristate was used as the oil phase, Kolliphor were used as the surfactant, and propylene glycol was used as the co-surfactant. SMEDD formulations were characterized (table 1) and dissolution studies were evaluated in pH 6.8 phosphate buffer (figure 1). Permeation studies were examined with Caco-2 cell culture.

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Novel self-assembled liquid crystalline nanoparticles for transdermal delivery of Progesterone: Development, quality by design, *in-vitro* optimization and *ex-vivo* permeation studies

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The present chapter aimed to elaborate novel self-assembled liquid crystalline nanoparticles (LCNPs) for management of hormonal disturbances following non-invasive transdermal delivery of Progesterone. The LCNPs bearing Progesterone were prepared via a simple processing technique utilizing different glyceryl monoglycerides. Fabrication and optimization of Progesterone-loaded LCNPs were assessed via a quality by design approach based on 23 full factorial designs. The design includes the functional relationships between independent processing variables and dependent responses of particle size, polydispersity index, zeta potential, % cumulative drug release after 24 h and *ex-vivo* transdermal steady flux. Morphological elucidation of the prepared novel system was examined using transmission electron microscopy. The developed nanocarrier was subjected to a stability study within a period of three months at different storage temperatures. The cubic phase of LCNPs was successfully prepared using GMO (glyceryl mono oleate) via the emulsification technique. Based on the factorial design, the independent operating variables significantly affected the five dependent responses. The diameters of the prepared cubosomes were in the nano-metric range (101-386 nm) with a narrow particle size distribution, high negative zeta potential ≥-30 mV and entrapment efficiency ≥94%. The LCNPs succeeded in sustaining the drug release for almost 24 h, following a non-Fickian transport of drug diffusion mechanism. *Ex-vivo* study revealed a significant enhancement up to six folds in the transdermal permeation of Progesterone-loaded LCNPs compared to the aqueous drug suspension. The optimized LCNPs exhibited a high physical stability profile while retaining the cubic structure for at least three months. In conclusion, a quality by design approach successfully accomplished a predictable mathematical model permitting the development of novel LCNPs for transdermal delivery of Progesterone with the benefit of reducing its oral route hazards.

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