

# **loco-regional breast cancer therapy through in situ thermosensitive Tamoxifen citrate niosomal gels.**

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## **Abstract**

Loco-regional delivery of Tamoxifen Citrate (TMC) is used in this study to localize its activity into the vicinity of tumor and hence improving therapeutic outcome with less toxicity on other organs. Herein, innovative TMC niosomal thermosensitive gels were proposed as a tool to achieve this goal. Niosomes were prepared by thin lipid film hydration technique and evaluated for cellular uptake and cytotoxicity. The anti-cancer activity was also tested in-vitro using MCF-7 breast cancer cell line. Moreover, in-vivo anti-tumor efficacy was examined in Ehrlich carcinoma mice model through reporting solid tumor volume regression and tissue TMC distribution. Significantly enhanced cellular uptake (2.8 fold) and greater cytotoxic activity with MCF-7 breast cancer cell line were obtained from vesicles prepared with span 60: cholesterol (1:1 molar ratio). Niosomes were then packed in thermosensitive gels using cold method. TMC niosomal thermosensitive gels were evaluated for gelation temperature, rheological behavior and in vitro drug release. Type and ratio of used poloxamers were manipulated to provide an optimal gelation temperature (34-37°C). Rheological analysis showed low viscosity and elasticity values at low temperature while these values significantly increased at elevated physiological temperature. A prolonged release of TMC following a diffusion-driven release model was detected. Furthermore, in vivo data showed evidently that anticancer activity was improved with significant retention of the drug at the tumor site. These encouraging results confined that this in situ gel depot offers an attractive approach for controlled delivery of TMC and clinically expected to be useful candidate in breast cancer loco-regional therapy.

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