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## Combinative therapy of Tamoxifen and Doxorubicin loaded dual niosomes for applications in Breast cancer treatment

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This study was developed with the objective to prepare self-assembled niosomes to support sufficient entrapment and sustained drug release of the drugs having different solubility and mechanisms. In the current work, Tamoxifen- and Doxorubicin loaded dual niosomes were prepared for applications in combinatorial breast cancer treatment with statistical optimization by Box-Behnken experimental design. Transmission electron microscopy revealed a spherical shape morphology of the niosomes. The entrapment efficiencies for the drugs were found to be 74.3% and 72.7% for Tamoxifen and Doxorubicin, respectively. The drug release experiments at different pH values displayed a sustained release up to 3 days. Fourier transform infrared spectroscopy and differential scanning calorimetry showed a robust drug-excipient compatibility. The niosomes were stable over a period of 6 months under refrigeration with no significant changes. In vitro cytotoxicity studies on MCF-7 cell line showed a 15-fold improvement (0.01 mg per mL) and a better synergistic effect of the niosomes in comparison to the free drug combination (0.15 mg per mL). Moreover, the nanocarrier uptake studies by fluorescence microscopy and flow cytometry showed a good distribution and greater uptake of the niosomes throughout the cells. These results suggest a profound therapeutic application of the niosomes for a combinatorial breast cancer treatment.

**Keywords:** Niosomes, Breast cancer, Combinative drug delivery, Box-Behnken, Synergism

### Biography:

Mr. Pratik P. Kulkarni is a PhD. Research scholar (awaiting final defense) at the National Forensic Sciences University (NFSU). He received his bachelors in pharmacy from K.B Inst. Of Pharma. Edu. and Research, and a master's degree in nano drug delivery systems from NFSU, Gandhinagar, India. His research interests include development of drug loaded nanocarriers for combinative drug delivery applications. Till now he has published 9 scientific papers in journals of International repute. His work on Breast cancer nanoformulation was awarded a place in the virtual issue titled "Most original and Most significant scientific contribution" in 2018 (Elsevier).