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Levofloxacin loaded nano-niosomes for controlled release ocular drug delivery

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The current study aimed to increase ocular residence time of levofloxacin by formulation into controlled release nano-niosomes for once daily administration. Levofloxacin loaded niosomes were prepared by the film hydration technique with aid of sonication, utilizing either chloroform or dichloromethane as a solvent, methanol as a co-solvent, span 60 as a surfactant; cholesterol as a surfactant-additive agent; Dicetyl Phosphate (DCP) as a charge inducer. Nine niosomal formulae were prepared and characterized for Entrapment Efficiency (EE%), morphological features, Particle Size (PS), Polydispersity Index (PDI), Zeta Potential (ZP), pH and *in vitro* release. Based on the results of these studies, certain formula was further investigated for its morphology using transmission electronic microscopy; sterilization using gamma-irradiation; stability upon storage; *in vivo* evaluation. The selected nano-niosomal formula showed good EE% and was found to be stable upon storage after being exposed to sufficient doses of gamma-irradiation. *In vivo* testing of the selected formula showed that the niosomes extended levofloxacin release up to 24 hours without causing any ocular irritation. This formula exhibited superior microbiological activity compared to the commercial eye drops.

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