

## **Tri/Tetra-Block Copolymeric Nanocarriers as a Potential Ocular Delivery System of Lornoxicam: Experimental Design-Based Preparation, in-vitro Characterization and in-vivo Estimation of Transcorneal Permeation**

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**Abstract :** Introduction: Polymeric micelles that can deliver drug to intended sites of the eye have attracted much scientific attention recently. The aim of this study was to review the aqueous-based formulation of drug-loaded polymeric micelles that hold significant promise for ophthalmic drug delivery. This study investigated the synergistic performance of mixed polymeric micelles made of linear and branched poly (ethylene oxide)-poly (propylene oxide) for the more effective encapsulation of Lornoxicam (LX) as a hydrophobic model drug. Methods: The co-micellization process of 10% binary systems combining different weight ratios of the highly hydrophilic poloxamers; Synperonic® PE/P84, and Synperonic® PE/F127 and the hydrophobic poloxamine counterpart (Tetronic® T701) was investigated by means of photon correlation spectroscopy and cloud point. The drug-loaded micelles were tested for their solubilizing capacity towards LX. Results: Results showed a sharp solubility increase from 0.46 mg/ml up to more than 4.34 mg/ml, representing about 136-fold increase. Optimized formulation was selected to achieve maximum drug solubilizing power and clarity with lowest possible particle size. The optimized formulation was characterized by <sup>1</sup>HNMR analysis which revealed complete encapsulation of the drug within the micelles. Further investigations by histopathological and confocal laser studies revealed the non-irritant nature and good corneal penetrating power of the proposed nano-formulation. Conclusion: LX-loaded polymeric nanomicellar formulation was fabricated allowing easy application of the drug in the form of clear eye drops that do not cause blurred vision or discomfort, thus achieving high patient compliance.

**Keywords :** confocal laser scanning microscopy, Histopathological studies, Lornoxicam, micellar solubilization

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