Polymer-Free Injectable In Situ Forming Nanovesicles as a New Platform for Controlled Parenteral Drug Delivery Systems

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Abstract

Purpose: In this study, the preparation of self-assembled polymer-free in situ forming nanovesicles (ISNs) based on non-ionic surfactants (NISs) is presented.Methods: A 22Ł41 full factorial experimental design was adopted for the development of novel polymer-free ISNs loaded with tenoxicam utilizing the emulsion method. The type of NIS (BrijÈ 52 or SpanÈ 60), the cholesterol percentage (30, 50, or 60 w/w%), and the internal phase percentage (20 or 30 v/v%) were chosen as the independent variables. Percentage drug released after 1 h (Q1), vesicle particle size (PS), and mean dissolution time (MDT) were the dependent variables. Selected formulation was investigated morphologically using transmission electron microscopy. Results: Results revealed that the formation had spherical dense shape. All independent factors significantly affected the percentage drug release after the first hour (Q1), and the MDT, while only the type of NIS had a significant effect on PS. The highest control of drug release was observed in formulation containing SpanÈ 60 with lower internal phase percentage (MDTj=j 20.06jÑj0.40 h) as well as the smallest PS (123.75jÑj16.68 nm).Conclusion: The obtained results indicated the potentiality of the invented ISNs in controlling the release of tenoxicam in a desirable economical biphasic pattern compared to other in situ formulations.

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