DOI: 10.14232/syrptbrs.2022.25

Stability studies of cefuroxime loaded self-emulsifying drug delivery systems for ocular administration

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Self-emulsifying drug delivery systems (SEDDS) are water-free dosage forms consisting of an isotropic mixture of oils and surfactants. Following dilution with the aqueous media (lacrimal fluid) with gentle agitation (as occurs with blinking) a fine oil-in-water emulsion is created at the site of administration. The main objective of current project is focusing on developing ocular self-microemulsifying suspensions as a novel approach to improve the stability of administering water-sensitive cefuroxime sodium (CEF). The content assay was performed to determine the potential drug decomposition over time.

SEDDS carriers were obtained by dissolving benzalkonium chloride (0,01% w/w), Cremophor EL, Span 80 and Tween 20 in Miglyol oil (5% w/w) with subsequent CEF (5% w/w) incorporation. The self-emulsification efficiency upon dilution with deionized water was reviewed. The formulations were exposed to 6-months long stability testing. Physicochemical parameters: particle size, pH, Zeta potential were studied and HPLC assay was performed.

The SEDDS suspensions diluted with water were reported to spontaneously form fine emulsions exhibiting an immediate dissolution of cefuroxime. The samples showed negative zeta potential range of -40mV - -50 mV and the mean droplet size from 20 µm to 30 µm. The developed formulations proved to be chemically stable over storage and seem feasible to serve as the effective carriers for water-sensitive drugs.

References

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