e-ISSN: 2349-2759 p-ISSN: 2395- 1095

Journal of Innovations in Pharmaceutical and Biological Sciences (JIPBS)

www.jipbs.com

Research article

Application of D-optimal mixture design for optimization of production parameters of fast and complete release dexamethasone amorphous solid dispersion tablet

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Key words: Solid dispersion, Dissolution, Solubility, Bioavailability, Oral absorption, Mixture Design.

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Abstract

Dexamethasone is a glucocorticoid used widely worldwide for immunosuppressive treatment, allergies, bronchiolitis, and croup, among others. However poor aqueous solubility (0.1mg/ml) leads to poor rate of dissolution and hence limits its oral bioavailability. The objective of the present study was to optimize the level of different formulation components like PEG-6000 (hydrophilic carrier), lactose (filler) and starch (disintegrating agent) for the development of fast and complete release tablet of dexamethasone by 16 run D-Optimal Mixture Design. Dexamethasone was dispersed in PEG-6000 by Melt/Fusion method. FTIR and DSC study confirmed that dexamethasone was compatible with PEG-6000 and upon dispersion it became amorphous. Tablets were prepared by direct compression method. UV Spectrophotometric method was developed for estimation of dexamethasone. Both the response parameters Maximum % Drug Released (MDR) and Time to Maximum % Drug Release (T_{MDR}) were best fitted to Cubic Mixture Model. The optimized tablet released 99.5% drug in 5 minute.