Formulation, Optimization, and Evaluation of Solid Dispersions of metformin HCl Using Factorial Design

Mona El Assal ,Mona El Assal, Mohammed mannaa, Ahmed Abdel Bary,

Abstract

ABSTRACT
The objective of this study is to achieve the controlling dissolution rate of Metformin HCl, a freely water soluble antidiabetic drug.
Solid dispersions microcapsules were prepared using solvent evaporation method which enclosed preparation of a uniform
dispersion of Metformin HCl in (Hydroxy propyl methylcellulose k100, Ethyl cellulose, Eudragit RL PO, RS PO & Compritol 888 ATO). A
two-factor, General factorial statistical design was used to quantitate the effect of polymer type (X1) and drug: polymer ratio(X2) on
the release profile. Where polymer type and drug: polymer ratio were selected as independent variables, while Y1 (cumulative drug
release after 1 hr.) and Y2 (cumulative drug release in 3 hrs.), Y3 (cumulative drug release in 10 hrs.),Y4 (angle of repose) and Y5
(Hausner ratio) were selected as dependent variables. The solid dispersions were characterized for their in vitro- release rate. The
optimized formulation was further characterized by Drug scanning calorimetry, infrared spectrophotometry, X-Ray Diffractometer
and SEM analysis. A convenient statistical model was made and a significantly controlled release rate was exhibited .the optimized
formulation was investigated by DSC, XRD, FTIR and SEM data which showed the crystalline nature of Metformin HCl in a solid
dispersion, the statistical model helped us to recognize the effects of formulation variables on the dispersion.
Keywords: Metformin HCl, Solid dispersion, controlled release, factorial design, HPMC k 100, Ethyl cellulose, Eudragit RL, RS&
Compritol ATO 888.

International Journal of Pharmaceutical Sciences Review and Research 2016, December