

# 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*