Available online on 15.09.2014 at http://jddtonline.info
Journal of Drug Delivery and Therapeutics
Open access to Pharmaceutical and Medical research

RESEARCH ARTICLE

PREPARATION AND EVALUATION OF POLYMERIC NANOPARTICLES OF GLIBENCLAMIDE

Naha Anup*, Kiran Sai , Rai Ikya, Vora Bhavisha, Reddy D Apoorva, P Kartika

Department of Pharmaceutics, Manipal College of Pharmaceutical Sciences, Manipal University, Manipal- 576104, Karnataka, India.

**Corresponding AuthorE-mail: anupnaha@gmail.com*

ABSTRACT

Simple, reliable and reproducible method was used for the preparation of polymeric nanoparticles of Glibenclamide. The formulation was prepared by solvent evaporation method using magnetic stirrer with overnight stirring and the same was then evaluated for its particle size, drug content and *in vitro* dissolution studies. The above mentioned method showed similar particle size and exhibited an improvement in the drug entrapment efficiency. The ultraviolet spectrophotometric method was used to analyze Glibenclamide at 300 nm in different buffers. The study demonstrated the successful preparation of sustained release polymeric nanoparticles of Glibenclamide.

Keywords: Glibenclamide, polymeric nanoparticles, solvent evaporation

INTRODUCTION

Solubility is an important criterion for drug efficacy, independent of route of administration. It also poses a major challenge for pharmaceutical industries, which are developing new pharmaceutical products, since 40% of the active substances being identified are either insoluble or poorly soluble in aqueous media[1]. A limiting factor for *in vivo* performance of poorly water soluble drugs, following oral administration, is their resistance to being wetted and being dissolved into the fluid in the gastrointestinal tract[1]. Increasing the dissolution rate of poorly water soluble drugs is thus important for optimizing bioavailability[1]. To overcome these problems, various formulation strategies are reported in the literature including the use of surfactants (e.g. tween 80, gelucire), cyclodextrins (e.g. beta-cyclodextrin, hydroxypropyl beta-cyclodextrin), solid dispersions, micronization, lipid based systems[2,3,4,5]. However, these approaches are successful in only selected cases.

Nanoparticles are defined as particulate dispersions or solid particles with a size in the range of 10-1000 nm[6]. Nanocapsules are systems in which the drug is confined to a cavity surrounded by a unique polymer membrane, while nanospheres are matrix systems in which the drug is physically and uniformly dispersed[6]. Glibenclamide is one of the most widely used anti hyperglycemic drug. However, glibenclamide's low bioavailability has been attributed to its poor dissolution properties[7]. Hence, in the study it is planned to formulate polymeric nanoparticles of Glibenclamide to improve its dissolution and absorption.

METHODS

Preparation of polymeric nanoparticles of glibenclamide:

Weighed amount of drug was dissolved in dichloromethane, and weighed amount of Eudragit RLPO polymer was dissolved in methanol (Table 1). Drug-polymer solution was prepared by mixing the solutions, followed by vortexing. The drug-polymer solution was homogenized at 10000-13000 rpm and sonicated. The solution was then evaporated using a rotary evaporator, until there were no traces of the organic solvent. The resulting solution was centrifuged and the solution was freezed at -80^{0}C and then lyophilized, after the addition of required quantity of mannitol.

Corresponding Author
Anup Naha
Department of Pharmaceutics,
Manipal College of Pharmaceutical Sciences,
Manipal University, Manipal- 576104,
Karnataka, India.
E-mail: anupnaha@gmail.com