Chapter I Introduction

Glibenclamide is a potent oral hypoglycemic agent from the second generation sulfonylureas used in the treatment of type II diabetes mellitus. It is poorly soluble or practically insoluble in water with very poor in vitro dissolution. This causes low bioavailability of the drug where only about 45% of the oral dose is absorbed through the gastrointestinal tract(Obaidat & Ababneh, 2009). Glibenclamide lowers plasma glucose concentrations by stimulating the release of insulin from pancreatic β cells and by increasing the sensitivity of peripheral tissue to insulin(Davis and Granner 1996). This inhibition causes cell depolarization, which causes voltage-dependent calcium channels to open, which causes an increase in intracellular calcium in the beta cell, which stimulates insulin release(Goyal & Sharma, 2014).
It belongs to the second class of biopharmaceuticals classifications(BCS).(Lucio, Irache, & Mart, 2017).because it has poor water solubility and good permeability.

Cyclodextrin complexation proved to be especially useful to improve the oral bioavailability of several drugs, belonging in particular to the Classes II and IV of the BCS, mainly because of the increase in their solubility and wettability through the formation of inclusion complexes(Cirri, Righi, Maestrelli, Mura, & Valleri, 2009).

I.1 the aim of research

The main goal of the research is to improve Glibenclamide bioavailability by forming a complex with Cyclodextrins.

I.1 Hypothesis

Forming an inclusion complex between Glibenclamide and β Cyclodextrin and HPβ Cyclodextrin, using two methods of preparation of complex, freeze drying and solvent evaporation techniques, for freeze-drying Glibenclamide and Cyclodextrin dissolved in ammonia water, for solvent evaporation drug and Cyclodextrin also dissolved in ammonia water and ethanol. The resulted complex assayed by dissolution test, FTIR, DSC, XRD tests.