CHAPTER I

INTRODUCTION

Controlled release drug delivery systems can provide drug release at a predetermined, predictable and controlled rate. Besides reducing the dosing frequency, a controlled release drug delivery systems can provide advantages such as reduced fluctuations in drug plasma levels, a reduction in total dosage, minimal side-effects and a high degree of patient compliance.

The most widely used technology for controlled release system is drug diffusion using a hydrophilic polymer matrix. The polymer used in the preparation of hydrophilic matrix can be divided into three main groups, cellulose derivatives (HPMC, HPC, and sodium carboxymethylcellulose etc.), non-cellulose natural (xanthan gum, alginate, and agar-agar etc.) and acrylic polymers (Salsa, Veiga, and Pina, 1997). HPMC and xanthan gum have been widely used in the formulation of hydrophilic matrix for controlled drug delivery because of its convenience, easiness of manufacture, high biocompatibility and high biological safety. According to the different characteristics of the polymer used, these drug delivery systems exhibit different release kinetics and swelling behavior. Dhopeshwarkar and Zatz (1993) observed in vitro drug release from the HPMC matrix and xanthan gum matrix. This experiment indicated that drug release from xanthan gum matrix was pH-independent, whereas drug release from HPMC matrix was fairly independent of pH. Moreover, the initial burst drug release from HPMC matrix was faster than xanthan gum matrix (Talukdar et al., 1996). However, there is no study to compare and evaluate drug release between HPMC matrix and xanthan gum matrix in vivo models. Therefore,

the main purpose of this study is to compare and evaluate in vivo and in vitro drug release of these two hydrophilic polymers matrices. Gliclazide was employed as a model drug and the rabbits were employed as an animal model.

Objectives of the study

1. To develop the formulation of gliclazide controlled release tablets which provide sustainable drug release over twelve hours using HPMC and xanthan gum as matrix forming agent.

2. To evaluate the effect of the quantity of these two polymers on drug release and also study the effect of pH of dissolution medium on gliclazide release.

3. To compare the bioavailability and pharmacokinetic parameters of the developed products and commercial gliclazide controlled release tablets in rabbits.