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FORMULATION AND EVALUATION OF FLOATING TABLETS OF CEFUROXIME AXETIL

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ABSTRACT

The aim of the present work was to design and development of hydrodynamically balanced tablet of cefuroxime axetil to enhance the bioavailability and therapeutic efficacy of the drug. cefuroxime axetil is classified as a second-generation cephalosporin antibiotic and beta lactum antibiotics based on spectrum activity. Tablets are prepared by the direct compression technique by using HPMC K4M and mannitol as polymers along with sodium bi carbonate as gas generating agent. Formulation were evaluated for in vitro byoyancy and drug release study using up dissolation apparatus using 0.1N Hcl as a medium.The result indicate that floating tablets of dissolation cefuroxime axetil containg 45mg HPMC K4M provides a better option for control release action and improved bioavailability.

Keywords: cefuroxime axetil, floating tablets ,HPMCK4M

INTRODUCTION

The design of oral controlled drug delivery systems (DDS) should be primarily aimed to achieve more predictable and bioavailability. Approximately 50% of the drug delivery systems available in the market are oral DDS and these systems have more advantages due to patient acceptance and ease to administration. Gastric retention drug delivery systems can be retained in the stomach for a long time. such retention systems are important for drugs that are degraded in intestine or for drugs like antacids or certain antibiotics. Cefuroxime axetil is classified as a second generation cephalosporin antibiotic and cefuroxime axetil beta lactum antibiotics based on spectrum of activity. In the present work by developing hydrodynamically balanced system or floating drug delivery system which increases the gastric residence time, decreases the diffusion distance and allow more of antibiotic to penetrate through the gastric mucus layer and act locally at the infectious site. The present study outlines a

systemic approach for design and development of hydrodynamically balanced tablets cefuroxime axetil to enhance the bioavailability and therapeutic efficacy of the drug.

Materials and methods

cefuroxime axetil is procured by Cipla drugs pvt,ltd. Bangalore, HPMCK4M is procured by Signet ,Mumbai and Mannitol , Sodium bi carbonate, Citric Acid, PVPK30, Magnesium Stearate, Talc Loba chemie,cochin.

Preparation of cefuroxime axetil floating tablet-

Floating tablets contain cefuroxime axetil were prepared by direct compression technique. Using variable concentration of HPMCK4M with sodium bi carbonate. All powders were passed through 60 mesh sieves. Required quantity of drugs polymers were mixed thoroughly. talc and magnesium stearate were added as glident & lubricant, The blend were directly compressed using tablet compression machine. Each tablet contained 150 mg of cefuroxime axetil.

Table 1:

Ingredients(mg)	F1	F2
cefuroxime axetil	300	150
HPMCK4M	90	45
Mannitol	40	20
Sodium bi carbonate	50	25
Citric Acid	20	10
PVPK30	Qs	Qs
Magnesium Stearate	5	2.5
Talc	1	0.5

Results and discussion

Hydrodynamically balance tablets of cefuroxime axetil were prepared & evaluated to increase its local action & bioavailability. In the present two formulations with variable concentration of polymer were prepared & evaluated for physio-chemical parameters & invitro buoyancy studies

Post –Compression Parameters

1. **Shape of the tablet**

   Macroscopic examinations of tablets from F1 & F2 were found to be circular shape with no cracks.

2. **Hardness test**

   The measured hardness of tablets of each batch ranged between 5 to 6 kg/cm2.this ensures good handling characteristics of all batches.

3. **Friability test**

   The % friability was less than 1% in all the formulations ensuring that the tablets were mechanically stable.

4. **Weight variation test**

   All the formulated tablets passed weight variation test as the % weight variation was within the pharmacopoeial limits of + or – 7.5% of the weight.

5. **Invitro buoyancy study**

   On immersion in 0.1 N HCl solution pH (1.2) at 37 degree, the tablets floated and remained buoyant without disintegration. The result of effect of different polymers on drug release by paddle method The results

it can be concluded that the batch containing only HPMC polymer showed good buoyancy lag time & total floating time.

6. In-vitro dissolution study

The prepared floating tablets of cefuroxime axetil were subjected to in-vitro studies were carried out using USP XXIV dissolution apparatus, 0.1 N HCl (PH 1.2)

Table 2: Evaluation of physical parameters of Floating Tablets

Batch	Weight variation (%)	Friability (%)	Hardness (kg/cm2)	Thickness (mm)	Drug content (%)
F1	**3.54**	**0.91**	**4.3**	**3.16**	**98.24**
F2	**2.89**	**0.96**	**4.4**	**3.10**	**99.74**

Conclusion

Cefuroxime axetil is bacteriostatic & bactericidal depending on the organism & antimicrobial agent. The tablets were formulated using various concentration of polymer such as HPMC K4M and mannitol and effervescing agent. The parameters hardness, friability and content uniformity etc. were evaluated for all the formulated for all the formulated batches. The results were complies with the official specifications. Buoyancy lag time, total floating time, tablet density showed satisfactory results for batch F1, F2. The F2 was optimized & selected for further studies. Since it had sustained activity & good buoyancy leg time (45 sec). From the in-vitro dissolution data in using USP dissolution apparatus indicates the formulation F1 and F2 containing HPMC K4M released 91.55% & 76.04% of drug within 8 hours. Formulation F2 was evaluated for effect of hardness on floating lag time result showed that the floating lag time increased as hardness increased. Results showed that45 mg HPMCK4 provides a better option for control release action. F2 had good sustained activity and the optimized formulation F2 had better control release action and improved bioavailability.

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