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FORMULATION AND IN VITRO EVALUATION OF ANTIHYPERTENSIVE DRUG CAPTOPRIL MODIFIED RELEASE FORMULATION

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ABSTRACT

Oral drug delivery has been widely used for the administration of the formulation and in this research work an antihypertensive drug Captopril has been taken by converting it in to the sustained release formulation by using Hydroxy propyl methyl cellulose and polyvinylpyrroli done in different concentration, Then these formulation were subjected for various evaluation parameters like Hardness, thickness, friability, weight variation and In vitro drug release study, it was observed that formulation batch F3 revealed better in vitro drug release profile. Which shows that sustained release formulation of Captopril can be a better way to enhance its bioavailability.

KEYWORDS: Bioavailability, Sustained release, Captopril.

INTRODUCTION

Oral delivery is one of the most widely used delivery mode for the administration of the formulation since it is natural, It does not have many complication, It is convenient and feasible, It is easy to administer, patient compliance and flexibility in different type of formulation and its manufacturing process is also cost effective [1] For modified release systems, the oral route of drug administration has received the most attention as it is natural, uncomplicated, convenient and safer route.(2) Sustained release constitutes of dosage form that provides medication over an extended time to get the better therapeutic effect. Ultimate objective of the sustained release dosage form is to maintain therapeutic blood or tissue levels of the drug for an extended period. This can be usually accomplished by getting zero order release from the dosage form formulated. Oral sustained release drug delivery system improved therapeutic advantage, such as ease of dosing administration, patient compliance and flexibility in formulation.[3]

The drug is considered as a drug c Captopril belongs to class angiotensin converting enzyme inhibitor (ACE). Captopril (1-[(25)-3-mercapto-2-methyl propionyl]-1-proline) an angiotens in converting enzyme of choice for the treatment of hypertension and congestive heart failure. The bioavailability of captopril is approximately 60-75% and it has elimination half-life after an oral dose is 2-3 h. It is stable at acidic pH (1.2) and is specifically absorbed from the stomach.(4)

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Development of a captopril oral formulation would be a significant advantage for patient compliance accompanied by minimization of the drug side effects as a result of reduction in the drug blood concentration, fluctuations, especially in long term therapy[5]. Their are many pros of sustained drug delivery system like it may reduce the frequency of drug administration, the blood leel oscillation characteristic to multiple dosing of conventional dosage forms is reduced, even Better control of drug absorption can be obtained, since the high blood level peaks that may be observed after administration of a dose of a high availability drug can be reduced.

To overcome the above drawbacks the present study is aimed at developing a sustained release dosage form which gives, patient's compliance and enhancing the bioavailability of drug through sustained release the drug in to the body.

MATERIAL AND METHOD

Drug was obtained as a Gift sample and other ingredient like mannitol, polyvinylpyrollidon magnesium sterate, Hydroxy propyl cellulose were purchased from Chemical drug House New Delhi, Solvent used in the work are of analytical grade .

PREPARATION OF CAPTOPRIL TABLETS:

DIRECT COMPRESSION METHOD

Tablet was prepared by direct compression method. The weighed quantity of captopril, mannitol, granular magnesium oxide and low molecular weight HPMC were sieved through 40 # size. The above shifted materials were lubricated with PVP (Poly vinyl pyrolidon) and magnesium stearate for 5 min. The lubricated blend was compressed by using tablet compression machine.

FORMULA FOR PREPARATION OF TABLETS BY DIRECT COMPRESSION METHOD

Table 1.Various formulations of tablets were prepared in different concentration of the Polymer HPMC

S. No.	INGREDIENTS	Various formulation tablets (mg/tab)		
		F1	F2	F3
1	Captopril	20	20	20
2	Mannitol	83.5	10	10
3	PVP	15	15	15
4	Granular magnesium oxide	20	20	20
5	HPMC	10	100	200
6	Magnesium stearate	1.5	1.5	1.5

EVALUATION OF CAPTOPRIL TABLETS

- **FRIABILITY**

Ten tablets were weighed and placed in the Roche friabilator and apparatus was rotated at 25 rpm for 4 minutes. After revolutions the tablets were dedusted and weighed again. The observed value should not be more than 1 %. The percentage friability was measured using the following formula. % F = {1-(Wt/W)} ×100

Where, % F = friability in percentage, W = Initial weight of tablet, Wt = weight of tablets after revolution.

- **HARDNESS [8]**

Monsanto hardness tester was used for the determination of hardness of the tablets.

- **THICKNESS**

The thickness of the tablets was determined using a thickness gauge. Five tablets from each batch were used, and average value were calculated**.**

- **WEIGHT VARIATION TEST**

20 Tablets of each formulation were weighed using an electronic balance and the test was performed according to the official method.

- **DISSOLUTION STUDIES**

900ml of 0.1N HCl was placed in vessel and the USP apparatus-I (Paddle type) was assembled. The medium was allowed to equilibrate temperature of 37 ˚C ±0.5 ˚C. Tablet was placed in the vessel the apparatus was operated for 12 hrs at 50rpm. At definite time intervals, 5ml of the sample solution was withdrawn filtered and then 5ml of fresh dissolution medium was replaced. Suitable dilutions were made and analysed spectro photometrically at 205nm using UV-visible Spectrophotometer.

OBSERVATION AND RESULTS

Table 2.Evaluation parameters of different formulations

S. no.	Batches	Weight variation (%)	Hardness (Kg/cm2)	Thickness (mm)	Friability (%)
1	F1	Pass	4.5 – 5	2.4 – 2.5	0.62
2	F2	Pass	5.4 –6	2.4 – 2.5	0.63
3	F3	Pass	5.5- 6.5	2.4 - 2.5	0.61

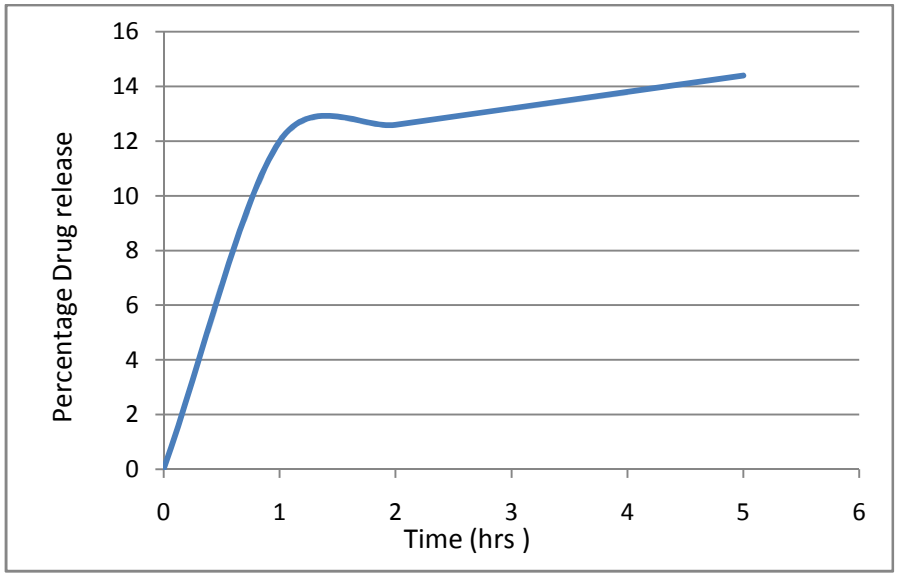

Figure 1.Percent drug release of drug of Formulation batch F 3

CONCLUSION

Form the above results it is concluded that formulation of sustained release tablet of captopril batch F3 can be taken as an optimized formulation of sustained release tablets since it has passed all the evaluation parameters .This is the only batch which exhibited maximum hardness of the Tablet which proved that this formulation will extend the release of the drug from the formulation since higher harness takes more time to release the drug. From the present research it can be concluded that a successful sustain release tablet of captopril

can be formulated using different concentration of (Hydroxy propyl methyl cellulose) HPMC (Low molecular weight), PVP (Poly vinyl pyroli done.

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