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Original Article

Formulation and Evaluation of Taste Masked Captopril Tablet By using ion Exchange Resin

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ABSTRACT

The present work captopril fast dissolving tablets were formulated for masking of bitter taste of captopril. Captopril had bitter taste so for masking of bitter taste of captopril this ion exchange technique was used. The tablets were prepared by direct compression method usually by varying the individual concentration and combination of different concentrations of drug resin complex. The powder blend was evaluated for precompression parameters in order to assess the flow properties of powder like bulk density, tapped density, compressibility index, hausner's ratio, angle of reposes. The powder blend showed excellent flow properties. The prepared tablets were evaluated for thickness, hardness, weight variation, friability, drug content, disintegration time and in-vitro drug release and determination of masking of taste of captopril was determined. Therefore it can be concluded from this study of captopril containing combination of drug resin complex was showed masking action compared to individual concentration of drug resin complex.

Keywords: Drug resin complex, Captopril, Precompression, competitive inhibitor

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INTRODUCTION

Drug delivery systems are a strategic tool for expanding markets, extending product life cycles and generating opportunities. Drug delivery systems make a significant contribution to global pharmaceutical sales through market segmentation, and are moving rapidly. Fast dissolving technology is one of such opportunities to improve bioavailability, immediate relief and patient compliance in comparison to conventional tablets. Fast dissolving drug delivery can be achieved by various conventional methods like direct compression, wet granulation, moulding, spray drying, freeze drying and sublimation. In order to allow fast dissolving tablets to dissolve in the mouth, they are made of either very porous and soft-moulded matrices or compressed into tablets with very low compression force, which makes the tablets friable or brittle, which are difficult to handle, often requiring specialized peel off blister packaging1. Captopril is a sulfhydryl containing dipeptide surrogate of proline which abolishes the pressor action of Angiotensin I but not that ofAngiotensin II: does not block AT1 or AT2 receptors2. Captopril produces antihypertensive effect as it inhibits conversion of angiotensin I to angiotensin II, by competitive inhibiting angiotensin converting enzyme. Angiotensin II produces direct pressor activity and stimulation of aldosterone secretion from adrenal cortex. These effects are inhibited by captopril.

MATERIALS AND METHODS

Captopril was obtained as gift sample from Wockhardt Research Centre, Aurangabad, India. All others excipients like MCC, Kollidon, sucrose, Mannitol, magnesium stearate and orange flavors were received from same.

Method- Direct Compression: All the ingredients were passed through 40 mesh. The sifted ingredients were blended for 10-15 minutes in DCB. The blend was lubricated with sifted (# 40) magnesium stearate. The blend was compressed into tablets with 6mm Rounded punches using 16 station compression machine (Cadmach) to obtain the tablet weight of 200 mg

RESULTS AND DISCUSSION

The objective of the present study was to prepare fast dissolving tablets of captopril to mask the taste and enhance patient compliance and quick onset of action by using individual and combination of resins at different concentration and to optimize the best drug-resin complex ratio. For the masking of taste of captopril Indion was selected as resin for complex. Before going for compression of the tablets the powder blend was evaluated for the pre-compression parameters like angle of repose, bulk density, tapped density, carr's compressibility index and Hausner's ratio to predict the flow properties of powders. All the formulations showed good and excellent flow properties.

The fast dissolving tablets were prepared by direct compression method because of its cost effectiveness and due to less number of manufacturing steps. The post compression parameters like the hardness, thickness, friability, weight variation, disintegration time, wetting time, drug content and water absorption ratio were performed.

The total weight of tablets was 200 mg and it was observed that all the tablets are from 198 mg – 201 mg. And the hardness of all the formulations was observed to be 50-60 N. The percentage friability of all the formulations was found to be less than 1% to provide mechanically stable fast dissolving tablets. As the fast dissolving tablets must show immediate action all the tablets were found to be disintegrated less than one minute.

The combination of Drug and Indion 234 polymer masked the taste of the Captopril at 25:75 concentration. The percentage drug content of all the tablets was found to be between 96 – 98 %. All the tablet values ranges were found to be within specific prescribed limits. The in- vitro drug release studies were done in pH 6.8 phosphate buffer and data was mentioned in Table 5. By using the Indion 234 resin masked taste of Captopril completely.

CONCLUSION

From the results obtained, it was observed that formulation containing combination of drug and resin complex i.e. Captopril and Indion as taste masking agent showed good taste masked results and dissolution results as compared all other formulations. Finally the formulation F was considered as the optimized batch suitable for masking of taste and gives immediate action.

Sr.No	Captopril (mg)	Indion 234 (mg)	Results
1	25	50	No test masked
2	25	60	No test masked
3	25	75	Test masked

Table 1. Formulation of captopril fast dissolving tablets:

F. Code	Captopril	Indion	Microcrystalline cellulose	Manitol SD200	Kollidon CL(10)	Magnesium stearate	Orange flavor	Sucrose
A	25	70	24	60	15	1.0	0.5	4.5
B	25	75	20	68	6	1.0	0.5	4.5
C	25	75	30	60	4	1.0	0.5	4.5
D	25	75	25	64	5	1.0	0.5	4.5
E	25	75	20	60	14	1.0	0.5	4.5
F	25	75	15	64	15	1.0	0.5	4.5

Evaluation data of pre-compression studies

Formulation Code	Bulk density	Tapped density	Carr's index	Angle of repose	Hausner ratio
A	0.58	0.68	15.2	22.8	1.12
B	0.58	0.66	18.2	23.55	1.23
C	0.56	0.65	15.55	23.84	1.16
D	0.59	0.66	14.11	25.65	1.15
E	0.58	0.68	16.65	24.6	1.24
F	0.55	0.6	15.4	25.21	1.12

Evaluation of weight variation, thickness, hardness, friability

Formulation Code	Wt. variation (mg)	Thickness (mm)	Hardness (N)	Friability (%)
A	199.81	4.12	45	0.16
B	198.66	4.25	55	0.015
C	199.69	4.22	50	0.21
D	200.01	4.1	48	0.18
E	201.23	4.29	49	0.19
F	200.0	4.11	50	0.11

Evaluation of disintegration time, % drug content

Formulation Code	Disintegration Time(sec)	% Drug content
A	44	94.32
B	40	96.45
C	35	96.25
D	36	98.45
E	45	96.55
F	40	98.66

Evaluation data of *In-vitro* drug release

	In-Vitro drug release				
Formulation Code	2 min	4 min	6 min	8 min	10 min
A	30.2	46.31	55.65	78.52	96.38
B	35.29	52.2	60.885	70.54	95.89
C	26.8	56.49	66.08	72.3	97.25
D	29.85	49.84	61.45	86.35	98.54
E	25.22	55.74	58.88	84.33	97.96
F	30.64	48.99	56.44	82.44	98.66

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