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# FORMULATION AND CHARACTERIZATION OF SUSTAINED RELEASE TABLET OF METORPOLOLSUCCINATE USING CHIA SEED AS BINDING AND DISINTEGRATING AGENTS

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## ABSTRACT

Tablet is one of the most widely used pharmaceutical formulation which is used worldwide. It is prepared by using many agents like bulk forming agent , disintegrate, binding agents lubricants .In this work an attempt is made by formulating tablet using chia seed mucilage as disintegrant, Since chia seed is a good neutraceutical and by using it we can also avoid synthetic disintegrants which we normally use in tablet formulation .After the formulation of tablet prepared tablets were subjected for weight variation, thickness, disintegration and friability and dissolution study .The result revealed that tablet prepared with chia seed as disntegrats showed promising result and even after comparing with marketed formulation prepared tablet shows similar result which indicates that chia seed can be a better alternative as a disintegrating agent in tablet formulation .

## INTRODUCTION

The term “Drug Delivery” is a techniques used to deliver therapeutic agents into the human body. Drugs are administered with an aim of curing patient ailments. Drugs are administered in a suitable formulation so that its onset and intensity of action as well as total duration of action can be checked. Among the various routes of drug delivery oral route is most widely used route of drug delivery. Effective and safer use of existing drugs through concepts and techniques of sustained and targeted drug delivery systems can increase the bioavailability of drug and also provide better therapeutic effect.[1-2]

An ideal Sustained drug delivery system is that which delivers the drug at a specific rate locally or systemically for a specified period of time with minimum fluctuation in plasma drug concentration, reduced toxicity and maximum efficiency[3].

*Salvia hispanicaL.* or chia is an annual plant belonging to the *Lamiaceae* family native to Mexico and Guatemala [16]. The name Salvia originates from the Latin word Salvare, meaning ‘the healer’ Chia seeds are high in dietary fiber (34.6%) and the majority of fatty acids present in chia oil are α-linolenic (ALA) (64% of total oil), linoleic (LA) (21% of total oil), oleic, stearic, and palmitic acids. In 2009, it was approved as novel food by the European Parliament and the European Council.

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Recently, chia has regained its popularity by becoming one of the main oil sources that contains high levels of PUFA. chia seed fits for the definition of nutraceutical, it contains vital nutrients that provide protection against chronic disease[4].

Metoprolol succinate is a Beta 1 selective antagonist (blocker) used as an Anti hypertensive, Anti angina, Anti arrhythmic. It is readily absorbed from the gastrointestinal tract with oral bioavailability of about 38% and a plasma elimination half-life ranging from 1.5 to 2 hours.[5] Administration of Metoprolol succinate in a sustained release dosage form would be more desirable by maintaining the plasma concentrations of the drug.

## MATERIALS AND METHODS

### MATERIALS

Metoprolol succinate was obtained from Ravi Shankar College of Pharmacy, Bhopal (M.P). Chia seeds were received from Local Market, Bhopal. Other materials were purchased from CDH chemical new Delhi .Rest of the solvent used were of Analytical Grade.

### PREPARATION OF SUSTAINED RELEASE TABLETS

Tablet formulations were prepared by direct wet granulation technique. Chia seeds were roughly grind in a mortar and pestle. After that the drug and very small amount of calcium carbonate($CaCo_3$) were added to it to increase bulk.

All the powders were passed through 80 mesh. Required quantities of all ingredients were mixed thoroughly and a sufficient volume of granulating agent (distilled water) was added slowly.

After enough cohesiveness was obtained, the mass was sieved through 22/44 mesh. The granules were dried at 40°C for 12hrs. Once, dry the granules retained on 44 mesh were mixed with 10% of fine granules that passed through 44 mesh. Talc and magnesium stearate were added then The tablets were prepared and they were proceed for compression by hand operated machine.

**Table 1.Formulation of tablet by using different agents**

| S.No | Ingredients | Quantity per tablet |
|---|---|---|
| 1 | Metoprolol Succinate | 50mg |
| 2 | Calcium carbonate | 44mg |
| 3 | Chia seeds | 150mg |
| 4 | Magnesium stearate | 3mg |
| 5 | Talc | 3mg |

## EVALUATION OF PREPARED TABLETS

### WEIGHT VARIATION

The weight of tablets was evaluated on 20 tablets using an electronic balance.

The average weight was found 258.35 mg and variation in weight was found 12.9mg, so per cent variation 4.9%, which falls within the range of ±5%.

### FRIABILTY

Friability was determined using 6 tablets in Roche friability tester at 25rpm.

$$\%Friability = \frac{w1 - w2}{w1} \times 100$$

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W1–Is the Initial weight of Tablet and W2 is the final weight of the tablet. It is found to be 0.0219%, which was within range of ≤1%.

### HARDNESS

Hardness of the tablets was evaluated using anPfizer hardness tester. The average hardness was obtained, 3.5-4.2 Kg/cm$^2$.

### THICKNESS

It was masure by mitutoya thickness gauge instrument. The average thickness obtained about 4.077mm.

### DISINTEGRATION TIME

It is the time required for the tablets to break into particles, the disintegration test is a measure only of the time required under a given sets of condition for a group of tablets to disintegrate into particles. In a simulated gastric fluid TS at 37˚± 2˚C, there is No evidence of disintegration after 1 hour. But a simulated intestinal fluid TS at 37˚± 2˚C, it is found to be 1.45hr.

### IN VITRO DISSOLUTION STUDIES

(Comparison between Marketed Preparation and Prepared Tablets)

In vitro drug release studies from the prepared tablets and marketed tablets were conducted using USP type II apparatus at 37°C at 50rpm. Dissolution mediums used was phosphate buffer of pH 6.8. The release rates from tablets were conducted in phosphate buffer (pH 6.8) for 2 hours. The samples were withdrawn at desired time periods from dissolution media and the same were replaced with fresh dissolution media of respective pH. The samples were analysed by UV-Visible Spectrophotometer (Lab India 3000+). The amounts of drug present in the samples were calculated with the help of appropriate calibration curves constructed from reference standards. Drug dissolved at specified time periods was plotted as per cent release versus time curve [4].

### CALCULATION OF CUMULATIVE % DRUG RELEASE

The actual amount of the drug released cumulatively is the amount in the phosphate buffer solution at any time PLUS the amounts we discarded from each sample. (By removing a sample and replacing with fresh phosphate buffer solution, we are discarding the drug in each sample).

**Table 2.% Cumulative Drug Release**

| S. no | Time(min) | Cumulative Percent Drug Release | |
|---|---|---|---|
| | | Marketed tablet | Prepared tablet |
| 1 | 0 | 0 | 0 |
| 2 | 15 | 32% | 37% |
| 3 | 30 | 52% | 62% |
| 4 | 45 | 89% | 70% |

## CONCLUSION

Metoprolol succinate sustained release tablets were prepared successfully by using chia seeds. According to the in vitro release studies, was quite similar to the marketed SR tablets. The result of the study clear that the Chia seeds as a disintegrating agent can be use in formulation as a future aspect.

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