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### FORMULATION AND EVALUATION OF HERBAL CAPSULE FOR THE TREATMENT OF DIABETES

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#### ABSTRACT

Our present study is to formulate a antidiabetic herbal capsule dosage form having highly effective, least side effect and more dose accuracy. Our study focuses on preparation of herbal capsule which has antidiabetic activity by combination of herbal drugs Withania Coagulans, fenugreek, curcumin and ginger. The raw Withania Coagulans fruits and Fenugreek seeds is dried and triturate for increase the surface area of powder during dissolution and the powder of curcumin and ginger was taken. The powder which has been prepared have less dose accuracy and bitter taste during the direct consumption to overcome this limitations powder is filled in capsule shell which can retain the 300mg of powder. The capsule gets disintegrated in 3 to 4 minutes and the drug is released during the dissolution within a period of 1 hour.

#### KEYWORDS

Anti-Diabetic, Capsule, Withania coagulans and Fenugreek.

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#### INTRODUCTION

##### Introduction to Disease

“Diabetes mellitus”, is the most common disease among the non-communicable diseases worldwide. It is a group of metabolic diseases in which a person suffers from high blood sugar level, Either because of the body does not produce enough amount insulin, or because cells do not respond to the insulin that is produced by the body<sup>1,2</sup>.

##### Introduction to Dosage Form

Capsule is the dosage form of different size, shape and capacities. Containing a single unit cure of an active constituents. Capsules are of two types as follow.

Hard gelatin capsule

Soft gelatin capsule

### Introduction to Drugs

**Withania coagulans:** Withania coagulans is a medicinal shrub of the family Solanaceae. It is also known as 'Paneer Phool' or 'Indian cheese malor. The continuous use of withania coagulans has an antidiabetic activity. It is not only used in blood sugar but also repairs pancreatic beta cells, which is responsible for insulin production. In today's world patients with diabetes use withania coagulans over the antidiabetic drugs as it is a safer and effective medication to manage diabetes mellitus over chemical medicines<sup>3,4</sup>.

**Fenugreek:** Fenugreek also known as Trigonella Foenum graecum is a seed which belongs to the family Leguminosae. It is commonly called as 'Fenugreek' or 'Methi'. A seed of fenugreek is commonly used in both Indian Ayurvedic medicine and traditional Tibetan medicine and Chinese medicine from the several centuries. Modern studies have also proved that the fenugreek seeds and leaves are commonly used in several treatments, which includes successfully reducing of blood sugar and cholesterol<sup>5</sup>.

**Curcumin:** In the Ayurveda and Chinese medicine the curcumin is widely used, it is a spice which is obtained from the root of the Curcuma longa, as a diabetic treatment. The hypoglycemic, nephroprotective and cardioprotective effects of curcumin are sufficient to give it its medicinal property. The metabolic profile of diabetes can be enhanced by curcumin<sup>6</sup>.

**Ginger:** Ginger which is also known as 'Zingiber officinale' belongs to the family 'Zingiberaceae', which has a longer history of usage both as a spice and in traditional medicine. The spice has shown good effects on diabetic liver, kidney, eye, and neural system complications. Various studies have reported that administration of ginger significantly drops in blood glucose level in Type 1- and Type 2-diabetics<sup>7</sup>.

The anti diabetic capsule is being prepared by using the various different types of the medicinal drug

which are obtained from the plants by various parts such as fruits, seeds and rhizome.

The capsule is prepared in such a way that it should not show a large number of side effects as the various anti diabetic dosage form shows.

The aim of the study is formulation and evaluation of herbal capsule for the treatment of diabetes with the use of anti-diabetic ingredients which should show the least side effect and maintain the blood sugar level.

## MATERIAL AND METHODS

### MATERIAL

The fruits of Withania Coagulans, seeds of fenugreek, powder of Curcumin and Ginger was purchased from local market of Washim.

### Methods

#### Cleaning of equipments

Primarily take all the equipments/glassware wash it and clean properly and let it dry.

#### Weighing of drugs

Then weight all the ingredients in the required quantity.

#### Collection of drugs

Collect all the required drug in which fruits of withania coagulans, seeds of fenugreek and the powder of Curcumin and ginger which can be obtained from market (Figure No.1).

#### Drying of drugs

Dry the withania coagulans and Fenugreek seeds which are in raw form at 150 degree C in hot air oven individually (Figure No.2).

#### Trituration of drugs

After drying triturate both the drug withania coagulans and Fenugreek in mortar and pestle individually (Figure No.3).

#### Sieving of drugs

After the trituration is done the drug powder is individually passed through the different number of sieves 100, 80, 60 to obtain fine drug particles or fine powder (Figure No.4).

#### Mixing of drugs

Then mix all the powdered drug of withania coagulans, fenugreek, curcumin and ginger. All the drugs are mixed manually (Figure No.5).

### Capsule filling

After mixing the drugs weight 300mg of drug and fill it into the capsule manually by hand filling method in capsule shell of size #2 (Figure No.6).

### Packaging

Pack the capsules in the air tight container with proper labelling or strip packaging is a packaging in which a cavity previously formed is filled with product and lidded with backing material. Different types of packaging strip can be used like aluminum foils, cellophane, polyethylene (Figure No.7).

## RESULTS AND DISCUSSION

The below tablets herbal capsules were evaluated for by different parameters like Chemical tests (Molisch Test, Benedict Test, Biuret Test, Ninhydrine Test, Killer-Killani Test, Salkowski Test, Dragendroff Test, Mayer Test, Wagner Test), Pre-Compressional Parameters (Bulk Volume, Tapped Volume, Bulk Density, Tapped Density, f Repose, Hausner's Ratio, Carr's Index), Dissolution Angle on Test and Disintegration Test the result of the tests are given in the table below. Observation of the post evaluation parameters shows that the formulation show optimum result.

The formulation showed in Table No.1.

The Chemical tests results are shown in the Table No.2.

The Pre Compressional results are shown in the Table No.3.

The Dissolution test result is shown in the Table No.4.

The Post Evaluation Parameter result is shown in Table No.5.

### Dissolution Test

For the dissolution test preparation of Phosphate Buffer pH 7.2 should be done: Then dissolve 1.404gm of sodium hydroxide and 6.795gm potassium dihydrogen phosphate in water to produce 1000ml<sup>1</sup>.

### Disintegration Test

For the disintegration test preparation of Phosphate Buffer pH 6.8 should be done: Then dissolve 0.896gm of sodium hydroxide and 6.795gm of potassium dihydrogen phosphate in water to produce 1000ml<sup>1</sup>.

Disintegration Time is as follows:

In Phosphate Buffer: 3.20 minutes

In Water: 4.30 minutes

**Table No.1: Formulation of Herbal Capsule**

| S.No | Ingredients        | Quantity |
|------|--------------------|----------|
| 1    | Withania Coagulans | 25gm     |
| 2    | Fenugreek          | 15gm     |
| 3    | Curcumin           | 5gm      |
| 4    | Ginger             | 5gm      |

**Table No.2: Result of chemical tests**

| S.No | Test for phytochemical | Chemical test       | Result |
|------|------------------------|---------------------|--------|
| 1    | Carbohydrates          | Molisch Test        | +ve    |
| 2    | Carbohydrate           | Benedict Test       | +ve    |
| 3    | Protein                | Biuret Test         | -ve    |
| 4    | Amino acid             | Ninhydrine Test     | -ve    |
| 5    | Glycoside              | Killer-Killani Test | +ve    |
| 6    | Steroid                | Salkowski Test      | +ve    |
| 7    | Alkaloid               | Dragendroff Test    | +ve    |
| 8    | Alkaloid               | Mayer Test          | +ve    |
| 9    | Alkaloid               | Wagner Test         | +ve    |

**Table No.3: Result of pre-compressional parameters**

| S.No | Parameters      | Result |
|------|-----------------|--------|
| 1    | Bulk Volume     | 27     |
| 2    | Tapped Volume   | 20     |
| 3    | Bulk Density    | 0.35   |
| 4    | Tapped Density  | 0.55   |
| 5    | Angle Of Repose | 12.44  |
| 6    | Hausner's Ratio | 1.398  |
| 7    | Carr's Index    | 0.312  |

**Table No.4: Result of dissolution test**

| S.No | Time (min) | % Drug release |
|------|------------|----------------|
| 1    | 0          | 0.00           |
| 2    | 5          | 7.98           |
| 3    | 10         | 18.08          |
| 4    | 15         | 24.29          |
| 5    | 20         | 27.24          |
| 6    | 25         | 29.11          |
| 7    | 30         | 32.45          |
| 8    | 35         | 35.89          |
| 9    | 40         | 39.58          |
| 10   | 45         | 44.34          |
| 11   | 50         | 52.76          |
| 12   | 55         | 66.32          |
| 13   | 60         | 74.21          |
| 14   | 65         | 80.59          |
| 15   | 70         | 87.18          |

**Table No.5: Post evaluation parameter**

| S.No | Tests                        | Result            |
|------|------------------------------|-------------------|
| 1    | Colour                       | Transparent, Pink |
| 2    | Odor                         | Odorless          |
| 3    | Size of capsule              | #2                |
| 4    | Dissolution time             | 1h                |
| 5    | Disintegration time          | 3-4 min           |
| 6    | Therapeutic effect           | Anti-Diabetic     |
| 7    | Drug content in each capsule | 300mg             |
| 8    | Dosage frequency             | 2 times per day   |



**Figure No.1: Collection of drugs**



**Figure No.2: Drying of drugs**



**Figure No.3: Trituration of drugs**



**Figure No.4: Sieving of drugs**



**Figure No.5: Mixing of all drugs**



**Figure No.6: Capsules after Filling drug**



**Figure No.7: Capsule Packaging Container**



## CONCLUSION

The present work is to prepare and evaluate the anti-Diabetic capsule for the treatment of type-2 diabetes for which we use the Withania Coagulans, Fenugreek, Curcumin and ginger as a drug. It has least side effect and which contains herbal product with no excipient. So, we can conclude that herbal capsule which has a least side effect can provide require amount of healing to the Diabetes.

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## CONFLICT OF INTEREST

We declare that we have no conflict of interest.

## REFERENCES

1. Shetal B. Desai, Dixi G. Patel, Harshal H. Patel, Hiranshi A. Patel, Ishika H. Patel. Formulation and evaluation of herbal capsule containing paneer dodi and fenugreek for the treatment of diabetes, *EPRA International Journal of Research and Development (IJRD)*, 8(5), 2023, 409-418.
2. Bhanoo Pratap Singh, Narjis fatma, Anil Kumar, Akanksha Sharma, Mansha. A review: On diabetes mellitus (DM), *IJCRT*, 10(5), 2022, a674-a685.
3. Nandini Shimpi, Hemant Bhosle, Swati Gutte, Monika Vishe. Review on Withania coagulant (Paneer Phool)- for the treatment of diabetes, *IJCRT*, 11(12), 2023, a802-a813.
4. Mohini S. Kangarkar, Ravan S. Karodi, Pooja T. Auti. Paneer dodi: A magic remedy for diabetes mellitus, *International Journal of Creative Research Thought (IJCRT)*, 10(3), 2022, c353-c358.
5. Jyothi D, Koland M, Priya S, James J P. Formulation of herbal capsule containing Trigonella foenum-graecum seed extract for the treatment of diabetes, *Journal of Young Pharmacists*, 9(3), 2017, 352-356.
6. Dipesh Singh Rajput, Bhagyashree Agrawal, Satish Sahu. Curcumin: A boon as antidiabetic, *International Journal of Green Pharmacy*, 17(1), 2023, 19-26.
7. Gloria Aderonke Otunola. A review of the anti-diabetic activities of ginger, *Ginger Cultivation and Its Antimicrobial and Pharmacological Potentials*, 2020, 1-13.

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