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# FORMULATION AND STANDARDIZATION OF GHUTIKA (TABLET) AN AYURVEDIC FORMULATION

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***ABSTRACT:***

The science of Ayurveda is based on sound principles of its philosophy and not on mysticism, magic and anecdotes. Ayurveda is based on its unique principles of health and disease. Ghutika, also known as Vati, is a traditional Ayurvedic solid dosage form comprising various herbal ingredients. It is widely used for its therapeutic benefits. However, to ensure its efficacy and safety, proper formulation and standardization are essential. The study was designed as standardization and evaluation of two Harbal plants formulation (gutikas) for the treatment of Antihelmintic Activity of Cinnamon and funnel. It is prepared according to the standard Gutika along with modern techniques of Tablets. In the present era, as the changing trends necessitated the establishment of standards for Ayurvedic drugs & formulations and development of reliable quality protocols using modern techniques of analysis is extremely important. Gutika(tablet) is standardised by different physicochemical parameters and including All the parameters like uniformity of weight, Friability, disintegration time, Thickness, hardness, were well within the norms specified by the Indian Ayurvedic Pharmacopeia with respect to a tablet. The Polyherbal Solution of 0.1N HCL prepared and verified different Concentration in Antihelmintic Activity. Use healthy and active earthworms for the study. Divide earthworms into different groups, control group (water), and various treatment groups with different concentrations of cinnamon and fennel Solution. Place earthworms in Petri dishes containing the respective solutions.

***Keywords****:* Ayurveda, Ghutika, Standardization, Formulation

## I. INTRODUCTION: -

The word Ayurveda (Sanskrit word) is the form in the combination of “Ayur” means life and “Veda” means knowledge or science which means “the science of life,” and based on the theory of Tridosha. [1]. Ayurveda is a traditional system of medicine that originated in ancient India over 5,000 years ago. It focuses on holistic healing, emphasizing balance between the body, mind, and spirit to prevent illness and promote wellness. Ayurvedic treatments often include herbal remedies, dietary changes, yoga, meditation, massage, and detoxification practices. Its principles revolve around the concept of doshas (vata, pitta, and kapha), which represent different energies within the body. Ayurveda has gained popularity worldwide for its natural approach to health. India has a rich heritage of traditional system of medicine. Ayurveda is the traditional Indian system of medicine which is meant not only for curing the diseases but also for prevention of the occurrence of illnesses. Ayurvedic system adopts a holistic approach towards healthcare by balancing the physical, mental and spiritual functions of the human body.

Science of Ayurveda is unique as it provides opportunity to make a healthy, harmonious and long life [2]. . Undoubtedly, in comparison to allopathic treatment, Ayurvedic treatment is more effective in most of the chronic diseases. Ayurvedic treatment is although highly effective; proper mode of action, pharmacology, pharmacokinetics, and pharmacovigilance of many important Ayurvedic drugs are still not fully explored. Moreover, the comprehensive knowledge of the basic ideologies of Ayurveda is poorly acceptable scientifically due to lack of evidence. [3]. Ayurvedic medicines, the therapeutic components have not been fully elucidated or easily monitored. Chemo-profiling of The some promising leads from Ayurvedic medicines[4].The main aim of Ayurveda is to help the healthy person to protect and maintain health, to eradicate the diseases of the diseased persons [5].

fig.1: ayurveda

**Classification of Ayurvedic dosage forms :-**

They are classified into following groups as below –

A] Solid dosage form :-pills ,Ghutika,Vatika .

B] Semi-dosage form :- Avaleha ,pak, Lapa ,Ghrita.

C] Liquid dosage form :- Asava ,Arista ,Tails ,Dravaka

D]Powder dosage form :- Basma ,Sattva ,Pisti ,Mardhuna ,Lavana ,Churn .

## INTRODUCTION OF HERBAL DRUGS :-

### 1.1 CINNAMON :-

Cinnamon it is commonly knowns as Cinnamon bark , kalmi -Dalchini , Ceylon Cinnamon. It is obtained from dried inner bark of the shoots of Coppiced trees of Cinnamomum Zeylanicum (Cinnamomum Verum) Belonging into the family-Lauravceae .

fig.2: cinnamon

## Taxonomical classification of cinnamon:

**Kingdom :** Plantae

**Phylum :** Magnoliphyta

**Class :** Magnolispoda

**Order :** Laurales

**Family :** Lauraceae

**Genus :** Cinnamomum

**Species :** Zeylanicum

**Chemical constituents Of Cinnamon :-**

Cinnamon is mainly used in the aroma and essence industries due to its fragrance, which can be incorporated into different varieties of foodstuffs, perfumes, and medicinal products [6] he most important constituents of cinnamon are cinnamaldehyde and *trans*-cinnamaldehyde (Cin), which are present in the essential oil, thus contributing to the fragrance and to the various biological activities observed with cinnamon [7]. One of the major constituents of essential oil extracted from *C. zeylanicum* named (E)-cinnamaldehyde has an antityrosinase activity , while cinnamaldehyde is the principal compound responsible for this activity **.** Cinnamon consists of a variety of resinous compounds, including cinnamaldehyde, cinnamate, cinnamic acid, and numerous essential oils [8].

**Traditional Uses:-**

1. In addition to being used as a spice and flavoring agent, cinnamon has been used as Anti-Inflammatory, Antihelmintic, Antimycotic, Anticancer agent.

2. Cinnamon can also improve the health of the colon, thereby reducing the risk of colon cancer.

3. Cinnamon is a coagulant and prevents bleeding and also increases the blood circulation in the uterus and advances tissue regeneration.

## 1.2 FENNEL:-

Funnel is commonly knows as Fennel fruit , Fenkal, Foeniculum It is obatained from Dried fruits of FoeniculumValgare Miller belonging into the family Apiaceae.

fig.3: fennel (foeniculum vulgare)

**Taxonomical Classification of Fennel:-**

**Kingdom :** Plantae

**Subkingdom :** Virideplantae

**Division :** Tracheophyta

**Class :** Magnoliopsida

**Order :** Apiaels

**Family :** Apiaceae

**Genus :** Foeniculum miller

**Species :** Foeniculum Vulgare Miller

**Funnel (Foeniculum Vulgare) Chemical Constituents** :-

Essential oil compounds like Anthole, Fenchone, Limonene Estragole, Myrcene, and other chemical constituent like flavonoids contains Quercetin ,Kaempferol ,Rutin ,and phenolic compounds contains Caffeic acid ,Chlorogenic acid ,and Fatty acid contain Oleic acid ,Linolic acid ,Palmitic acid ,and vitamis and minerals Contain vitamin C,Potassium ,Calcium ,Magnesium This components are present in the funnel plant.

**Traditional Uses:-**

1. **Ayurveda:** In Ayurvedic medicine, fennel is known as "Saunf" and is used to balance the body's doshas and enhance digestion.
2. **Respiratory Health:** Traditionally, fennel has been used to treat coughs, bronchitis, and other respiratory ailments.
3. **Menstrual Health:** Fennel is believed to have emmenagogue properties, helping to regulate menstruation and relieve menstrual cramps.
4. **Antihelmintic :-**Funnel is used to Treat infection of worm parasite infection.
5. **Antioxidant:** Fennel is believed to have antioxidant properties, contributing to overall health and wellness.

## 1.3 Introduction Of Ayurvedic Ghutika (Tablet):-

Gutika or tablet is a solid dosage form prepared by adding fine powder of drug/drugs to liquified starch or water or freshly herbal drug powder or as specific medium, either by heating or without heating. The size of the tablet depends upon the characteristics of its ingredients According to Acharya Vagbhatta, it is classified as a variety of preparation of a formulation in paste form known as kalka. Synonyms of gutika include vati, vatika, vataka, modaka, pindi, guda and varti. Although these preparations differ in size, shape, and binding agents, their method of preparation is the same.[9].

**Importance of Ghutika (Tablet):-**

1.Consume less time prepration .

2.Easy to administer.

3.More stable than Dosage form .

4.Maintain the accuracy of Dosage .

5.Easy To Transportable .

6.Palatable and convenient for dispensing.[10]

## II. Method of preparation of ayurvedic Ghutika (Tablet):-

Formulating a tablet through wet granulation and compression involves several steps to ensure the final product is effective and meets quality standards. Below is a general outline of the process tailored for an anthelmintic (anti-worm) medication.

### 2.1 Steps in Wet Granulation and Tablet Compression

**1.Selection of Active Pharmaceutical Ingredient(API)**

Selection of Anthelmintic Agent of Ayurvedic drugs. (e. g Cinnamon, fennel)

**2. Selection of Excipients :**

**1.Binders:** Used to hold the ingredients together (e.g. starch).

**2. Fillers/Diluents:** Added to create the desired bulk.

**3. Disintegrants:** Help the tablet break down in the digestive system(e.g starch).

**4. Lubricants:** Prevent sticking during compression (e.g., magnesium stearate).

**3.Weighing and Mixing:**

- Accurately weigh the API and excipients.
- Mix the ingredients to achieve a uniform blend.

**4.Prepration of the Granulating solution:**

- To prepare a solution of the binder in suitable solvent like starch mix with water and heat the solution for specific period of time.

**5.Wet Granulation:**

- Add the granulating solution to powder blend to form a wet mass.
- Pass the wet mass through a sieve no 22 and to produce a granule.

**6.Drying:**

- Dry the Granules using a suitable method by Hot Air Oven, Tray dryer to remove the moisture from the granules.

**7. Sizing:**

- Pass the granules through a sieve to achieve the desired particle size distribution.

**8. Blending:**

- Mix the sized granules with addition of Excipients and disintegrants.

**9. Compression:**

- Compress the final blend into the tablets by using tablet press.
- Ensure uniformity in the tablet weight and hardness.

**10. Evaluation test of tablet:**

Weight Variation, Hardness, Friability, Disintegration time, Thickness, Assy of Active ingredient.

## III. FORMULATION TABLE: -

table no.1

| Sr. No | Ingredients | Role in Formulation | Quantity |
|---|---|---|---|
| 1 | Cinnamon Powder | Active Pharmaceutical Ingredient (API) | 30gm |
| 2 | Fennel Powder | Active Pharmaceutical Ingredient (API) | 30gm |
| 3 | Starch | Binder | 5gm |
| 4 | Magnesium Stearate | Lubricant | 2gm |
| 5 | Water | - | 75ml |

## IV. PREPRATION OF GHUTIKA (TABLET):-

1. First, measure out the proper amount of each ingredient.
2. The cinnamon and funnel Powder are taken and put through sieve number 120.
3. Adjust the weight to the appropriate quantity of ingredient.
4. Put the Two powders into the mortar and pestle.
5. Appropriately Combined With it.
6. Pour 75ml of water into a beaker, and then stir constantly while adding the starch powder to the water.
7. The Right amount of heat is applied to the solution.
8. Gradually pour this solution to the powdered mortar pestle.
9. Ensure it is well mixed and dumps a large amount.
10. This material is passed through sieve no 22 for the Granulation.
11. Granules are produced.
12. Produced granules are Dry at specific period of time and maintain the Temperature of Hot Air Oven at 38 degrees.
13. After Specific period of time granules are remove from Hot Air oven and then Mixed the magnesium stearate powder into granules as a Lubricant.
14. These mixed granules are transfer through hopper for primary punching of the Ghutika (Tablet).
15. Then These granules are passed through secondary punch for the proper Formation of ghutika (Tablet) into the Tablet Punching Machine.
16. Ghutika (Tablet) is formed and then we check the Evaluation Test and Antihelmintic Activity Ghutika.

fig.4: cinnamon

fig .5: fennel

fig .6 : starch

fig.7. granules

fig. 8: mg stearate

fig. 10: ghutika

**Prepration of Ghutika (Tablet)**

## V. Evaluation of Ghutika (Tablet) :-

### 1 .Organoleptic Evaluation :-

1. **Color :-** Brown ,Light Brown
2. **Odour:-** Aromatic
3. **Taste :-** Sweet and aromatic
4. **Size** :- Dimensionally,It is 20mm length,9.30 Width,7.52mm Thickness Which Falls Within +5% Variation of the standard value .The shape of the Ghutika (Tablet) was Elongated Bi-convex.
5. **Shape :-** Circular

### 2.Weight Variation :-

Twenty tablets were chosen at random, and each was given a unique weight on a Shimadzu electronic analytical balance. The following formula was used to get the percentage of variance after the average weight was measured.

**Formula :-**

**Weight Variation = (Iw-Aw)/Aw x 100%**

**Where,**

**IW : Individual Weight**

**AW : Average Weight**

As per USP standards, individual weights of two tablets should not deviate from the average weight by 5% and none deviated by 10%[11].

### 3.Hardness :-

Hardness24 is the measure of the mechanical integrity of the tablets. It is the force required to break the tablets in a specific plan. To endure the mechanical shaking of handling during manufacture, packaging, and shipping, tablets need to have a particular amount of strength or hardness and resistance. Pfizer's tablet hardness tester25 was used to independently test the randomly chosen tablets. Between the hardness tester's jaws, the tablet was held vertically. By gradually applying more pressure to the tablet's edge while pressing the jaws with the aid of a hand, the tablet eventually broke. The reading was taken, and each group's average hardness was determined independently. The reading is given in Newton’s or kg/cm2. [12].

### 4.Friability :-

The Friability test should be performed for compressed ,uncoated tablet. One of the often-used tests to assess a tablet's ability to withstand mechanical stresses evaluates how resistant it is to surface abrasion and chipping by spinning it in a rotating drum. The friability of the tablets is measured by the amount of weight loss following tumbling. The friability test is conducted in the Roche friability apparatus by taking 20 tablets. This consists of a plastic drum that revolves at 25rpm, dropping the tablets through six inches in the friabilator to undergo shock, which is then operated for 100 revolutions. The tablets are reweighed. The tablet that lose less than 1.0% of the tablet weight are considered as acceptable.[13].

**Formula for Friability Test :-**

$$\text{Friability (\%)} = \frac{\text{Initial Weight (W1)} - \text{Final Weight (W2)}}{\text{Initial Weight (W1)}} \times 100 \qquad (1)$$

Where,

Initial Weight of 20 Tablet (W1) = 6.173gm

Final Weight of 20 Tablet (W2) = 6.160gm

$$= \frac{6.173 - 6.160}{6.160} \times 100 = \frac{0.013}{6.160} = 0.0021\text{gm}$$

**5.Thickness :-**

The Thickness of tablets can vary depending on the model and manufacturer. Typically, tablets range from around 5mm to 10mm in thickness Some ultra-thin models can be even thinner, while rugged or specialized tablets may be thicker for durability or additional features.

**6. Disintegrating Time :-**

Disintegration is defined as that state in which no residue of the tablet remains on the screen of apparatus. This test determines whether the tablet disintegrate within a prescribed time when placed in a liquid medium under the prescribed experimental conditions.[14]. The tank of the disintegration apparatus 27was filled with distilled water up to the mark. 750 ml of distilled water in each of the 1000 ml beaker was taken. The timer of the instrument was set for 60 minutes. The temperature of water in beakers to 37°C and that of water in the main tank to 37°C was maintained. One tablet was introduced into each tube and added a disk to each tube. The assembly was suspended in the beaker containing water and the apparatus was operated. The time duration at which the tablet disintegrates was noted. As per set criteria by USP if 6 tablets are tested, all the 6 tablets should be disintegrated.[15].

## VI. Antihelmintic Activity of Cinnamon and Fennel on Earthworms: -

Antihelmintic activity refers to the ability of substances to expel or destroy parasitic worms. Both cinnamon and fennel are traditionally known for their medicinal properties, and there is interest in their potential as natural antihelmintic agents.

**1.Cinnamon: -** Cinnamon, particularly its essential oils and tablet, has been studied for various medicinal properties, including its antihelmintic activity. The active components in cinnamon, such as cinnamaldehyde, eugenol, and cinnamic acid, are believed to contribute to its effectiveness against parasitic worms. Research has shown that cinnamon Ghutika (Tablet) can affect the motility and survival of various parasitic worms, including earthworms.

**2. Fennel: -**

The essential oils in fennel, such as anethole, fenchone, and estragole, have been studied for their potential antihelmintic properties. Similar to cinnamon, fennel extracts can affect the motility and mortality of parasitic worms.

**Experimental Animals:-**

Adult earthworms (*Pheretima posthuma*), Roundworm (*Ascaridia galli*) and Tapeworms (*Raillietina spiralis*) were used to evaluate anthelmintic activity *in vitro*. Earthworms were collected from moist soil and washed with normal Water to remove all faecal matter were used for the anthelmintic study. The earthworms of 3-5 cm in length and 0.1-0.2 cm in width were used for all the experimental protocol. Roundworms and tapeworms were obtained from intestine of freshly slaughtered fowls. Infested intestines of fowls were collected from the local slaughter house and washed with normal saline solution to remove all the faecal matter. These intestines were then dissected and double distilled water as control.[16 ,17] .

This procedure was adopted for all three different types of worms. All the test solution and standard drug solution were prepared freshly before starting the experiments. Observations were made for the time taken for paralysis was noted when no movement of any sort could be observed except when the wormsand worms were collected and kept in normal saline solution. The average size of round worm was 5-7 cm and average size of tapeworm was 6-8 cm. Earthworm and helminths were identified [18,19].

**Testing Antihelmintic Activity on Earthworm: -**

The evaluation of antihelmintic activity typically involves exposing earthworms (often Eisenia fetida) to different concentrations of the test substances and observing their effects.

**Experimental setup: -**

The Polyherbal Solution of 0.1N HCL prepared and verified different Concentration in Antihelmintic Activity. Use healthy and active earthworms for the study. Divide earthworms into different groups, control group (water), and various treatment groups with different concentrations of cinnamon and fennel Solution. Place earthworms in Petri dishes containing the respective solutions.

**Observation: -**

Monitor the earthworms for a specific period, typically several hours. Record observations such as paralysis and death of earthworms.

**Data Analysis :-**

Compare the effects of different concentrations of cinnamon and funnel and Polyherbal solution 0.1N HCL. Determine the effective concentration at which the extracts show significant antihelmintic activity.

Fig.11: Antihelmintic Activity of Cinnamon and Funnel on Earthworms.

# VII. Result :-

**1 .Organoleptic Evaluation :-**
**1 .Color :-** Brown ,Light Brown
**2.Odour:-** Aromatic
**3.Taste :-** Sweet and aromatic
**4. Size** :- Dimensionally,It is 20mm length,9.30 Width,7.52mm Thickness Which Falls Within +5% Variation of the standard value.
**5.Shape :-** Circular, The shape of the Ghutika (Tablet) was Elongated Bi-convex.

**2.Physicochemical Evaluton :-**
The Ghutika tablet's thickness, hardness, weight variation, reliability, and disintegration time were all successfully evaluated physiochemically.

**3.Antihelmintic Activity:-**

table no.2

| Sr.No | Concentration of Drug /mg | Average Time | Paralysis Time Of Earthworm |
|---|---|---|---|
| 1. | 25mg | 14min | 17min |
| 2. | 50mg | 14min | 11min |
| 3. | 75mg | 14min | 8min |

If we know that concentration of drugis inversly praportional to the Activity of paralysis time.the drugs concentration will rise,and the paralysis time will be there after decreses. Both drugs are expected to exhibit antihelmintic activity, with the effectiveness depending on the concentration and the active components of the extracts.Higher concentrations of the drugs are generally expected to show greater efficacy.

## VIII. Conclusion :-

Cinnamon and fennel have potential as natural antihelmintic agents against earthworms. Their effectiveness can be attributed to the bioactive compounds present in these plants. Further research, including detailed biochemical analysis and in vivo studies, can help in understanding the full scope of their antihelmintic potential**.** The data thus obtained can be used to conclude that standardisation of the manufacturing process and standardisation of the raw materials will be helpful in reproducibility of formulations as well as to ensure the quality and safety of the formulations

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