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" Formulation And Evaluation Of Gutika – An Ayurvedic Dosage Form "

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ABSTRACT

Gutika is an ancient and ayurvedic dosage form and it's a result of kalkakalpana among the five key of ayurvedic knowledge. They are very minute in size as analogized to vati. According to Acharya Sharangdhargutika is a replica of vatikalpana which called as capsules in current dosage form. Gutika plays a very important role in the ayurvedic pharmacy. There are numberable advantages of this dosage form like easy to administer, transmittable, palatable, accessible for dispensing, consume lower time in medication. In the ancient primer two types are mentioned Agnisadya and anagnisadya. System of medication is classified as per operation of constituents. In ultramodern gutika is called as pills and spheres means spheres are agglomerates of fine powder or granules of mass specific and also excipients. In ancient time gutika is made by hands but as time goes on the methodologies are also changed. In this study, the development in the pharmaceutical procedure to formulate gutika or pills or spheres is done.

Keywords:-Kalkakalpana, Vatikalpana, Agnisadya, Anagnisadya, Spheroids

INTRODUCTION

ॐ हिताहितं सुखं दुःखं आयुः तस्य हिताहितं ।
मानं च तच्च यत्रोक्तं आयुर्वेदः स उच्यते ॐ

Ayurveda is a Veda that provide the knowledge of good, bad, happy and unhappy life, it's promoters and non-promoters, measurement and nature.

हितायुए अहितायुए सुखायु एवं दुःखायुय इस प्रकार चतुर्विध आयु के हित तथा अहितए पथ्य और अपथ्य आयु का प्रमाण एवं स्वरूप जिसमें होए वह आर्युवेद कहा जाता है।

Gutika:- Gutika or pill is defined as the medicine prepared in the form of tablets or pills.Theseare made up of drugs of plants and mineral origin. Medicine prepared in the form of tablet are known as vati or gutika.Gutika is an efficient ayurvedic formulation that maintain the balance of vata and Kaphadoshas in the body. Gutika is very good and important dosage form of Ayurveda which is known as pills, spheroids in the modern era. So many ancient references are available in the context of gutika. These are made of at least one medication from Plant, creature, mineral or metal birthplace. Gutika is described as vatikalpana. Because the procedures are same for the both but size variation is there so, gutika describes as Vati. In the preparation of vatikalpana, plants or minerals are crushed with specific liquid medias prescribed in ancient Literature and molded in the shape of pills or tablets. In ancient books called as Brhatrayi different vati plans are referred to in different setting. Regardless, Acharya Sarngadhara was the chief person who referred to the point- By-point portrayal with respect to vatikalpana in a different chapter [1] .Spheroids are more agreeable to film covering, because of their smooth, mathematically characterized surface. Spheroids containing various Medications can be mixed and planned in a solitary Measurement structure including those that display Differential delivery rates for a similar medication. Spheroids can scatter in the gastrointestinal lot as discrete subunits, which guarantee a consistent pace of medication assimilation subsequently limiting pinnacle plasma variances. Bothering delivered by a high nearby convergence of a medication from a solitary unit measurement structure can be evaded[2]. Ayurveda is the one of the oldest healing system of medicine. The principle is based on that the disease causing because of Vata, Pita, Kapha and can be treated by substance obtained from nature i.e plant, mineral, metals and mineral etc. Drugs in Ayurveda are of two kinds use of single drugs and use of combination of drugs [3].

The alternate system of medicine, Ayurveda is comprises different types of formulation which includes Churnas[4], Kashayam[5], Taila[6], Gutikas and Bhasma etc. Gutika is an important drug delivery system in Ayurveda[7]. Acharya Sharangadhar in 13th century AD was the 1st person who explained in detailed about Bhaishajyakalpana in Sharangadhar Samhita. He explained various Kalpana and in one of these chapters he explained about vati. Vatikalpana is a pharmaceutical procedure in which the powder of the raw drugs triturated together with certain juices, infusions, decoctions or even honey and then prepared in the forms of pills and tablets. The effective ayurvedic formula gutika keeps the body's vata and kapha doshas in balance. An ancient and traditional ayurvedic dosage form,gutika is a product of kalkakalpana, one of the five fundamental principles of ayurvedic sciences. These gutika heal acid reflux and discomfort caused due to gas and bloating. Antacids are a medicine that relieves heartburn and indigestion by reducing the amount of acid in your stomach. Antacids neutralize the acid in your stomach by stopping an enzyme that creates acid to break down food for digestion (pepsin).

There are two types of Gutika:

1. AgnisandhyaVati

2. AnagnisandhyaVati

1. **AgnisandhyaVati:**

   This gutika is prepared over a fire. Here, the sugar is heated to a high concentration and combined with additional powdered materials to resembles thick glue. The mixture is then moulded into a sphere [8].

2. **AnagnisandhyaVati:**

   This gutika is prepared without fire by pounding the other powdered components with sugar or guda in the specified liquid medium until they are the right shape [8].

   Charcterstics of good Gutikas:

- It should be sufficiently hard to withstand reasonable handlings from the time of manufacture until they reach to consumer.
- It should be a suitable size for easy administration.
- It should be free from physical imperfection and foreign matter.
- It should be disintegrate readily.
- It should contain the stated dose within permitted limits.

OBJECTIVES

- An Ayurvedic Gutika is easy to administer.
- It is more stable dosage form.
- Economical dosage form.
- Ayurvedic Gutika take less time in preparation.
- It is very convenient for dispensing.
- Ayurvedic Gutika maintain the accuracy of dosage form.
- It is palatable.
- Gutika is easy to transport

MATERIALS AND METHODS

Herbal ingredients used in Gutika:-

1. AMLA POWDER (□□□□□ / □□□□) :

Synonyms:- Amlang, Amlaki, Ambala,Amalica,Aunla,Nellikai[11]

Botanical Name:-Emblica Officinalis Gaertnor Phyllanthus emblica Linn[12]

Family:- Euphobiaceae

Biological Source:-This is consist of dried as well as fresh fruits pericarp of the plant Emblica Officinalis Gaertn or Phyllanthus emblica Linn.Belonging to family Euphobiaceace[13].It contains not less than 1.0% w/w gallic acid calculated on dry basis[14] .

Chemical Consituents:-

Tannins and gallic acid,Polyphenols. It is commonly known as Indian gooseberry or amla, It is the most important medicinal plant in the Indian traditional system of medicine, the Ayurveda. Various parts of the plant are used to treat a range of diseases, but the most important is the fruit. The fruit is used either alone or in combination with other plants to treat many ailments such as common cold and fever antacid diuretic, laxative, liver tonic, refrigerant, stomachic, restorative, alterative, antipyretic, anti-inflammatory, hair tonic; to prevent peptic ulcer and dyspepsia, and as a digestive. Fruit has pale yellow colour, round in shape and has six vertical strips. A ripened amla fruit is hard and weights approximately between 60 and 70 grams[15].

Fig.1.Amla Powder

2 .GULVEL POWDER ;अमृता, कुण्डलिनी / गुडची, गुळवेल)रू

Synonyms:-Gilo ,Guluchi Gulvel, Chittamrutu ,Amrita,Gulancha ,Gurcha[16].

Botanical Name:-Tinospora Cordifolia

Family:- Menispermaceae

Biological Source:-This is obtained from leaves or dried as well as fresh stem of Tinospora Cordifolia belonging to family Menispermaceae[17] .

Chemical Consituents:-

It is the common plant of deciduous and dry forest. Large, deciduous, extensively spreading climbing shrub. The plant has heart-shaped leaves with greenish-yellow flowers. It grows in tropical and sub-tropical regions of the globe, of these the African and Asian continents are abundant with *Tinospora cordifolia* [18].

Tinospora cordifolia is an important drug of Indian systems of medicine and used in medicines since times immemorial. The drug is well known Indian bitter and prescribed in fevers, antacid, diabetes, dyspepsia, jaundice, urinary problems, skin diseases and chronic diarrhoea and dysentery. It has been also indicated useful in the treatment of heart disease, leprosy, and helmenthiasis. The starch obtained from the stem is highly nutritive and digestive and used in many diseases [19].

Fig. 2.Gulvel Powder

3 .TULSI POWDER (तुलसी ɛ तुळस) :

Synonyms:-*Ocimum sanctum, ocimum tenuiflorum*

Botanical name:- ocimum tenuiflorum

Family:- Lamiaceae

Biological source:- Tulsi consist of fresh and dried leaves of Ocimum species like Ocimum sanctum Linn and Ocimum basillicum Linn[20].

Chemical constituents:-

The chemical composition of tulsi is highly complex, containing many nutrients and other biologically active compounds, the proportions of which may vary considerably between strains and even among plants within the same field[21]. Furthermore, the quantity of many of these constituents is significantly affected by differing growing, harvesting, processing and storage conditions that are not yet well understood.

The nutritional and pharmacological properties of the whole herb in its natural form, as it has been traditionally used, result from synergistic interactions of many different active phytochemicals. Consequently, the overall effects of tulsi cannot be fully duplicated with isolated compounds or extracts[22]. Because of its inherent botanical and biochemical complexity, Tulsi standardization has, so far, eluded modern science. The leaf volatile oil contains eugenol, euginal (also called eugenic acid), urosolic acid, carvacrol, linalool.limatrol, caryophyllene.while the seed volatile oil have fatty acids and sitosterol; in addition, the seed mucilage contains some levels of sugars and the anthocyans are present in green leaves. The sugars are composed of xylose and polysaccharides[23].

Fig.3.Tulsi Powder

4. JESTHMADH POWDER (यष्टिमधु / मुळेठी) :

Synonyms:-Glycyrrhiza, Mulethi, Licorice, JethiMadh, Yashtimadhu

Biological name:-Glycyrrhiza glabra

Family:-Fabaceae, Leguminosae

Biological source:- It consist of peeled and unpeeled stolons,roots,and stems of glycyrrhiza glabra linn.

Chemical Constituents:-

Liquorice root contains triterpenoids, polyphenols, and polysaccharides[24]. Flavonoids account for the yellow root color[24]. The principal glycoside, glycyrrhizin, exists incontent of 7% to 10%, depending on cultivation practices[24].The isoflaveneglabrene and the is of lavane glabridin, found in the roots of liquorice, are phytoestrogens[25][26]. The scent of liquorice root comes from a complex and variable combination of compounds, of which anethole is some 3% of total volatiles.Much of the sweetness in liquorice comes from glycyrrhizin, which has 30–50 times the sweetness of sugar.The sweetness is different from sugar, being less instant, tart, and lasting longer[27].

Fig.4 .Jeshthmadh Powder

5. HONEY(□□□/ □□):

Synonyms:-Madhu, Madh, Mel, Purified honey.

Family:-Apideae

Biological Source:- Honey is a viscid and sweet secretion stored in the honey comb by various species of bees,such as Apismellifera, apisdorsata, apisflorea, Apisindica and other species of apis[28].

Chemical Constituents:-

The average composition of honey is as follows: Moisture 14–24%, Dextrose 23–36%, Levulose (Fructose) 30–47%, Sucrose 0.4–6%, Dextrin and Gums 0–7% and Ash 0.1–0.8% [29]. Besides, it is found to contain small amounts of essential oil, beeswax, pollen grains, formic acid, acetic acid, succinic acid, maltose, dextrin, colouring pigments, vitamins and an admixture of enzymes, for example, diastase, invertase and inulase[30]. Interestingly, the sugar contents in honey varies widely from one country to

another as it is exclusively governed by the source of the nectar (availability of frag-ment flowers in the region) and also the enzymatic activity solely controlling the conversion into honey[31].

Fig 5. Honey

6 .JAGGERY(□□□□/ □□□) :

Synonyms:- Brown sugar, gur, medicinal sugar

Biological name:-Saccharum officinarum

Family:-Poaceae

Biological source:-Jaggery is made by sugarcane and the toddy palm tree.The sugar made from the sap of the date palm is more prized and less commonly available outside of the region where it is made[32].Jaggery is made by evaporating the water from sugarcane juice or palm sap.It is solid as a block, liquid or granules[33] .

Chemical Constituents:-

Jaggery, made from sugarcane juice, has a pH of around 5.8–6.4 100 g of jaggery contains approximately 70–85 g of sucrose, 7–10 g of reducing sugars (glucose and fructose), 0.500–0.750 g fats, 0.35–0.45 g proteins, and 0.5–1.0 g ash contents[34]. Jaggery is rich in important minerals like calcium, magnesium, potassium, phosphorus, sodium, iron, man contains approximately 70–85 g of sucrose, 7–10 g of reducing sugars (glucose and fructose), 0.500–0.750 g fats, 0.35–0.45 g proteins, and 0.5–1.0 g ash contents. Jaggery is rich in important minerals like calcium, magnesium, potassium, phosphorus, sodium, iron, manganese, zinc, copper, and chloride, and vitamins like A, B1, B2, B5, B6, C, D2, E,

nicotinic acid, and protein. sugarcane jaggery also contains phenolics (280–320 mg/100 g jaggery) [35].

Fig.6 jaggery

Formulation of Gutika :

To make good and effect gutika, we have to take the fine medication powder. The desired amount of jaggery is taken in a clean, suitable sized wide mouthed stainless steel container. The necessary amount of water is added, and the mixture is cooked on the fire while continuosly stirring. When syrup is ready, the fine medication powder of tulsi powder 10 mg, amla powder 10 mg, gulvel powder 10 mg, jesthmadh powder 5 mg in a small amount and mixed it well until required consistency is acquired. The bulk is then formed into the pills of the desired shape and size. The prepared pills are dried in a shade and stored in airtight container.

Fig 7.Preparation of Gutika

Fig 8.Gutika

Sr no.	Ingredients	Uses	Quantity
1	Tulsi Powder	Helps in lowering the acid level in stomach, reduce heartburn	10 gm
2	Amla Powder	Improve digestion	10 gm
3	Gulvel Powder	Helps to reduce bloating, acidity	10 gm
4	Jeshtmadh Powder	Deals with upset stomach, and heartburn. Helps to improve indigestion, which curbs acid reflux.	5 gm
5	Jaggery	Helps to enhance the agni(digestive fire) and improve digestive stimulant.and it act as a sweetener.	20 gm
6	Honey	Preservative	q.s
7	Water	Vehicle	q.s

Table 1: Formulation of Gutika

Mode of action of Gutika

After you consume a tablet, it will first break down in your stomach and intestines before the medication molecules are absorbed into your bloodstream. Once in the circulation, it can go throughout the body to affect different tissues and organs. By calming the three humors—health abberations associated with fire (Pitta), health aberrations associated with air and ether (Vata), and health aberrations associated with water (Kapha), gutika strengthens immunity. It restores the body's tridosha balance[36].

Need for Standardization of Gutika:

A drug's evaluation include verifying its identity, assessing its quality and purity, and identifying any adulteration[36]. Standardization is the process for the establishment of standard for a particular or drug.

EVALUATION TEST OF GUTIKA

1.Organoleptic Evaluation

The Gutika obtained was evaluated for its organoleptic properties like colour, odour, taste, texture, shape[37].

i)Colour- Identify the colour and matches the standard.

ii) Odour- Identify the odour and matches it standard.

iii) Taste- Identify the taste.

iv) Texture- identify the texture of gutika.

v) Shape- Check the shape whether it matches the standard.

2.Physico-chemical analysis

i)Determination of Total Ash

About 2 to 3 g of the pulverised drug, precisely weighed, should be burned in a platinum or silica dish coated with tar until carbon-free, then cooled and weighed. If a carbon-free ash cannot be produced in this manner, burn the charred matter with hot water, collect the residue on ashless filter paper, add the filtrate, burn the residue and filter paper until dry, and ignite at a temperature no higher than 450°C. Determine the amount of ash in relation to the air-dried medication[38] [39].

Fig 9. Total Ash

ii) Determination of Acid Insoluble Ash

Using 25 ml of diluted hydrochloric acid, boil the ash for 5 minutes. Then, collect the insoluble material in a crucible or on ashless filter paper, wash with hot water, and ignite to a constant weight. Determine the amount of acid-insoluble ash in the drug's air-dried form [38] [40].

Fig 10.Acid Insoluble Ash

iii) Determination of Water Soluble Ash

The ash was boiled with 25 ml of water for 5 minutes, the insoluble matter on ash less filter paper collected, washed with hot water, ignited, cooled in a desiccator, and weighed. The weight of the insoluble matter from the weight of the total ash was subtracted. The difference represents the water-soluble ash. The percentage of water insoluble ash was calculated with reference to the air-dried drug [41].

Fig 11.Water Insoluble Ash

iv) Loss on drying

After precisely weighing the medication put about 10 g of it in a tar-coated evaporating plate (without first drying it). Drugs are weighed after 5 hours of drying at 105°C in a tarred evaporating plate. Continue drying and weighing every hour until the difference in weight between two subsequent measurements is no greater

than 0.25 percent. When two subsequent weighs after drying for 30 minutes and cooling for 30 minutes in a desiccator show a variation of no more than 0.01 g, the weight is considered constant[38].

v) Determination of pH

The pH meter was calibrated using standard buffer solution. pH is determined by dissolving 2gm of tablet powder in 100 ml of de-mineralized water at room temperature and its pH was measured with the help of digital pH meter[41].

Fig.12 ph determination

vi) Weight variation test

Twenty pills were chosen at random and each one was weighed using a electronic analytical balance23. the average weight was determined, and the following formula was used to determine the percentage of variance. Individual weights of two tablets should not deviate from the average weight by more than 5%, and none should deviate by more than 10%, per USP guidelines[42].

vii) Hardness

Hardness[42] is the measure of the mechanical integrity of the tablets. It is the force required to break the tablets in a specific plan. Pfizer's tablet hardness tester[43] was used to independently test the randomly chosen gutika. Between the hardness tester's jaws, the gutika was held vertically. By gradually applying more pressure to the gutika'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 (N) [44].

Fig 13.Hardness Test

ix) Friability

Friability of a gutika can determine in laboratory by using electrolab friabilator. This consist of a plastic chamber that revolves at 25 rpm, dropping the gutikas through a distance of six inches in friabilator, which is then operate for 100 revolutions. The gutika"s are reweighed. Compress gutika that loss less than 0.5% to 1.0% of the tablet weight are considered acceptable[45].

Fig 14.Friability Test

RESULTS AND DISSCUSION

1.Physical Properties:

The Organoleptic properties of formulated antacid Gutika were judged by colour, taste, and odour.

Prepared formulations was dark brown in colour. It has characteristic odour, and astringent-sweet taste.

Sr.no.	Parameters	Evaluations
1	Colour	Dark Brown
2	Odour	Charecteristic
3	Taste	Astringent-sweet
4	Texture	Smooth
5	Shape	Circular/spherical

Table 2. Physical Properties

2.Physico-chemical Properties

i)Determination of Total Ash

The determination of total ash of antacid Gutika was found to be 6.5%. According to standard specification of Gutika should not more than 20%.

ii)Determination of Acid insoluble ash

The determination of Acid Insoluble Ash of antacid Gutika was found to be 4.5%. According to standard specification of Gutika should not more than 10%.

iii)Determination of Water Soluble Ash

Water soluble ash of antacid was found to be 5%. According to standard specification of Gutika the water soluble ash should not more than 10%.

iv)Loss on Drying

To determine the moisture content of sample loss on drying is performed. LOD of antacid Gutika was found to be 7%. It should not be more than 10%.

v)PH of Gutika

The ph of gutika was found to be 6.7 which is good for stomach.

vi)Weight Variation

Weight variations of 20 tablets Total weight of 20 tablets was 1.96 gm

Average weight of tablet was 0.096gm

According to USP standards, individual weights of two tablet should not deviate from the average weight by 5% and none deviated by 10%.

viii)Hardness Test

The hardness of antacid gutika was found to be 3.20 kg/cm. According to standard specification it should be not less than 10 kg/cm.

ix)Friability Test

The friability of antacid gutika was found to be 0.49%. According to its standard specification it should not be more than 1%.

Sr. No.	Test	Result	Standard value
1.	Determination of Total Ash	6.5%	NMT 20% ±
2.	Determination of Acid insoluble Ash	4.5%	NMT 10%
3.	Determination of Water Soluble Ash	5%	NMT 10%
4.	Loss on drying	7%	NMT 10%
5.	pH of Gutika	6.7	5.0 – 7.0
6.	Weight Variation	0.096gm	± 5 % of average weight
7.	Hardness Test	3.20 kg/cm	NLT 10kg/ cm^2
8.	Friability Test	0.49%	NMT 1% w/w

Table 3.Result

CONCLUSION

Though there are currently many distinct types of formulations in use, gutika plays an important part in the pharmaceutics of Ayurveda. This is due to its various advantages, which include rapid action, palatability, convenience of administration, easy dispensing and transportation, and the capacity to maintain the medicine's potency for an extended period of time. There are many ways to make tablets, and the right composition of

the formulation determines how successful the finished product will be. The pharmaceutical business came to know several gutika products because to their great potential, high patient compliance, and availability of multiple formulation processes. Furthermore, it is stressed that more recent scientific and technological developments are necessary to provide a workable and flexible dosage form with innovative performance and attributes to materialise.

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