Herbal Effervescent Powder For Gastritis Using Shankabhasma, Yashadbhasma, Triphala And Others.

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Abstract:
Gastritis is the inflammation of the mucosa of stomach. Histologically,It can be divided into two distinct categories: non-atropic and atropic. There are numerous etiological forms of gastritis, with each etiology being associated with distinct clinical symptoms and pathological characteristics. Atropic gastritis (mostly caused by long-term *Helicobacter pylori* infections) is a considerable risk factor causing gastric cancer (intestinal type). Many a times, Allopathic gastric medications are prescribed in combination with antibiotics. Duo to a lot of adverse effects. Anti gastric herbal medicines are a better choice. Effervescent Anti-gastric Herbal powder is a type of bulk powder containing herbal ingredients along with citric acid and sodium bicarbonate which reduces gastritis in a better way, due to its even distribution and comparatively higher bioavailability. Hence, an attempt is made to formulate a polyherbal effervescent powder for gastritisusing Shankabhasma, Yasadbhasama, Triphala, Ginger, Moringa, Pudina, Turmeric, Khajoor, Pipali, Ajamooda, Black pepper, Black salt, Sodium bicarbonate, Citric acid, and Tartaric acid. The main ingredient, Shankabhasma is a great acid neutralizer that helps in lowering hyperacid secretions in the stomach and aids in balancing acid production.Further, the formulated polyherbaleffervescent powder for gastritis, is evaluated for its organoleptic, physical andphytochemicalparameters.
On evaluation, the prepared polyherbal effervescent Powder for Gastritis was found to be satisfactory.

Keywords: Anti-gastric, Herbal effervescent powder, Shankabhasma, Yasadbhasma, Triphala.

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INTRODUCTION:[1]

The term 'Gastritis' is applied to any clinical disorder of upper abdomen, such as indigestion or dyspepsia.

Gastritis is the inflammation of stomach mucosa. It can be chronic oracute. Acute gastritis is characterized by inflammation of the mucus membrane's superficial layers and infiltration with leukocytes, predominantly neutrophils. Inflammation of deeper layer and an increase in lymphocyte infiltration are features of chronic gastritis. It causes "Atrophy of the Gastric Mucosa," which includes the loss of glandular chief and parietal cells. Gastric juice secretion consequently declines.

GASTRIC ATROPHY:[1]

Atrophy of the stomach is a disorder in which the muscles of stomach shrink and becomes weak. Additionally, shrinking of gastric glands result in a gastric juicedeficiency.

Inflammation of the mucus membrane (Gastritis) as a distinct disease is caused by an irritation that acts directly on the mucosa. The most prevalent cause is viruses, but bacteria and fungi can also play a role.

Causes: -

1). Gastric atrophy is caused by chronic gastritis known as chronic atrophic astritis.

2). There is atrophy of the stomach mucosa, as well as glandular atrophy. Gastric atrophy is also caused by autoimmunity-associated atrophic gastritis.

TYPES OF GASTRITIS:[1]

1). ACUTEGASTRITIS:-Acute gastritis is a temporary acute inflammation or swelling of the stomach lining, primarily the mucosa caused by,

a) Diet and personal habits:-Intake of high-spicy foods, excessive alcohol, malnutrition, and heavy smoking.
b) Traumacaused by nasogastric tubes.
c) Repeatedradiation exposure (rare).
d) Excessusage of Aspirin and other NSAID ("Non -Steroidal Anti-Inflammatory Drugs").
e) Diseases caused by Bacteria like, *Helicobacterpylori, Corynebacteriumdiph theriae, Salmonella, Streptococcus aureus* etc.

2). CHRONIC GASTRITIS:

Chronic gastritis is histologically similar to an inflammatory cell infiltration characterized by lymphocytes and plasma cells with few neutrophils. In the initial phase, only the lamina propria undergoes alterations (superficial gastritis). Atrophic gastritis results when the condition worsens to the point where glands are destroyed. Gastric atrophy is the last stage, characterized by thin mucosa and sparse infiltration.

PATHOGENESIS:[1]

The main etiological factors that contribute to chronic gastritis include,

- *H. pylori* chronic infection.
- Immunological (auto immunological) in relation to pernicious anemia and with alcohol and tobacco use.
- Postoperatively, particularly after an antrectomy accompanied with gastroenterostomy and reflux of bilious duodenal secretions.
- Motor and mechanical, such asbezoars (luminal concretions), obstruction and Radiation,Gastric atrophy.
- Granulomatous conditions (Crohn disease).
- Miscellaneous-Amyloidosis, remia, graft-versus-host disease etc.

SIGNS & SYMPTOMS OF GASTRITIS:[1]

The signs and symptoms of gastritis differ from person to person, and in many cases, there are none at all. The following symptoms, however, are the most prevalent: nausea or persistent stomach upset, abdominal discomfort, abdominal bloating, vomiting, indigestion, burning or gnawing sensation in stomach between meals or at night, appetite loss, hiccups, vomiting blood, Black tarry loose stool.

Synthetic anti-gastric drug:[2,3,4]

Treatment of gastritis with synthetic drug has become common. These are chemically synthesized. Even though it heals gastric within a short limit of time it causes adverse effects that rangesfrom mild to severe on

human health. When synthetic anti-gastric drugs are continuously used, the efficacy of the gastric receptors eventually reduces.

Synthetic drugs like Ranitidine, Omeprazole, Pantoprazole, belongs to a group of drugs known H_2 receptor antagonist (also called H_2 blockers). Ranitidine is a drug which reduces the gastric acid present in the stomach. But in present scenario,Ranitidine is not currently available globally, as it may contain a small amount of an impurity associated with anenhan cement of cancerrisk.[9]

Herbal anti-gastric drugs: [2,3,4]

Herbal anti-gastric medications are based on naturally occurring substances found in nature. In other words, natural plants, extracts and herbs are used in herbal formulations.

Fewer side effects of natural herbs, plants, minerals are one of the benefits of herbal medicines. Herbal remedies are manufactured with natural substances that do not have detrimental impact on health.

Effervescent powder:[5]

Effervescent powders are in the form of granules or coarse to very coarse powders and include medicinal ingredients in dry mixtures that are typically combined with citric acid, sodium bicarbonate, and tartaric acid. Effervescence is produced when acid and base come incontactwith water and react to release carbon dioxide. Effervescent powder for gastritis has a better effect than a typical carbonated solution since it contains a variety of phytochemicals that help to treat gastritis and improve biological functions of human body.

Some potent herbs used in treatment of gastritis:[6-22]

1. Shankabhasma: Shanka is a component of herbal medicines that are used to treat a variety of digestive disorders. Conch shell is widely used to make Shankabhasma (Conch Ash), which is described in numerous herbal literatures. Because it has Kshariya (alkaline), Sheetal (cooling), Grahi (adsorbent), and Vishahara (detoxifying) characteristics, it is used in herbal preparation Shankabhasma is frequently used to treat GIT illnesses. It is white and alkaline. It is used for the treatment ofseveralconditionsinvolvingTarunyapedika for acne vulgaris, Agnimand for appetite loss, Parinam Shula for peptic ulcers, Grahini for ulcerative colitis, and Amlapitta for dyspepsia, Netrapusphaharafor eye infection.

2.Yashadbhasma: It is zinc-based bhasma.It is used as antacid, anti-inflammatory, anti-arthritis, antipyretic, digestive, and stimulant.

3. Triphala, (*Amalaki,Vibhitaki, Haritaki)*

a). Amalaki (*Emblicaofficinalis*): It contains phenol, tannins, carboxylic acid, carbohy drates and isanti-ulcerous, antimicrobial, immune modulator, anticarcinogenic ,etc. Hence it is useful in curing diseasessuch ascough, diabetes,asthma, hyperacidity, bronchitis, peptic ulcer, etc.

b).Vibhitaki(*Terminalia bellirica*): It contains tannins, resins, ellagic acid, lignins, saponins, carbohydrates, glycosides, flavonoids, phenols, steroidsand terpenoids. It is used to treat stomach disorders like indigestion, diarrhea, constipation and other gastric problems. Vibhitakiis also used to alleviate cough andalso it treats eye disorder.

c). Haritaki*(Terminalliachebula)*: It contains alkaloids, glycosides, flavonoids, sterol, phenols, tannins, saponins, protein and amino acids. It is used in treatment of constipation, skin disease,cough and aids in weight loss, metabolism and builds up immunity.

4. **Ginger**(*Zingiberofficinale*): It contains resins, volatile oils, starch, fat, inorganic materials, gingerols, shogaolsand parabols. It is used as a stomachic, carminative etc. Carminative properties of ginger on GI tract cause adsorption of toxins and supresses acid-enhanced gastric motility.

5. Moringa(*Moringaolifera*): It contains phytochemicals such as alkaloids, saponins, tannins, steroids, phenolic acid, glucosino lates,flavonoids, terpenesetc. It is used as anti-inflammatory, anti-cancer, antidiabetic and also treats stomach pain, stomach and intestinal ulcer, intestinal spasms.

6. Pudina (*Menthaspicata*): It contains diterpenes, steroids,tannins. It is used as a carminative,flavouring agent and antiseptic.[17]

7. Turmeric (*Curcuma longa*): It contains phytochemicals such as resins, volatile oils, curcuminoids, curcumin. It is utilized as anti-inflammatory agent, treatsdisorders of digestive system, joints, skin, upper respiratory tract and is also used as condiment and spice.

8. Khajoor(*Phoenix dactylifera*): It contains carbohydrates, proteins, fibers, minerals, VitaminB complex. It is used to improve digestion, acts as sweetening agent and flavouring agent.

9.Pipali(*Piper longum*): It contains piperine along with methyl piperine, iperonaline, ascarinine, pellitorine, piper longumine, piper longuminine, brachystamide A, pipercide and piperidine. It is used in the treatment of heartburn, stomach ache, intestinal gas.[20]

10.Ajamooda(*Trachyspermumammi*):
It contains alkaloids, steroids, fixed oil, glycosides, tannins, saponins and flavonoids, cumin, thiamineand amino acids. It is utilized as an essential therapeutic drug for flatulence, latonic dyspepsia, diarrhea, abdominal tumors, abdominal pain, piles and for lack of appetite. It also has antispasmodic and carminative qualities.

11.Black salt (*Sawarchalalavana*): It reduces the risk of excess sodium levels, may improve muscle cramps and may aid in digestion.

12.Jestamadhuor liquorice(*Glycyrrihaglabra*):
It contains alkaloids, saponin glycosides, flavonoids, triterpenoids. It is used as anti-gastric agent, flavoring agent etc

13.Kala jeera(*Nigella sativa*): It contains terpenoids, phytosterols, alkaloids and polyphenols. It acts as anti-oxidant,stimulant, carminative,appetizer, improves digestion, relieves joint pain and lowers inflammation.

14.Black pepper (*Pipernigrum*): It contains proteins, carbohydrates, vitamin C, calcium, potassium, magnesium, iron, flavonoids, tannins, carotenoids. It is used as aromatic, stimulant, stomachic, carminative, condiment.

15.Sodium bicarbonate: It is used to relieve heartburn, neutralize excess stomach acid relieves sour stomach or acid indigestion, andis alsowidely utilized in effervescent mixture.

16.Citric acid: It has an acidic, sour taste and is typically employed as a flavoring and preservative agent. Additionally, it is utilized to stabilize or preserve medications and as an effervescent mixture.

17.Tartaric acid: It helps in boosting immunity, antiseptic agent, aids in digestion, is antioxidant, and is also used as effervescent mixture.

Ideal properties of herbal effervescent powder for gastritis*:*

1. Non-irritant and non-toxic
2. Economical
3. Effective

MATERIALS AND METHODS:[23]

Effervescent powder for gastritis was prepared by using Shankabhasma, Sodium bicarbonate, Pippali, Yashadbhasma, Triphala, Tartaric acid, Citric acid, Khajoor, Jesthamadhu, Ginger, Moringa, Pudina, Turmeric, Black salt, Kala jeera, Ajamooda and Black pepper. All the herbal ingredients were weighed in accordance. Weighed substances were trituratedin a mortar & pestle. The powdered herbal ingredients were sieved via mesh size of No. 120 and stored in an airtight container.Table no. 1 provides a summary of the composition of developed formulation.

Table no. 1: Formulation of herbal effervescent powder for gastritis:

Sl.no	ingredients	Quantity(50g)
1.	Shankabhasma	10g
2.	Sodium bicarbonate	7.5g
3.	Pippali	4g
4.	Yashadbhasma	4g
5.	Triphala	
a.	Amalaki	2g

b.	Vibhataki	1.5g
c.	Haritaki	0.5g
6.	Tartaric acid	3.95g
7.	Citric acid	3.55g
8.	Khajoor	2g
9.	Jesthamadhu	2g
10.	Ginger	1.5g
11.	Moringa	1.5g
12.	Pudina	1g
13.	Turmeric	1g
14.	Black salt	1g
15.	Kala jeera	1g
16.	Ajamooda	1g
17.	Black pepper	1g

FORMULATION OF EFFERVESCENT GRANULES:[5]

The needed amount was weighed and geometrically mixed in a mortar, which was then triturated until homogeneous mixture was obtained. The mixture was dried at 100 degree Celsius in hot air oven for twenty-four hours. The process of granule formulation was completed by sieving the bulk with a 120-micron sieve and adding the remaining excipients, comprising of effervescent vehicle. Granules were further subjected to necessary testing. The airtight container containing the formed granules was suitably labeled and sealed.

EVALUATION:[23]

1.Organoleptic character: The sample was analyzed for organoleptic character such as color, odor, flavor, appearance and solubility.

2.Ash content:

Ash levels frequently serve as a representation of the inorganic residue, such as phosphates, nitrates, carbonates and silicates. These reveal the authenticity and quality of herbal medication.

Total ash:A silicon crucible that was empty was weighed (W_1) The previously weighed crucible was filled with around 1g (W_2) of the air-dried herbal effervescent powder. The sample was slowly heated to between 600 and 700 degrees Celsiusin a muffle furnace till it turned white, demonstrating the absence of carbon. It was cooled in desiccator and reweighed, and total ash content was determined as follows:

%Total ash = $(W_2 – W_1/W_2)*100$

3. Loss on drying (LOD):

2 grams of sample was weighed in LOD bottle and placed in the hot air oven at 105 degree Celsius for 1 hour, then cooled. Weight loss is measured as a % loss on drying and is determined using formula provided.

% loss on drying =Weight of sample after drying/sample weight * 100

4. pH:

1g sample was collected in a 25ml beaker. To this was added 5ml of freshly boiled and cooled water and effectively mixed to create a complete suspension. pH of suspension was estimated using pH meter.

5. Bulk density:

Sample of approximately 10gms was weighed and placed in a dry graduated measuring cylinder; Volume was recorded as V_1 ml. The sample cylinder was placed in a bulk density apparatus and subjected to 50tappings. The volume of the powder was measured as V_2 ml and computed using the formula provided.

Bulk density = Untapped density(V_1)- Tapped density(V_2)

6.Flow property determination (Angle of repose):

Clean and dry funnel of 30mm diameter and a flat tip was affixed to burette stand. Graph paper was placed beneath the funnel and its height was adjusted to 2 cm. Formulated effervescent powder was poured into funnel from top until powder touched funnel's lower tip. A circle was drawn around pile of sample powder to cover it. Average diameter and radius of the circle were measured and determined using the formula;

$\theta = tan^{-1}$(h/r)

7. Chemical evaluation: The formulated herbal effervescent powder (Sample) was subjected to phytochemical screening.

Detection of alkaloids:

A).Dragendroff's test: Sample was dissolved in dil.Hcl and treated with Dragendroffs reagent (potassium bismuth iodide solution).

The development of reddisah brown precipitate is a sign that alkaloids are present.
b). Mayer's test: Sample treated with Mayer's reagent (potassium mercuric iodide solution) after being dissolved in dil.Hcl. A yellow cream precipitate suggests the alkaloid' spresence.
c). Hager's test: Sample was dissolved in dil.Hcl and Hager's reagent (saturated solution of picric acid)was added. A yellow precipitate is an indication of the presence of alkaloids.
d). Wagner's test: Sample was dissolved in dil.Hcl acid and treated with Wagner's test (Iodine potassium iodide solution). Formation of a reddish-brown precipitate is a sign that alkaloids are present.

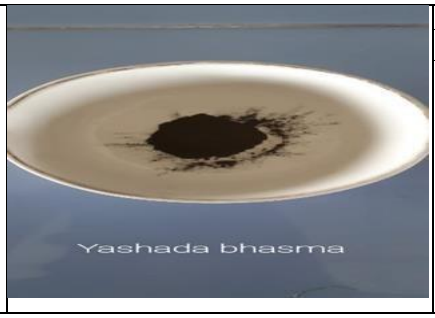
Detection of flavonoids:
a). Lead acetate test: Lead acetate solution was added to the sample. The precipitate's yellow tint represents flavonoid's presence.
b). **Alkaline reagent test**: Sample was treated with NaOH solution. The flavonoid's presence is shown by the development of the bright yellow color that fades to colorlessness when dilute acid is added.
Detection of carbohydrates:
a). **Fehling's test:**The sample was diluted in 5 ml of distilled water, then hydrolyzed with dil. HCl and neutralized with alkali. Finally Fehling's solutions A and B was added and boiled over water bath. Red precipitate illustrates presence of carbohydrates.
B). Molisch test: In test tube, 5ml water was added to dissolve the sample. And then treated with a few drops of an alcoholic alpha naphthol solution. 2ml of Conc.H_2SO_4 was added along sides of the test tube. The emergence of violet ring at junction demonstrates the presence of carbohydrates.

Detection of Glycosides:
A). Froth formation test: In a test tube, 2 gram of sample was taken and water was added. On shaking vigorously, stable foam was formed.

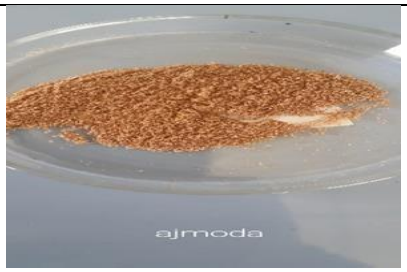
8. Effervescent test:
The granules were subjected to test for effervescence in accordance to IP 2018. Pour 5 grams of effervescent granules in beaker comprising 200ml of water at 15 to 25 degrees Celsius. Numerous gas bubbles are produced. When the effervescent ceases, the granules have either dissolved or been distributed in the water and the time is recorded. The test was carried out five times.**esult and Discussion:**
The herbal effervescent powder for gastritis was prepared and evaluated. The results obtained are as below:

Table no. 1: Details of ingredients used in herbal effervescent powder

S.No.	Ingredients	Biological source	Photography of sample used	uses
01.	Shankabhasma	Calx of Conch Shell		Helps in Indigestion, act as alkalizer, appetite, stimulant
02.	Pippali (long pepper)	It is dried ripe fruits of *Piper longum* F: Piperaceae		Relieves Stomach ache

03.	Yashadbhasma	Calx of zinc		Antacid, antipyretic, Antiinflammatory
4.	**Triphala**			
a.	Amalaki	It is a fruits of Embelicaofficianalis F: Phyllanthaceae		Antimicrobial, used in treatment of peptic ulcer, hyperacidity
b.	Vibhitaki	It is dried fruits of *Terminalia bellirica* F: Combretaceae		Helps in Indigestion, constipation
c.	Haritaki	It is the mature dried fruits of *Terminalia chebula* F: Combretaceae		Helps in Constipation, gas, and bloating
05.	Khajoor	It is a dried fruits of *Phoenix dactylifera* F: Arecaceae		Sweetening agent
06.	Jesthamadhu	It is the dried peeled or unpeeled, roots, rhizome or stolon of *Glycyrrhizaglabra* F: Leguminosae		Anti-gastric agent , Sweetening agent

07.	Ginger	It is a rhizomes of *Zingiberofficinale* F: Zingiberaceae		Stomachic, carminative
08.	Moringa	It is a dried leaves of *Moringaoleifera* F: Moringaceae		Anti-oxidant
09.	Pudina	It is a dried leaves of *Menthaspicata* F: Lamiaceae		Anti-septic, flavoring agent
10.	Turmeric	It is the dried rhizomes of *Curcuma longa* F: : Zingiberaceae		Antiinflammatory
11.	Black pepper	It is a dried fruits of *Pipernigrum* F: Piperaceae		Carminative , Aromatic, Stomachic

12.	Ajamooda	It is a dried fruits of*Trachyspermumammi* F: Apiaceae		Carminative, Anti-septic
13.	Black salt	*Sawarchalalavana*		Anti-oxidant , relieves Indigestion
14.	Kala jeera	It is a dried seeds of*Nigella sativa* F: Ranunculaceae		Anti-oxidant, Anti Inflammatiory, Stimulant
15.	Sodium bicarbonate	----------		Relief heartburn, effervescent mixture
16.	Tartaric acid	----------		Antiseptic, Effervescent mixture
17.	Citric acid	----------		Stabilizer, Effervescent mixture

Evaluation was performed on the formulated herbaleffervescent powder for gastritis. Each result is the mean of three replicates.

nct parameters were investigated like colour,taste, odour, solubility, appearance and flow and it is illustrated in Table 2.

Table no 2 : Organoleptic evaluation

S.no	Parameters	Observations
1.	Colour	Dull green
2.	Odour	Aromatic
3.	Appearance	Acceptable
4.	Taste	Aromatic
5.	Flow	Good flow
6.	Solubility	Easily soluble in water

The formulated herbal effervescent powder for gastritis was dull green in color, odor and taste was aromatic as well as acceptable. Herbal effervescent powder for gastritis had excellent flow characteristics.

Figure 1: Formulated herbal effervescent powder

2.Physical evaluation:[24]

Various parameters like Ash content, Loss on drying, pH, Angle of repose, Tapped density and Bulk density was evaluated. Results are shown in table3.

Table no 3: Results of physical evaluation

S.no	Parameters	Observations
1.	Ash content	4.33%
2.	Loss on Drying	7.08%
3.	pH (1%w/w)	7
4.	Angle of repose	29.8
6.	Tapped density	1.38 gm/ml
7.	Bulk untapped density	0.82 gm/ml

The formulated herbal effervescent powder for gastritis has 4.33% w/w of ash content and 7.08% v/w of loss on drying and have good stability. pH value of herbal effervescent has 7, which is neutral and indicates that it wil not cause any irritation in the GI tract.Bulk untapped density and tapped density is 0.82 and 1.38 respectively and the difference between these two values is 5, which shows good porosity value.Angle of repose value is 29.8 which shows excellent flow property of herbal effervescent powder for gastritis.

3.Phytochemical evaluation:

The prepared herbal effervescent powder was subjected to phytochemical screening. The findings of the chemical analysis of the formulated effervescent powder for gastritis are summarized in table 4.

Table no 4: Phytochemical evaluation of herbal effervescent granules:

S.no	Test	Results
1.	Dragendroffs test	+
2.	Mayer's test	+
3.	Wagner's test	+
4.	Hager's test	+
5.	Lead acetate test	-
6.	Alkaline test	+
7.	Fehling's test	-
8.	Molisch test	-
9.	Froath test	-

Gastritis herbal effervescent powder shows the presence of alkaloids and flavonoids. Flavonoids present may be responsible for anti-inflammatory and anti-gastric effects. Further, this would be confirmed by biological evaluation.

4.Effervescent test:[5]

Granules size(mesh)	Effervescent time(sec)
180 mm	25
125 mm	20

The formulated herbal effervescent powder shows that in the mesh no.180 mm, the effervescent time was found to be 25 sec and in mesh no.125mm, the effervescent time was found to be 20 sec. The values obtained is satisfactory and in accordance with Indian pharmacopeia.

CONCLUSIONS:

Polyherbal effervescent granules for gastritis was prepared and found satisfactory on subjecting to Organoleptic, physical and chemical evaluation. This gastritis powder reduces gastritis and heartburn. Usage of

herbal effervescent powder of 5g in 200ml water twice a day is safe and effective.

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