"Formulation and evaluation of herbal mouth dissolving tablet using shankh bhasma for dyspensia"

Corresponding Author*

1.Name- Anita G. Choudhary

Name of Institute-Genba Sopanrao Moze College (Department of Pharmacy)

Co-Author

2. Name- Rushali S. Darade

Name of Institute- Genba Sopanrao Moze College (Department of Pharmacy)

3. Name- Reena J. Choudhary

Name of Institute- Genba Sopanrao Moze College (Department of Pharmacy)

4. Name-Payal J. Dodamani

Name of Institute- Genba Sopanrao Moze College (Department of Pharmacy)

5. Name- Akshata S. Patil

Name of Institute- Genba Sopanrao Moze College (Department of Pharmaceutics)

Abstract

A chemical called an antacid is used to treat heartburn, indigestion, and upset stomach by neutralizing stomach acidity. Compared to single-herb formulations, antacids have gained popularity because of their recognized safety and potential synergistic effects. Herbal medicine is an alternative medical practice that uses natural plants and their extracts to heal illnesses. A medical condition known as acidity is brought on by an excess of acid production.

The gastric glands in the stomach create this acid. It results in symptoms like dyspepsia, stomach ulcers, heartburn, and gastric inflammation. An imbalance between the stomach's and the proximal intestine's acid-secreting mechanisms causes acidity, a worldwide problem. Relief is provided by poly herbal antacids. Many people experience problems in their lives as a result of acidity. The many polyherbal antacids used to treat gastric acidity are covered in this review article. The usage of polyherbal antacid is widespread worldwide.

Shankha Bhasma is a popular Ayurvedic formulation which is used in hyperacidity, indigestion, ulcerative dyspepsia and other acid peptic disorders. The dosage uniformity and patient compliance can be increased and adultration can be decreased in ayurvedic powders by formulating them into tablets. The aim of the present work is to develop and evaluate Shankha Bhasma tablets using starch as a binder.

Keywords:

Acidity, Antacid, gastric acidity, stomach glands.

Introduction

The stomach's production of acid breaks down food during digestion. Anger, stomach lining heartburn, gastrointestinal distress, and discomfort are all brought on by the stomach's overproduction of acid. The pH of stomach acid ranges from 1.5 to 3.5. Stomach acidity refers to the presence of gastric acid (mainly hydrochloric acid) in the stomach.[1]

Reason of acidity:

1.Spicy and oily foods

2.Stress and anxiety

3.Certain Medications

4. Gastrointestinal disorders

Digestive enzymes that are readily triggered by stomach acid can break down long-chain amino acids. Pharmaceutical formulations known as polyherbal antacid dosage forms are intended to neutralize excess stomach acid and relieve the symptoms of heartburn and acidity. They usually include a blend of herbal substances with antacid qualities that have been carefully chosen and prepared to effectively relieve gastric discomfort. By combining several herbs, these formulations seek to improve their effectiveness through synergistic effects, providing a comprehensive approach to digestive health. Because of their natural constituents and perceived safety, polyherbal dosages are becoming more and more popular as an alternative to traditional antacids. Antacids work by neutralizing stomach acid and preventing the proteolytic enzyme pepsin from working. The unique pharmacological characteristics of each of these cationicionsdictate their therapeutic application. The following are some therapeutic uses for antacids. Treating of heartburn in GERD[2] .

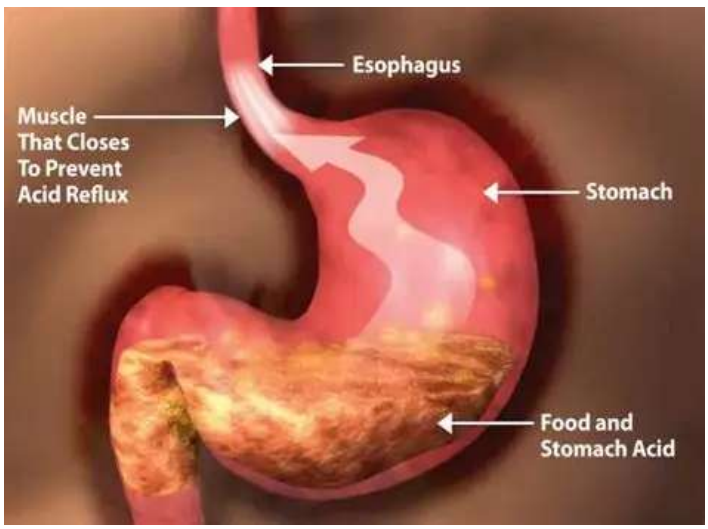

Figure no.1: Stomach acidity

Classification of Antacids

1**. Systemic (Absorbable) Antacids**

- Absorbed into bloodstream

- Quick action but may cause systemic alkalosis[3]

Examples: Sodium Bicarbonate

2. Non-Systemic (Non-absorbable) Antacids

-Not significantly absorbed

-Safer for long-term use [4]

Examples: Aluminium Hydroxide, Magnesium Hydroxide

Shankh Bhasma

Shankh Bhasma derived from conch shell is an Ayurvedic formulation popularly used for the treatment dyspepsia and indigestion. [5] Shankha (Turbinella pyrum) is the member of Mollusc's largest class Gastropoda. These mollusces are enclosed in a shell and the shell is very hard & dense calcareous structure. Shankha bhasma is commonly prepared from Conch shell which is mentioned in several Ayurvedic literatures [6]. Classically, Shankha Bhasma is alkaline in nature, Balya (increasing strength), Grahi and is indicated in Amlapitta (Hyperacidity), Agnimandhya (Digestive insufficiency), Grahani (irritable bowel syndrome) and Parinama Shula (Ulcerative Dyspepsia, Duodenal Ulcer) [7]. Shankha Bhasma basically contains inorganic substances such as Carbonates of Calcium, Iron, Magnesium & Calcium oxide. It is used for indigestion, flatulence, abdominal pain, vomiting belching, diarrhoea, belching & gastritis.[8]

The term dyspepsia has been derived from the greek words dys which means bad and peptein which means digestion. Dyspepsia is often generally defined as persistent or recurrent pain or discomfort in the upper part of the abdomen. The various symptoms of dyspepsia include epigastric pain, postprandial fullness, early satiety, anorexia, belching, nausea and vomiting, upper abdominal bloating and even heartburn and regurgitation [9]

Herbal Ingridients

1. Shankh Bhasma:

Biological name : Macrostrombus costatus

Family: Marine fastropod

Figure no.2: Shankh Bhasma

Benefits:

- It helps with conditions like acidity, indigestion, diarrhea, and irritable bowel syndrome.
- It also improves appetite and digestion.
- Being a natural source of calcium, it supports healthy bones, teeth, and cell membranes.

2.Plantago Ovato

Biological name: Psyllium /Isabgol

Famliy: Plantaginaceae

Figure no.3: Plantago Ovato

Benefits:

- Work as binder
- Thickening agent
- Suspending agent

3. Fenuqreek Seed Mucilage:

Biological name: Trigonella foenum-graecus

Family: Fabaceae

Figure no.5:Feunqreek Seed Muciliage

Benefits:

- Soothes gastric mucosa (reduces acidity)
- Acts as natural disintegrant (fast action
- Provides anti-ulcer & demulcent effect

4. Dehydrated Banana Powder:

Biological name: Musa Paradisiaca

Family : Musaceae

Figure no.6: Dehydrated Banana Powder

Benefits:

- Natural binder - Improves tablet strength and cohesiveness
- Gastroprotective effect - Helps reduce gastric irritation and acidity
- Nutritional support - Provides potassium and aids digestion

Method and Preparation of Shankh Bhasma Tablet

Raw material collection

Weighing of ingredients

Sieving (#60-80 mesh)

Dry mixing of ingredients (shankh bhasma +herbal excipients)

Granulation (add mucilage of fenugreek/cassia toragum)

Wet mass formation

Screening of wet mass

Drying (40-50°C)

Sizing of dried granules

Lubrication (add magnesium stearate+talcum powder)

Compression (tablet puncing)

Herbal shankh bhasma tablets

Evaluation (hardness, weight variation, dissolution, friability, ph, etc)

Formulation for Herbal Shankh Bhasma Tablet:

Sr.no	Ingredient	F1	F2	F3	F4	F5	F6	F7	F8	F9
1	Shankh Bhasma	180	180	180	180	180	180	180	180	180
2	Plantago Ovato	18	27	36	18	27	36	18	27	36
3	Fenuqreek Seed	12	12	12	21	21	21	30	30	30
4	Dehydrated Banana Mucilage	84	75	66	75	66	57	66	57	48
5	Magnesium stearate	3	3	3	3	3	3	3	3	3
6	Talcum	3	3	3	3	3	3	3	3	3

Table.1 Formulation Table

Evaluation Parameters of Tablets :

A. Pre compression test:

1. Tapped Density: A tapped density test measures how compact a powder becomes after being mechanically tapped to a specific height and frequency. It determines the maximum density of a powder by mechanically tapping a container of the sample until the volume no longer changes significantly, which helps eliminate air pockets and allows particles to settle into a more compact arrangement. This test is important for understanding powder properties related to packing, handling, and storage.[10]

2. Bulk Density: A bulk density test measures the mass of a material per unit volume, including pore space. It involves weighing a sample and measuring its total volume, and the resulting value (mass/volume) indicates how compacted or porous the material is. Common methods include filling a container, then weighing it and its contents, or using a core sampler for soil. It is typically expressed in grams per cubic centimeter (g/cm) or grams per milliliter (g/ml)[11]

3. Angle Of Repose: The angle of repose test is a simple method used to determine the flowability of granular materials like powders or sand. It measures the steepest angle at which a pile of the material will stand without the sides slumping or sliding down. A material with good flowability will form a flatter pile with a lower angle of repose (e.g, 25-30 degrees), while a material that is cohesive or flows poorly will form a steeper, more irregular pile with a higher angle (e.g., over 45 degrees)[12]

Sr.No	Test	Formulation								
		F1	F2	F3	F4	F5	F6	F7	F8	F9
1	Tapped density	0.50	0.51	0.52	0.54	0.55	0.56	0.57	0.58	0.59
2	Bulk density	0.42	0.43	0.44	0.45	0.46	0.47	0.48	0.49	0.50
3	Angle of repose	28.4	27.9	27.2	26.8	26.1	25.7	25.3	25.9	25.5

Table.2 Pre compression test

B. Post compression test :

1.Hardness Test:

Compression testing measures a tablet's hardness by applying force until it fractures, ensuring durability during storage, transport, and handling[13]. Tablets are placed between a fixed and moving jaw in a testing device, where gradual pressure is applied to determine the breaking point, recorded in units like kilopond or newtons. Common tools for this test include the Monsanto and Strong-Cobb testers[14].

2.Weight variation:

The weight variation test ensures uniformity in tablet dosage by verifying that each tablet contains the correct amount of active pharmaceutical ingredient (API)[15]. It involves weighing 20 tablets individually, calculating the average weight, and checking if any tablet deviates beyond acceptable limits (+5% to ±10%) [16]. If more than two tablets fall outside these limits, the batch fails the test [17]. This procedure helps maintain consistent drug potency and ensures patient safety by preventing dosage inconsistencies [18]. Pharmaceutical manufacturers rely on this test to meet quality control standards and regulatory requirements [19].

3.Dissolution Test:

Dissolution test is a procedure used in the pharmaceutical industry to metisure how a drug dissolves in a liquid medium, typically simulating conditions in the human body [20]. It helps assess the rate and extent of drug release from solid dosage forms like tablets and capsules, ensuring consistent quality and bioavailability [21].

4.Friability Test:

The friability test assesses a tablet's durability by measuring weight loss after tumbling in a rotating drum for 100 revolutions at 25+1 rpm. Afterward, tablets are weighed, and weight loss should no exceed 1%. This ensures the tablets can withstand handling, packaging, and transport without damage [22].

Sr.No	Test	Formulation								
		F1	F2	F3	F4	F5	F6	F7	F8	F9
1	Hardness test	3.8	4.0	4.2	4.4	4.5	4.6	4.8	5.0	5.2
2	Weight variation	298	300	301	299	300	302	299	300	301
3	Dissolution test	78°	80°	82°	84°	86°	88°	90°	92°	95°
4	Friability test	0.82%	0.79%	0.76%	0.72%	0.69%	0.66%	0.63%	0.60%	0.58%

Table.3 Post compression test

C. Physical and organoleptic properties:

- Colour: Greenish
- Odor: Pleasant
- Shape: circular
- Taste: Bitter
- PH: 6

Conclusion

The developed Shankha Bhasma tablets offer a safe and effective approach for managing acidity and related gastrointestinal disorders. The tablet formulation improves dose uniformity, stability, and patient compliance compared to traditional powders. The combination of herbal ingredients provides synergistic antacid and gastroprotective effects. Overall, the formulation meets pharmaceutical quality standards and shows promising potential, though further clinical studies are needed for confirmation

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