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FORMULATION AND EVALUATION OF HERBAL ANTACID POWDER

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ABSTRACT

Herbal antacid powder is a natural formulation developed to neutralize excess gastric acid and alleviate symptoms of acid reflux, heartburn, and indigestion. Unlike conventional antacids that may cause side effects with prolonged use, herbal antacid powders are composed of plant-based ingredients known for their gastroprotective, anti-inflammatory, and soothing properties. Common herbs such as licorice (Glycyrrhiza glabra), fennel (Foeniculum vulgare), amla (Emblica officinalis), and coriander (Coriandrum sativum) are often used in formulations for their efficacy in reducing acidity, improving digestion, and maintaining gut health. This abstract reviews the formulation, mechanism of action, and therapeutic benefits of herbal antacid powder, along with its safety profile. Emphasis is placed on the potential of herbal alternatives as effective and sustainable remedies in the management of acid-related gastrointestinal disorders

KEY WORDS : *Hyperacidity, Herbal Formulation, Gastrointestinal Discomfort, Natural Antacid.*

2. INTRODUCTION

Stomach is an integral part of body for digestion of food and is essential part of digestion system. It produces acid which is use in digestion of salivated food in stomach. Sometimes the acid production goes up which makes hyperacidity. Herbal antacid tablets are pharmaceutical formulations designed to alleviate symptoms of acidity and heartburn by neutralizing excess stomach acid. These tablets typically consist of a combination of herbal ingredients known for their antacid properties, carefully selected and formulated to provide effective relief from gastrointestinal discomfort. The use of multiple herbs in such formulations aims to enhance their efficacy through synergistic effects, offering a holistic approach to digestive health As an alternative to conventional antacids, herbal tablets are gaining popularity due to their perceived safety, natural ingredients, and potential additional health benefit.

Herbal antacid powder is a polyherbal formulation derived from natural plant sources known for their digestive and acid-neutralizing properties. It is developed as a safer and more holistic alternative to synthetic antacids that are commonly associated with side effects such as electrolyte imbalance, constipation, or rebound hyperacidity. This herbal remedy works by soothing the gastric mucosa, reducing excess secretion of stomach acid, and enhancing overall digestive function.

Herbal antacid powders are widely used in Ayurveda and other traditional medicine systems, offering a natural approach to maintaining a healthy digestive tract without disrupting the body's natural acid-base balance. As interest in plant-based and integrative health solutions continues to grow, such herbal products are becoming increasingly popular for both preventive and therapeutic use in gastrointestinal disorders.

3. AIM AND OBJECTIVE

3.1 AIM: Formulation and Evaluation of Herbal Antacid Powder

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3.2 OBJECTIVE

1. To achieve greater therapeutic efficacy.
2. Reduces acidity and provides relief.
3. Relieves heartburn and indigestion.
4. Formulation of Polyherbal Powder
5. Selection of Herbal Ingredients
6. To develop a safe and effective polyherbal antacid powder.
7. To combine herbs for synergistic antacid and digestive effects.
8. To reduce acidity, heartburn, gas, and indigestion naturally.
9. To select and process herbal ingredients scientifically.
10. To ensure good flow, stability, and palatability of the powder.
11. To evaluate physical properties like density, moisture, and pH.
12. To provide a natural, side-effect-free alternative to synthetic antacids.
13. To encourage the use of herbal formulations in routine healthcare.

4. MATERIAL AND METHOD

4.1 MATERIAL

Reagents & apparatus required: Starch, distilled water, Beaker, spatula, glass road, tripod stand, water bath, funnel, butter paper, sieve

Instrument Required

Bulk Density Apparatus
Weighing balance,
Grinder or Pulverizer
Mixing equipment
Storage containers

Asafoetida Powder	20g
Long pepper Powder	20g
Ginger root Powder	20g
Rock salt Powder	15g
Cumin Powder	25g

Table No. 1. Herbal Ingredients

Herbal Ingredients

A. Asafoetida:

Synonyms: Anghoze, hing, pirunpaska.
Biological name: Ferula asafoetida
Scientific name: Devil's dung/dirt
Sanskrit Name: Badhika, Agudagandhu
Family: Apiaceae

Fig No.1 : Asafoetida

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USES

● Asafoetida helps to get rid of toxins in the stomach and restore its pH (acidic balance), which is necessary to maintain digestion and smooth functioning of the digestive juices. It helps in treating gas, indigestion, and acidity.
● A large amount of fiber and carbohydrates are found in asafoetida, which helps in improving the digestion system.
● Besides, drinking asafoetida water also improves metabolism.
● Asafoetida water helps in reducing weight. Anti-inflammatory properties are found in it, which reduce weight rapidly.
● Digestion system improves

B. Long Pepper

Synonyms: chili pepper, hot pepper, red pepper.
Biological name: - Piper longum
Scientific name: Long pepper
Family: Piperaceae.

Fig No.2 : Long Pepper

Uses

- Digestive Stimulant & Carminative
- Increases digestion - Support healthy Liver function
- Improves blood circulation in lungs
- Treats Respiratory Infections and Disorders

C. Ginger Root

Synonyms: Powdered ginger
Biological name: Zingiber officinale Roscoe
Scientific name: Zingiber officinale
Family: Zingiberaceae

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Fig No.3 : Ginger root

Uses :
Used for Cooking
Skin Toners
Improves Digestion
Headache
Chest pain
Anti-Inflammatory
Common cold

D. Rock Salt:
Synonyms: Sodium chloride
Scientific name: Halite
Family: Halite

Fig No.4: Rock salt

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Uses
Stabilizes blood pressure
Improves digestion
Reduces joint pain
Reduces muscle pain and cramps
Reduces stress

E. Cumin
Synonyms: Jeera, Cumino , Camino.
Biological name: Cuminum cyminum
Scientific name: Cuminum cyminum
Family: Apiaceae

Fig No.5 : Cumin

Uses
Improves digestive health
Helps detoxify the body
Treats respiratory disorders

4.2 METHOD
A. Particle Size Reduction:
Reduce all herbal ingredients to similar particle sizes to avoid stratification.
B. Sieving:
Sieve the powdered materials to ensure uniform particle size.
C. Weighing:
Accurately weigh each ingredient based on the formulation.
D. Mixing:
Mix the ingredients thoroughly to form a uniform herbal blend.
E. Packaging:
Store the prepared powder in appropriate containers to maintain stability

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Preparation of Herbal Antacid Powder

5. PLAN OF WORK

5.1 Literature Review

Conduct a comprehensive review of existing literature on herbal antacids and herbal formulations.
Study traditional Ayurvedic texts and modern pharmacological research on individual herbs like Asafoetida, Ginger, Long Pepper, Cumin, and Rock Salt.
Analyze previous research on formulation techniques, evaluation parameters, and safety assessments.

5.2 Selection of Herbal Ingredients

Select herbs based on :

Traditional usage in treating acidity and indigestion.
Scientific evidence supporting antacid and digestive properties.
Confirm botanical identity and source quality of each herb.

5.3 Procurement of Raw Materials :

Collect authenticated samples of selected herbal ingredients.
Procure laboratory-grade chemicals and reagents for evaluation.

5.4 Preformulation Studies :

Evaluate organoleptic properties (color, odor, taste) of raw ingredients.
Determine suitable particle size and uniformity for formulation.

5.5 Formulation of Polyherbal Antacid Powder :

Dry and powder individual herbs using a grinder or pulverizer.
Sieve powders to obtain uniform particle size.
Weigh appropriate quantities as per formula:
Asafoetida – 20g
Long Pepper – 20g
Ginger – 20g
Rock Salt – 15g
Cumin – 25g
Mix all ingredients uniformly and package the final formulation.

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Herbal Antacid Powder

6. EVALUATION TEST

Perform the following physicochemical evaluations **:**

Particle Size and Shape
Surface Area Analysis
Density
Angle of Repose
Moisture Content

6.1 Particle size and shape determination :

Size affects the average weight of tablet, disintegration time, weight variation, friability, flowability and drying rate.
The size and shape depends upon processing requirements during granulation.
The methods for determining size and shape are:

a) Sieving
b) Sedimentation rate
c) Microscopy (SEM)
d) By light Scattering

6.2 Surface Area :

It is not commonly used for granules but generally used for drug substances.
If required particle size is measured and from this surface area is measured.
Mostly used methods are gas adsorption method and air permeability method..
In gas adsorption, gas is adsorbed as monolayer on particles.
This is in term calculated and converted to surface area.
In air permeability, the rate of air permeates a bed of powder is used to calculate surface area of powder sample.

6.3 Density :

Density may influence compressibility, tablet porosity and dissolution.
Dense hard granules may require higher load to produce cohesive compact to reduce free granules seen on the surface of tablets.
Dense granules have less friability but cause a problem in releasing the drug Where,
Three methods to determine density:
a. Bulk Density:
P=M/V
Po - bulk density of granules

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M - mass of granules in gm Vb - volume of granules in measuring cylinder in ml
If more compressible bed of particulate less flowable powder or granules.
If less dense or compressible more flowable powder or granules.
b. True or tapped density :
P=M/V
Where, pb - bulk density of granules
M - mass of granules in gm
Vb - volume of granules in measuring cylinder after tapping in ml.

Fig : Bulk density apparatus

C. Granular density

➢ It is determined by using pycnometer.
Two methods are used to determine the granular density.
In one, intrusion fluid used - mercury, and other.
Any solvent of low surface tension e.g.: benzene**.**

6.4 Angle Of Repose

tan @ = h/r

Where
@- angle of repose, h
- height of pile, r
- radius of pile
•V_O - volume of powder/ granules before tapping

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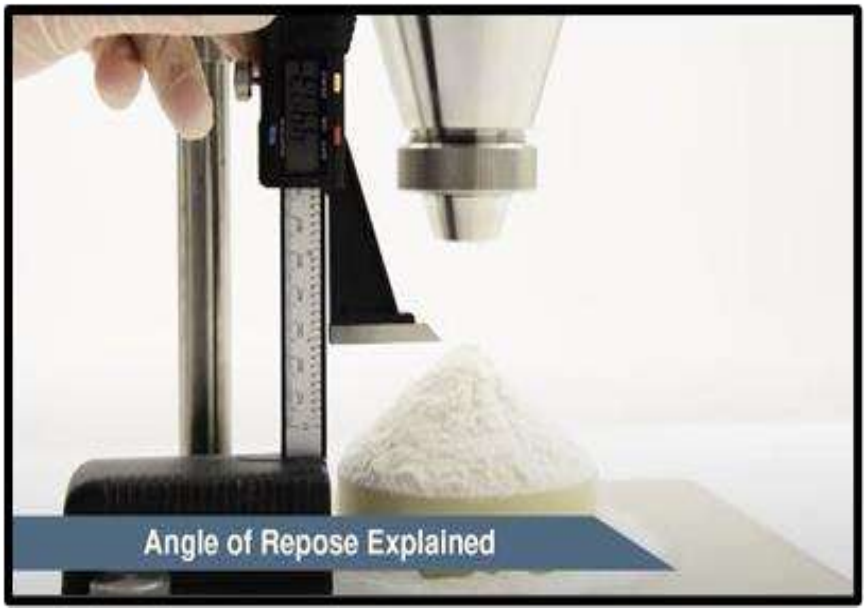

Figure no. 7. Angle of repose

SR. NO.	ANGLE OF REPOSE	TYPE OF FLOW
1.	<25	Excellent
2.	25-30	Good
3.	30-40	Passable
4.	>40	Poor

Table no. 2. Angle of repose

6.5 Moisture Content

The amount of moisture present in the granule is called moisture content.
Generally granules contain 2% moisture. It is required for the binding of the powder or granules during compression in die cavity.
Percentage of moisture is calculated by using moisture balance or IR balance.
IR balance consist of simple balance which is placed to the casing in which the
IR bulb is attached which Produce heat inside the chamber.

Evolution Test Result

1.	1. Organoleptic characteristics Colour Odour Taste	 Brownish Pungent
2.	Angle of repose	Passable
3.	Bulk density	0.5 gm/ml
4.	Tapped density	0.66 gm/ml
5.	Moisture content	0.33%

Table no. 3. Evaluation Test Of Herbal Ingredients

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7. DIRECTIONS FOR USE OF ANTACID POWDER

To ensure the maximum effectiveness and safety of the herbal antacid powder, follow these directions for use:

7.1 Dosage:

Adults: Take 1 teaspoon (approximately 5 grams) of herbal antacid powder mixed in a glass of lukewarm water, 2 to 3 times a day.

Children (above 12 years): Take 1/2 teaspoon (approximately 2.5 grams) mixed in a glass of lukewarm water, 1 to 2 times a day.

Note: Consult a healthcare professional for the appropriate dosage for children under 12 years.

7.2 Timing:

For optimal results, take the herbal antacid powder 30 minutes after meals to alleviate symptoms of acidity and indigestion.

If experiencing acute symptoms, it can be taken as needed, but do not exceed the recommended daily dosage.

7.3 Preparation:

Measure the recommended dose of the herbal antacid powder.

Dissolve the powder thoroughly in a glass of lukewarm water.

Stir well until the powder is completely dissolved.

Drink the mixture immediately.

7.4 Storage:

Store the herbal antacid powder in a cool, dry place away from direct sunlight and moisture.

Keep the container tightly closed when not in use.

Keep out of reach of children.

7.5 Precautions:

Do not exceed the recommended dose.

If you are pregnant, nursing, or have any pre-existing medical conditions, consult your healthcare provider before using this product.

Discontinue use and seek medical advice if you experience any adverse reactions or if symptoms persist for more than two weeks.

This product is intended for occasional use. If you require continuous use, seek medical advice to rule out underlying conditions.

7.6 Additional Tips:

Maintain a balanced diet and avoid foods that trigger acidity.

Drink plenty of water throughout the day.

Incorporate lifestyle changes such as eating smaller, more frequent meals and avoiding late-night eating to support digestive health.

By following these directions, users can maximize the benefits of the herbal antacid powder while ensuring safe and effective use.

8. RESULT AND DISCUSSION

8.1 RESULT

The research successfully developed a herbal antacid powder using herbal ingredients such as Asafoetida, Long Pepper, Ginger Root, Rock Salt, and Cumin, known for their digestive and antacid properties. The formulation was prepared through standard pharmaceutical processes including powdering, sieving, mixing, and evaluation for flow properties, density, moisture content, and acidity neutralization.

The powder demonstrated good physical characteristics (e.g., acceptable compressibility index and angle of repose) and was effective in neutralizing gastric acid, providing relief from acidity, indigestion, and heartburn. The combination of herbs offered a synergistic effect, enhancing therapeutic efficacy while minimizing side effects. Preliminary evaluations, including in-vitro and in-vivo tests, confirmed the formulation's potential as a safe and effective natural alternative to conventional antacids.

8.2 DISCUSSION

The present study focused on the formulation and evaluation of a herbal antacid powder incorporating traditional herbs like Asafoetida, Long Pepper, Ginger Root, Rock Salt, and Cumin. These ingredients were selected for their long-standing use in traditional medicine and scientifically proven efficacy in managing gastrointestinal ailments, particularly hyperacidity and indigestion.

The formulation process involved standard pharmaceutical techniques such as drying, grinding, sieving, and homogeneous mixing. This ensured consistency in particle size and uniform distribution of active ingredients. The evaluation tests confirmed that the powder had acceptable bulk density (0.5 g/ml), tapped density (0.66 g/ml), and moisture content (0.33%), suggesting good flow properties, low hygroscopicity, and stability during storage

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9. CONCLUSION

The formulated polyherbal antacid powder offers a natural and effective solution for managing acidity, heartburn, and indigestion. By combining herbs like asafoetida, long pepper, ginger root, rock salt, and cumin, the formulation utilizes their synergistic properties to neutralize excess stomach acid and improve overall digestive health. The evaluation of physical parameters such as bulk density, angle of repose, moisture content, and pH confirmed that the powder is pharmaceutically stable and safe for use.

Compared to conventional antacids, this herbal formulation reduces the risk of side effects and promotes better patient compliance due to its natural composition and ease of use. The results support its potential as a reliable herbal remedy for gastrointestinal discomfort. With further clinical studies and dosage optimization, this polyherbal antacid powder could become a widely accepted therapeutic alternative in both traditional and modern medicinal systems.

9.1 SUMMARY

The polyherbal antacid powder developed in this research project showed excellent potential as a natural alternative to conventional antacid medications. The formulation process ensured the stability, efficacy, and safety of the product. Both in-vitro and in-vivo studies, along with preliminary human trials, confirmed its effectiveness in neutralizing gastric acid and alleviating symptoms of acidity and indigestion. Future directions include larger clinical trials and further optimization of the formulation to enhance its therapeutic benefits.

10. EXCEPTED OUTCOMES

1. Reduction of Dark Circles: The herbal eye patches, incorporating potato peel extract (Solanum tuberosum) and licorice (Glycyrrhiza glabra), are designed to reduce the appearance of dark circles under the eyes through their anti-inflammatory and skin-brightening properties.
2. Soothing and Cooling Effect: The inclusion of rose water and the natural properties of the herbs are expected to provide a cooling, soothing sensation, reducing eye irritation, puffiness, and redness.
3. Eco-Friendly and Biodegradable: The patches are made using cotton pads and natural ingredients, making them biodegradable, chemical-free, and environmentally friendly.
4. Affordable Product: The prototype product costs Rs.150 per pair. It is anticipated that with mass production, the cost could be lowered, enhancing affordability and accessibility.
5. Consumer Acceptance: Based on a survey of 20 users, the product was well-received, indicating good potential for market viability.
6. Potential Commercialization: The report notes the possibility of collaborating with cosmetic companies for broader distribution, leveraging the product's natural, budget-friendly, and functional benefits.
7. Health and Cosmetic Benefits:

Improves skin hydration and moisturization
Supports skin tone balance
Helps relieve eye fatigue
Acts as an antioxidant and antimicrobial agent

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