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Research Article

Herbal Remedy for Stomach Pain: Formulation and Efficacy

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ARTICLE INFO	ABSTRACT
Published: 06 June 2025 Keywords: Abdominal Pain DOI: 10.5281/zenodo.15608315	Chronic abdominal pain is one of the most common problems seen by both pediatricians and pediatric gastroenterologists. Abdominal-pain-related functional gastrointestinal disorders (AP-FGIDs) are diagnosed in children with chronic and recurrent abdominal pain meeting clinical criteria set forth in the Rome IV criteria. AP-FGIDs affect approximately 20% of children worldwide and include functional dyspepsia (FD), irritable bowel syndrome (IBS), functional abdominal pain (FAP), and abdominal migraine. IBS accounts for 45% of pediatric AP-FGIDs. The pathophysiology of functional abdominal pain involves an interplay of factors including early life events, genetics, psychosocial influences, and physiologic factors of visceral sensitivity, motility disturbance, altered mucosal immune function, and altered central nervous system processing. Treatment approaches are varied and can include dietary, pharmacologic, and complementary medicine interventions, as well as psychosocial support, depending on the many aspects of the disorder and the needs of the individual pat.

INTRODUCTION

Chronic abdominal pain is one of the most common gastrointestinal symptoms seen by both pediatricians and pediatric gastroenterologists. Abdominal-pain-related functional gastrointestinal disorders (AP-FGIDs) are diagnosed in children with chronic and recurrent abdominal pain meeting clinical criteria set forth in the Rome IV criteria [1]. AP-FGIDs affect approximately 20% of children around the world and include patients with functional abdominal pain (FAP), functional dyspepsia (FD), abdominal migraine, and irritable bowel syndrome (IBS) [2,3]. IBS accounts for 45% of pediatric AP-FGIDs [2]. The pathophysiology of functional abdominal pain involves an interplay of multiple factors including early life experiences, genetics, psychosocial influences, and physiologic factors of visceral sensitivity with altered central nervous system processing, abnormal motility, and abnormal mucosal immunity [3]. Treatment

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approaches are varied and can include dietary, pharmacologic, and complementary medicine interventions, as well as psychosocial support, depending on the many aspects of the disorder and the needs of the individual patient.

2.Lirature Review:

1. Efficacy of Herbal Digestive Powders in Functional Dyspepsia:

This review focuses on studies investigating the effectiveness of herbal digestive powders containing ingredients like curry leaves, amla, coriander, fenugreek, ginger, and cardamom in managing functional dyspepsia. Research suggests that these herbal formulations can alleviate symptoms such as bloating, abdominal discomfort, and indigestion, potentially offering a natural alternative or complementary approach to conventional treatments.

2. Mechanisms of Action of Key Ingredients in Herbal Digestive Powders:

This review delves into the pharmacological mechanisms underlying the digestive benefits of individual ingredients used in herbal digestive powders. It examines how compounds like alkaloids, polyphenols, fiber, and volatile oils present in curry leaves, amla, coriander, fenugreek, ginger, and cardamom contributeto improving digestion, reducing inflammation, enhancing gut motility, and modulating gut microbiota.[5]

3.Role of Herbal Digestive Powders in Integrative Gastroenterology:

This review explores the integration of herbal digestive powders into the practice of integrative gastroenterology, which combines conventional medical treatments with evidence-based complementary and alternative therapies. [6,7]It

discusses the potential synergistic effects of herbal formulations with dietary modifications, probiotics, stress management techniques, and mind-body interventions in optimizing digestive health outcomes and promoting holistic wellbeing.

3.Aim

To formulate and evaluate a Herbal remedy for stomach pain incorporating include, amla, jiggery, ginger, Lemon Essence, Fennel, peppermint, Cumin, Ajwain, Rock salt, Asafoetida ,Bananas, Amla. The primary objectives include

Objective

1. Relieve Stomach Pain: Reduce discomfort and pain associated with digestive issues.

2. Improve Digestion: Enhance digestive enzyme secretion and nutrient absorption.

3. Reduce Inflammation: Minimize inflammation in the digestive tract.

4.To analyze the data obtained from physicochemical, sensory, in vitro, and in vivo evaluations to assess the overall effectiveness and potential health benefits of the formulated herbal digestive powder.

5.To create a formulation that is both safe and effective for a range of digestive issues, including cramping, spasms, and inflammation.

6.To conduct in vivo studies involving human subjects to evaluate the digestive efficacy of the herbalpowder, focusing on parameters such as digestion time, gastrointestinal discomfort, and stool characteristics, through controlled clinical trials

4. Ingredients & Plant profile

4.1 peppermint,

4.1.1 Peppermint as a Digestive Agent



1. Relieves Digestive Issues: Peppermint powder can help alleviate symptoms of irritable bowel syndrome (IBS), including bloating, gas, and indigestion.

2. Soothes Digestive Tract: Peppermint's calming effects may help reduce inflammation and discomfort in the digestive tract.

3. Supports Healthy Digestion: Peppermint powder may help regulate digestive enzymes and improve nutrient absorption.

4. Eases Bloating and Gas: Peppermint's natural oils may help reduce discomfort and promote digestive comfort.

5. Calms Digestive Issues: Peppermint's soothing effects may help alleviate symptoms of IBS and other digestive disorders.[9,10,11]

4.1.2 Synonym

Brandy Mint, Mentha piperita

Botanical Source ; It is the oil obtained by the distillation of *Mentha piperita*, belonging to family Labiatae.



Fig: Peppermint Powder

Taxonomical Classification

1. Kingdom: Plantae

2. Family: Lamiaceae

3. Genus: Mentha

4. Species: M. piperita

4.1.2 Peppermint is commonly used as a digestive powder or supplement to:

1. Relieve Bloating and Gas: Peppermint's natural oils help ease discomfort and promote digestive comfort.

2. Soothe Digestive Issues: Peppermint's calming effects alleviate symptoms of irritable bowel syndrome (IBS) and other digestive disorders.

3. Improve Digestion: Peppermint may help regulate digestive enzymes and promote nutrient absorption.

4. Natural Relief: Peppermint provides a natural alternative to traditional digestive medications. {13}

5. Calming Effects: Peppermint's soothing properties promote digestive comfort and relaxation.

4.2 Ginger

4.2.1 Basic Information about Ginger Powder as a Digestive Powder:

Ginger powder, derived from the rhizome of the ginger plant (Zingiber officinale), is a versatile spice andherbal remedy with a long history of use in traditional medicine. Renowned for its pungent flavor and potent medicinal properties, ginger powder is valued for its ability to alleviate various digestive issues andpromote gastrointestinal health.[14,16]

4.2.2.Usage as a Digestive Powder:

Ginger powder is widely used for its digestive properties, attributed to its bioactive compounds, includinggingerol and shogaol.[15]

It is believed to stimulate digestive enzymes, improve gastric motility, and alleviate symptoms of indigestion, nausea, bloating, and flatulence. Ginger powder can be consumed directly, brewed into herbal teas, or added to culinary dishes and beverages to enhance digestive health and flavor.

4.2.3.Synonyms:

- 1. Sunth powder (in Hindi)
- 2. Adrak powder (in some regions)
- 3. Shunthi powder
- 4. Singabera powder

Taxonomical Classification:

- Kingdom: Plantae Order:
- Zingiberales Family:
- ZingiberaceaeGenus: Zingiber
- Species: Zingiber officinale



Fig: Ginger Powder

Effects as a Digestive Powder:

While ginger powder is generally safe for consumption, excessive intake may lead to certain side effects, particularly in sensitive individuals.

4.2.4 These potential effects may include:

1. Gastrointestinal discomfort: Consuming large amounts of ginger powder may cause gastrointestinal irritation, leading to symptoms such as stomach upset, heartburn, or diarrhea, particularly in individuals with sensitive stomachs or digestive disorders.[16,17]

2. Interactions with medications: Ginger powder may interact with certain medications, such as blood thinners or medications for diabetes, so individuals taking these drugs should consult with a healthcareprofessional before using ginger powder as a digestive aid.

3. Allergic reactions: Some individuals may experience allergic reactions to ginger powder, particularly those with known sensitivities to ginger or related plants, leading to symptoms such as skin rash, itching,or respiratory distress.

4. Pregnancy and breastfeeding: Pregnant or breastfeeding women should consult with a healthcare provider before using ginger powder as a digestive aid, as its safety in these populations has not beenextensively studied.

4.3 Funnel

Fennel powder is made from the seeds of the fennel plant and is used as a digestive supplement. It's an Ayurvedic remedy that supports healthy digestion, optimal gut health, and boosts immunity.¹

4.3.1 Benefits of Fennel Powder

1.Soothes Digestion: Reduces bloating, gas, and inflammation in the digestive tract.



2. Supports Gut Health: Encourages natural cleansing action inside the GI tract and promotes healthy gut bacteria.[18]

3.Boosts Immunity: Supports immune function and overall well-being.

4. Aids in Weight Management: Helps with weight loss and maintenance when combined with a healthy diet and exercise.

4.3.2 Synonym

Feukel

Fructus foeniculum

Biological Source :- It is consists of dried ripe fruit of foeniculum vulgare



Fig: Funnel Powder

Taxonomical Classification:

The scientific name of fennel is Foeniculum vulgare.

Kingdom: Plantae (plants)
Phylum: Magnoliophyta (flowering plants)
Class: Magnoliopsida (dicotyledons)
Order: Apiales (parsley order)
Family: Apiaceae (carrot or parsley family)
Genus: Foeniculum
Species: vulgaris

4.3.3 Effects as a Digestive Powder:

- 1. Relieves Bloating and Indigestion: Fennel powder helps reduce discomfort and promotes smooth digestion.
- 2. Supports Gut Health: It nourishes beneficial gut bacteria, promoting a balanced microbiome.
- 3. Regulates Bowel Movements: Soluble fiber in fennel helps absorb water, forming a gel-like substance that supports regular bowel movements.[19,20]
- 4. Prevents Constipation: By promoting regularity and supporting healthy gut bacteria.
- 5. Aids Weight Management: By regulating hunger and satiety hormones, reducing cravings, and promoting fat burning.
- 6. Enhances Nutrient Absorption: Supports immune function and overall well-being.
- 7. Reduces Inflammation: Cooling agents in fennel may help alleviate stomach inflammation.





4.4 Asafoetida

Asafoetida, also known as hing or asafetida, is a spice derived from the roots of the Ferula asafoetida plant, a perennial herb native to Central Asia. It's a gum oleoresin that's dried and often blended with other ingredients like wheat or rice flour before being sold. Asafoetida has a strong, pungent, sulfurous odor and a bitter taste, which is why it's often used sparingly in cooking and traditional medicine[21]

4.4.1 Usage as a Digestive Powder asafoetida

It can also be consumed without cooking as it has a number of health benefits, such as controlling gas and acidity.[22]Take ¹/₂ teaspoon Hing powder and add to a glass of warm water. Drink this on an empty stomach. asafoetida is thought to have antispasmodic, anti-inflammatory, and anti-flatulent properties that can help soothe the digestive system

4.4.2 Synonyms:

Asant, Devil's Dung, Stinking Gum, Hing, Asafetida, Kayam, Henjana, Jowani Badian, and Ingu.

Biological Source:

Oleo-gum-resin extracted from the taproots and rhizomes of Ferula species, particularly Ferula asafoetia



Fig: Asafoetida Powder

Taxonomic Classification:



- **Kingdom:** Plantae (Plants)
- **Division:** Magnoliophyta (Flowering plants)
- **Class:** Magnoliopsida (Dicots)
- Order: Apiales
- Family: Apiaceae (Umbelliferae)
- Genus: Ferula
- Species: Ferula asafetida

4.4.3 These potential side effects may include

1. Relieving Gas and Bloating: Asafoetida's carminative properties may help ease digestive discomfort.

2. Aiding Digestion: May stimulate digestive enzymes and improve nutrient absorption.

3. Reducing Flatulence: Helps minimize gas and discomfort.

4. Antimicrobial Properties: May help regulate gut bacteria and promote digestive balance.

5. Anti-inflammatory Properties: May help reduce inflammation.

4.5 Lemon essence,

Lemon essence, also known as lemon essential oil, is derived from the Citrus limon plant, specifically from the peel of the fruit. It's extracted through methods like cold-pressing or steam distillation. Lemon essence, typically derived from the essential oil of Citrus limon, contains key volatile compounds such as limonene, citral, linalool, and pinene. TLC is used to identify these constituents in herbal formulations and confirm authenticity[23]

4.5.1 Usage as a Digestive Powder Lemon essence,

Lemon essence, or lemon essential oil, can be beneficial for digestion by promoting bile production, acting as a natural laxative, and helping to stimulate digestion. It can also alleviate symptoms like indigestion, bloating, and nausea. However, it's crucial to note that it may not be suitable for everyone, especially those with sensitive stomachs or acid reflux.[25]

4.5.2 Synonyms: Lemon essence, lemon oil, Citrus limon essential oil, and the botanical name Citrus limon.

Biological Source: The peel of the lemon fruit (Citrus limon).



Fig: Lemon

Taxonomic Classification:

Kingdom: Plantae. Class: Magnoliopsida. Order: Sapindales. Family: Rutaceae. Genus: Citrus. Species: Citrus limon

4.5.3 Side Effects as a Digestive Powder:

1. Acid Reflux: Lemon's acidity may exacerbate acid reflux or heartburn in some individuals.

2. Tooth Erosion: The citric acid in lemon essence may erode tooth enamel if good oral hygiene practices are not followed.

3. Allergic Reactions: Some people may be allergic to lemons or citrus, which can cause



symptoms like hives, itching, or difficulty breathing.[26]

4.5.4.Digestive Effects

- 1. Stimulating digestion
- 2. Relieving nausea
- 3. Supporting gut health

4.6 Ajwain

Ajwain, also known as ajowan or Carum copticum, is a herb with the scientific name Trachyspermum ammi. It belongs to the Apiaceae family (Umbelliferae). The biological source of ajwain is the fruit-like seed or the entire plant.

4.6.1 Synonyms: Ajowan, Carum copticum, Ammi copticum, Thymol seeds, Bishop's weed, and Carom.



Fig; Ajwain Powder

Taxonomic Classification:

- Kingdom: Plantae
- Class: Magnoliopsida
- Order: Apiales
- Family: Apiaceae (Umbelliferae)
- Genus: Trachyspermum
- Species: Trachyspermum ammi

4.6.2 Usage as a Digestive Powder:

Ajwain, also known as carom seeds, is a popular digestive aid used in Ayurvedic medicine and Indian cuisine. It can be consumed as a powder, either directly or added to meals, to improve digestion and alleviate various stomach issues. [27,28]Ajwain's active ingredient, thymol, stimulates the production of gastric juices, which aids in breaking down food and reducing bloating, indigestion, and gas

4.6.3 These potential effects may include:

1. Relieving Gas and Bloating: Ajwain's carminative properties may help ease digestive discomfort.

2. Aiding Digestion: May stimulate digestive enzymes and improve nutrient absorption.

3. Reducing Flatulence: Helps minimize gas and discomfort.[28]

4. Antimicrobial Properties: Ajwain has been traditionally used for its antimicrobial properties.

5. Anti-inflammatory Properties: May help reduce inflammation.

4.7 Cumin

Cumin's scientific name is Cuminum cyminum. It's a plant in the Apiaceae family, also known as the parsley family. Cumin is classified as follows:

Kingdom: Plantae; Subkingdom: Viridiplantae; Infrakingdom: Streptophyta; Superdivision: Embryophyta; Division: Tracheophyta Subdivision: Spermatophytina Class: Magnoliopsida Superorder: Asteranae Order: Apiales



Family: Apiaceae **Genus**: Cuminum **Species**: Cuminum cyminum.

4.7.1 Synonyms: Cuminia cyminum J. F. Gmel, Ligusticum cuminum (L.) Crantz, Cuminum sativum J. Smith, Cuminum sudanense H. Wolff, and Cyminon longeinvolucellatum St. Lag.

Biological Source: The seeds of the Cuminum cyminum plant are used as the spice, known as cumin. Cumin is native to the Mediterranean region and South Asia.



Fig: Cumin Powder

4.7.2 Usage as a Digestive Powder:

1. Relieve Gas and Bloating: Cumin's carminative properties help ease digestive discomfort.

2. Aid Digestion: Stimulates digestive enzymes and improves nutrient absorption.

3. Reduce Flatulence: Minimizes gas and discomfort.

4. Natural Digestive Aid: Offers a natural alternative to traditional digestive medications.

5.Antimicrobial Properties: May help regulate gut bacteria.[29]

4.7.3 These potential side effects may include:

1. kin Rash: Some individuals may experience skin irritation or allergic reactions.

2. Respiratory Issues: Rarely, cumin allergy can cause respiratory problems.

3. Stomach Upset: Excessive consumption may cause stomach discomfort.

4. Heartburn: Cumin can exacerbate heartburn in some individuals.

4.8 Amla

4.8.1 Basic Information about Amla Powder as a Digestive Powder:

Amla powder, derived from the Indian gooseberry (Emblica officinalis), is a versatile herbal remedy with along history of use in Ayurvedic medicine. Renowned for its potent antioxidant properties and rich nutrient content, amla powder is utilized for various health benefits, including digestive support.[30,31,32]

4.8.2 Usage as a Digestive Powder:

Amla powder is valued for its digestive properties, primarily due to its high fiber content and abundance of vitamin C. It is believed to promote bowel regularity, relieve constipation, and support overall digestivefunction by stimulating the secretion of digestive juices and enzymes. Amla powder can be consumed directly, mixed with water or other beverages, or incorporated into culinary recipes and herbal formulations aimed at improving digestive health.

4.8.3 Synonyms:

- 1. Indian gooseberry powder
- 2. Amalaki powder (in Sanskrit)
- 3. Nellikkai powder (in Tamil)



4. Dhatriphala powder

- Taxonomical Classification:
- Kingdom: PlantaeOrder: Ericales
- Family: Phyllanthaceae
- Genus: Phyllanthus
- Species: Phyllanthus emblica

Side Effects as a Digestive Powder:

While amla powder is generally considered safe for consumption, excessive intake may lead to certain sideeffects, particularly in sensitive individuals.[34]

4.8.4 These potential side effects may include:

1. Gastrointestinal discomfort: Consuming large amounts of amla powder may cause gastrointestinalirritation, leading to symptoms such as stomach upset, nausea, or diarrhea.

2. Hypoglycemia: Amla powder may lower blood sugar levels, so individuals with diabetes should monitortheir blood glucose levels closely when using amla powder as a digestive aid, as it may interact with diabetes medications and lead to hypoglycemia.[35]

3. Allergic reactions: Some individuals may experience allergic reactions to amla powder, particularly thosewith known sensitivities to berries or citrus fruits, leading to symptoms such as skin rash, itching, or respiratory distress.[36]

4. Interactions with medications: Amla powder may interact with certain medications, such as blood thinners or medications for diabetes, so individuals taking these drugs should consult with a healthcare professional before using amla powder as a digestive aid.[36]



Fig: Amla powder

4.9 Jaggery

4.9.1 Basic Information about Jaggery Powder as a Digestive Powder:

Jaggery powder, also known as "gur" in Hindi, is a traditional sweetener made from the concentrated sapof sugarcane or palm trees. It is widely used in various cuisines around the world and is valued not only for its sweet taste but also for its potential health benefits, including its role as a digestive aid.[37]

4.9.2 Usage as a Digestive Powder:

Jaggery powder is often used as a digestive aid due to its natural properties. It is believed to stimulate thesecretion of digestive enzymes, aid in digestion, and alleviate symptoms of indigestion, bloating, and constipation. Additionally, jiggery powder contains small amounts of minerals such as iron, potassium, and magnesium, which may further support digestive health. [38,39,] Jaggery powder can be consumed directly, dissolved in water or beverages, or incorporated into culinary dishes and herbal formulations to enhancedigestive function.[40]

4.9.3 Synonyms:

1. Gur powder (in Hindi)



- 2. Panela powder (in some regions)
- 3. Palm jaggery powder
- 4. Sugar cane jaggery powder

Taxonomical Classification:

Jaggery is not derived from a specific plant species but is produced from the sap of various plants, including sugarcane (Saccharum officinarum) and certain species of palm trees (e.g., Palmyra palm, Date palm).

4.9.4 Side Effects as a Digestive Powder:

While jaggery powder is generally considered safe for consumption, excessive intake may lead to certain side effects, particularly in individuals with diabetes or those prone to dental issues. These potential sideeffects may include:

1. Elevated blood sugar levels: Jaggery powder is high in sucrose and glucose, which can cause a rapid increase in blood sugar levels, particularly in individuals with diabetes. Therefore, individuals with diabetesshould monitor their blood glucose levels closely when consuming jaggery powder and limit their intake accordingly.[41]

2. Dental problems: Like other sugary foods, excessive consumption of jaggery powder may contribute todental cavities and tooth decay, especially if proper oral hygiene practices are not maintained.

3. Weight gain: Jaggery powder is calorie-dense and should be consumed in moderation, especially byindividuals watching their weight or trying to manage their calorie intake.[42]

4. Contaminants: The quality of jaggery powder may vary depending on the production process and source. Contaminants such as mold, dirt, or

pesticide residues may be present in inferiorquality jaggerypowder, which could pose health risks if consumed.



Fig: Jaggery Powder

4.10 Rock Salt

Halite more commonly known as Rock salt is a mineral formed from sodium chloride. It's chemical formula is NaCl and this also includes other variations of salt such as common salt and table salt. Rock salt tends to be the industrial name used for Halite.[43] It forms as isometric crystals and is typically colourless or white, but may also be other colours depending on the amount and type of impurities contained within it. The salt occurs in beds of sedimentary evaporite minerals. This is caused by large lakes and seas drying up. These salt beds can be hundreds of metres deep.

4.10.1 Synonyms:

Halite, Table salt, Common salt, and Sendha Namak (Hindi).

Biological Source:

Not a biological source; it's a mineral formed from the evaporation of saline water bodies.

Taxonomic Classification:

• Classified as a mineral within the Earth's crust.



• Specifically, it's a type of sedimentary rock called an evaporate

4.10.2 Digestive Effects

1. Relieving Bloating and Gas: Rock salt may help reduce bloating and gas discomfort.

2. Aiding Digestion: May stimulate digestive enzymes and improve nutrient absorption.

3. Antimicrobial Properties: Rock salt has been traditionally used for its antimicrobial properties.

4. Reducing Inflammation: May help reduce inflammation in the digestive tract. [44]



Fig: Rock Salt

5 MATERIALS

1. Herbal Ingredients:

- Amla (Emblica officinalis)
- Jaggery (unrefined cane sugar)
- Ginger (Zingiber officinale)
- Lemon essence (Citrus limon)
- Fennel seeds (Foeniculum vulgare)
- Peppermint (Mentha piperita)
- Cumin seeds (Cuminum cyminum)

- Ajwain seeds (Trachyspermum ammi)
- Rock salt (Himalayan pink salt)
- Asafoetida (Ferula asafoetida)
- Bananas (Musa paradisiaca)

2. Equipment:

Grinder or mill, Sieve, Mixing bowl, Capsule filling machine (if applicable)

5.1 Methods

1. Formulation Development:

- Weigh and mix herbal ingredients in a specific ratio.
- Grind ingredients into a fine powder.
- Sieve the powder to ensure uniform particle size.

2. Capsule Preparation:

- Fill capsules with the herbal powder using a capsule filling machine.
- > Ensure uniform filling and sealing of capsules.

3. Efficacy Evaluation:

- Conduct a randomized controlled trial (RCT) to evaluate the efficacy of the herbal remedy.
- Assess outcomes such as stomach pain intensity, symptom scores, and quality of life.

6. Product formulation and formulation table

The Poly Herbal Formulation (PHF) is prepared using a blend of 12 different herbal extracts. The amount of each ingredient added to the formulation

Sr.no	Name of the Ingredients with common name & botanical name	Quantity	Chemical constituent
1	Lemon Essence (Citrus limon plant	0.05gram	citric acid
2	Ginger (Zingiber officinale)	0.5 gram	Gingerols 5 %
3	Fennel (Foeniculum vulgare.)	1 gram	4 to 5% volatile oil.
4	Peppermint (Mentha piperita L.)	0.15 gram	menthol and menthone



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5	Cumin (Cuminum cyminum L.)	0.75 gram	<i>cuminlaldehyde</i> (19.9– 64 31 %)
6	Ajwain (Trachyspermum ammi)	0.15 gram	thymol (39.1%)
7	Rock salt (sodium chloride)	0.25 gram	calcium, potassium,
			magnesium,
8	Asafoetida (Cassia angustifolia)	0.05 gram	resin (40-64%)
9	Bananas (Musa acuminata)	0.2 gram	protein, fat,
			carbohydrates,
10	Amla (Phyllanthus emblica tree)	0.05 gram	Emblicanin A and B

6.1 Blend preparation and process

The blend is prepared by following a detailed production process, which is illustrated in_below. This process ensures the quality and consistency of the blend. Once prepared, the blend further used in the PHF and stored in a cool, dry place, away from direct sunlight to maintain its integrity. This was distributed in 200 ml package among the patients.



Fig. 1. Flowchart of the production process for extract solution & formulation.

7.Evaluation Test:

To evaluate the quality and potency of a herbal digestive powder, chemical tests can be employed to assessthe presence of specific bioactive compounds and ensure compliance with established standards. Here's a set of chemical tests that can be conducted:

1. Total Phenolic Content (TPC) Assay:

Principle: This assay quantifies the total phenolic compounds in the herbal powder, which contribute to its antioxidant and anti-inflammatory properties.

Procedure: Use a colorimetric method, such as the Folin-Ciocalteu assay, to measure the absorbance of the herbal powder extract at a specific wavelength. Calculate the TPC based on a standard curve generated using gallic acid as the reference compound.

2. Total Flavonoid Content (TFC) Assay:

Principle: Flavonoids are secondary metabolites with antioxidant and digestive-stimulant properties.This assay determines the total flavonoid content in the herbal powder.

Procedure: Utilize a colorimetric method, such as the aluminum chloride assay, to quantify the flavonoid content. Measure the absorbance of the herbal powder extract at a specific wavelength and calculate the TFC based on a standard curve prepared with a known flavonoid (e.g., quercetin).

3. Thin-Layer Chromatography (TLC) Profiling:

Principle: TLC separates the components of the herbal powder based on their differential migration ona stationary phase. It provides a qualitative

assessment of the presence of specific phytochemicals.

Procedure: Apply the herbal powder extract onto a TLC plate and develop it using suitable solvent systems. Visualize the separated bands under UV light and/or by using specific staining reagents. Comparethe obtained chromatographic profile with reference standards to identify the presence of characteristic compounds.

4. pH Measurement:

Principle: pH measurement indicates the acidity or alkalinity of the herbal powder, which can influenceits solubility stability, and bioavailability.

Procedure: Prepare a suspension of the herbal powder in distilled water and use a calibrated pH meter to measure the pH of the solution. Compare the obtained pH value with the acceptable range specified forherbal digestive powders.

5. Angle of Repose:

Angle of repose was determined by using funnel method the powder was allowed to flow through a funnel fixed on a stand to form a heap. The height and radius give the angle of repose.

Angle Of Repose(Θ) = Tan-1(h/r)

h = 0.8r = 8.7 $\Theta = 0.18$

6. Practical Size:

This was done by sieve method, sieves were arranged in ascending order churna was weighed and added to the top sieve and the assemble was shaken for 15 min. and the weight of churna retained over each sieve was measured. Partical size= 0.20.





Fig: Practical Size

7.1 . Determination of Moisture Content:

The moisture content of churna was found using the hot air oven. For the evaluation of moisture content we weight accurately 10 gm of powder and put the sample in the hot air oven for at least 4 hrs and check the weight after a particular time period. Finally we calculate the % moisture content present in the churna. Moisture content was determined with the help of hot air oven in which we kept the sample for 4 hours and check the sample after the 15 minutes interval.

Discussion : Discussing the mentioned topic, "Chemical Test for Evaluating Herbal Digestive Powder," would involve examining the significance of each test in ensuring the quality, safety, and efficacy of the product.



Fig: Total Moisture Content

7.2. Total Phenolic Content (TPC) Assay:

Significance: Phenolic compounds contribute to the antioxidant and anti-inflammatory properties ofherbal digestive powders. Assessing TPC helps determine the potency of the powder in providing these beneficial effects.

Discussion: A higher TPC indicates a greater concentration of phenolic compounds, suggesting better antioxidant capacity. This is important for combating oxidative stress and inflammation in the gastrointestinal tract, promoting digestive health.

7.3. Total Flavonoid Content (TFC) Assay:

Significance: Flavonoids possess antioxidant, anti-inflammatory, and digestive-stimulant properties, contributing to the therapeutic effects of herbal powders.

Discussion: Measuring TFC provides insight into the flavonoid content of the powder. Higher TFCvalues suggest increased potential for improving digestion and alleviating gastrointestinal discomfort through mechanisms such as smooth muscle relaxation and enhanced bile secretion.

7.4. Thin-Layer Chromatography (TLC) Profiling:

Significance: TLC profiling provides a qualitative assessment of the presence of characteristicphytochemicals in the herbal powder.

Discussion: TLC can detect the presence of specific compounds based on their migration patterns and visual appearance. This technique serves as a rapid and cost-effective screening tool for assessing the authenticity and identity of herbal



ingredients, thereby preventing adulteration and ensuring product quality.

7.5. pH Measurement:

Significance: pH measurement assesses the acidity or alkalinity of the herbal powder, which caninfluence its solubility, stability, and bioavailability.

Discussion: Maintaining an appropriate pH is crucial for ensuring the physiological compatibility of the herbal powder with the gastrointestinal environment. An optimal pH range promotes proper dissolution and absorption of bioactive compounds, enhancing the efficacy of the product in supporting digestive function.

8. Overall Discussion:

By employing these chemical tests, manufacturers and regulatory authorities can evaluate the quality, safety, and efficacy of herbal digestive powders. Standardized testing protocols help ensure consistency in product composition and potency, enabling consumers to make informed decisions about their health andwell-being.

8.1 Future Perspectives:

Continued research and development in analytical techniques and quality control methods are essential for advancing the evaluation of herbal digestive powders. Integrating modern analytical tools with traditional knowledge can enhance the reliability and accuracy of quality assessment, contributing to the advancement of herbal medicine in promoting digestive health.

9 RESULTS:

The present study aimed to formulate and evaluate a herbal digestive powder using natural ingredients known for their digestive properties. Various herbal components were selected based on their traditional use and scientific evidence supporting their efficacy in promoting digestion. The formulation was prepared by blending these ingredients in optimized proportions to achieve a balanced and effective digestive powder. The final product was subjected to comprehensive evaluation including physicochemical analysis, organoleptic evaluation, microbial analysis, and stability testing to ensure its safety, quality, and shelf-life. The results indicated that the formulated herbal digestive powder possessed desirable characteristics and showed promising potential as a natural digestive aid. Digestive disorders are prevalent worldwide, often leading to discomfort and reduced quality of life. Whileseveral conventional treatments are available, there is an increasing demand for natural and herbal remedies due to their perceived safety and minimal side effects. Herbal remedies have been used for centuries in traditional medicine systems for promoting digestion and alleviating gastrointestinal symptoms. In line with this, the present study aimed to develop a herbal digestive powder using a combination of potent herbal ingredients known for their digestive properties.

CONCLUSIONS

Conclusion: Herbal Remedy for Stomach Pain – Formulation and Efficacy

Herbal remedies for stomach pain have been widely used in traditional medicine systems like Ayurveda, Unani, and Traditional Chinese Medicine. These formulations, often composed of multiple herbs, target the root causes of digestive discomfort such as indigestion, bloating, inflammation, and spasms.Key formulations like Shadanga Kashayam, Triphala, Hingvashtaka Churna, and teas made from ginger, peppermint, fennel, and chamomile have demonstrated therapeutic efficacy in clinical and anecdotal



Their actions include improving settings. digestion, reducing gas, relaxing gastrointestinal muscles, and soothing inflammation.Efficacy depends on the correct formulation, dosage, and individual constitution (Prakriti in Ayurveda). Many herbs contain bioactive compounds with antispasmodic, carminative, anti-inflammatory, and antioxidant properties, supporting their use in disorders.However, gastrointestinal while generally safe, herbal remedies should be used under professional guidance to avoid interactions and ensure proper diagnosis. Ongoing research, including studies available on platforms like Shodhganga, supports the potential of herbal medicine as a complementary approach to conventional gastrointestinal treatments.In summary, herbal remedies offer effective, natural options for managing stomach pain, but their use should be evidence-informed and personalized for maximum benefit and safety.

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