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Formulation and Evaluation of Herbal Constipation Tablet

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Abstract: *The present research work tries to solve the problem that associated with Irritable Bowel Syndrome with constipation. Constipation is a prevalent gastrointestinal issue that affects individuals globally. It is typically characterized by symptoms such as difficulty passing stools, hard or lumpy stools, and a persistent sensation of incomplete bowel evacuation. This research seeks to explore commonly used herbal treatments for constipation. The present study focuses on the formulation and evaluation of an herbal tablet for the effective management of constipation using a synergistic blend of Senna, Amla, and Ginger powders. These herbs were selected for their proven laxative, digestive, and carminative properties, respectively. The herbal powders were processed through standard collection, drying, and fine grinding techniques, followed by precise weighing and geometric blending to ensure uniformity. The tablets were then prepared using direct compression. The formulation underwent preformulation studies and was evaluated for physical parameters including weight variation, hardness, friability, and disintegration time, all of which were found within acceptable pharmacopeial limits. This research underscores their potential as effective and safer alternatives for managing constipation.*

Keywords: Constipation tablet, Laxative, Bowel syndrome, Herbal formulation

I. INTRODUCTION

Constipation is a widely encountered symptom affecting many individuals. Given the advancements in understanding and managing this condition since the last technical research 15 years ago, this updated research aims to outline a practical, effective, and ideally cost-efficient approach for addressing constipation. Ayurveda have been used for centuries to manage digestive disorders. A combination of Senna, Amla, and Ginger offers a synergistic approach to relieve constipation. [(1)] The present study aims to formulate and evaluate an herbal tablet using these three botanicals, complemented with standard pharmaceutical excipients for improved tablet stability and patient acceptability. The formulation was developed using the direct compression method, which is cost-effective and suitable for moisture-sensitive herbal powders. Through this approach, we aim to provide a comprehensive overview of the condition and inform evidence-based practices. [(2)]

1. Gastrointestinal Disorders?

This article explores the epidemiology of gastrointestinal disorders, with a focus on the most prevalent conditions: gastroesophageal reflux disease (GERD), non-cardiac chest pain, functional dyspepsia, irritable bowel syndrome (IBS), and defecation disorders. [(3)]

2. Defination of Constipation:

Constipation is a condition that has been described in various ways. Physicians often define it as a decrease in bowel movement frequency, typically fewer than three times per week. However, patients tend to emphasize the associated symptoms, including difficulty passing stool, hard or lumpy stool consistency, abdominal discomfort or cramping, and a persistent sensation of incomplete evacuation. [(4)]

3. Defination of Laxative: [(5)]

To define laxatives within the context of traditional medicine, it is essential first to understand the concepts of humors and temperament. In Indian medicine, it is believed that after digestion, food is transformed into a fluid known as humor.

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4. Pathophysiology:

Constipation has a complex etiology, and classification systems can be perplexing. Constipation is typically categorized into primary and secondary causes. [6]

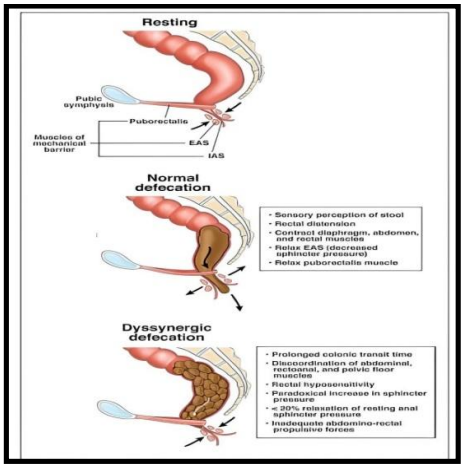

Fig.1 - Physiology of Defecation[6]

Primary constipation (Functional Constipation):

Irritable Bowel Syndrome with Constipation : (IBS)[7]
Slow-transit constipation (STC)
Normal-transit constipation (NTC)
Dyssynergic defecation (DD)

Secondary Constipation:

Secondary constipation arises from underlying medical conditions, medications, or lifestyle factors. [8]

Drugs causing constipation: Many medications can induce constipation, making it crucial to review a patient's medication history during the diagnostic process.[6]

Dehydration
Metabolic Disorders
Neurological Diseases
Medication Side Effects

5. Herbs used for treatment of Irritable Bowel Syndrome: [9]

Herb	Function	Effect
Senna	Strong natural laxative	Stimulates the intestines to promote bowel movements, helping relieve constipation
Isabgol (Psyllium Husk)	Bulk-forming laxative	Absorbs water to soften stool, increases stool bulk, and makes bowel movements smoother.
Castor Oil	Strong laxative	It is a powerful stimulant laxative that speeds up bowel movements.
Curry Leaves	Digestive aid	Improves digestion, reduces bloating, and helps in overall gut health.
Ginger	Carminative, Anti-bloating and pasmodic	Stimulates digestion, reduces bloating, and promotes better
Aloe Vera	Soothing laxative	Acts as a gentle laxative, soothes the digestive tract, and

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		aids in smooth bowel movements.
Amla	Digestive, Mild Laxative and Anti-oxidant	Rich in vitamin C, promotes healthy digestion, and relieves constipation.

II. AIM AND OBJECTIVE

Aim for Herbal Constipation Tablet [10]

To create a natural herbal remedy in the form of tablets that effectively relieves constipation.
Promotes regular bowel movements, and supports overall digestive health.
Using a combination of traditional Ayurvedic herbs known for their gentle and effective laxative and digestive properties.

Objectives for Herbal Constipation Tablet [10]

- Relieve Constipation
- Promote Regular Bowel Movements
- Improve Digestive Health
- Gentle and Safe Laxative Action
- Maintain Stool Consistency and Hydration
- Support Healthy Gut Flora

III. MATERIALS AND METHODS

Materials used in Herbal Constipation Tablet:

SENNA

Fig.2 - Senna (Cassia angustifolia)

Synonyms: Senna leaf, Tinnevelly senna, Alexandrian senna, Cassia senna, Indian senna, Senai-ki-patti, Cassia angustifolia.
Biological source: Senna consists of the dried leaflets of Cassia angustifolia (Alexandrian senna) or Cassia senna Vahl (Tinnevelley senna).
Family: Leguminosae.
Part Used: Leaves, Fruit.

Uses:

Purgative: Senna is commonly used as a natural laxative for treating constipation.
Effect on Stool: Senna promotes soft, bulky stools by reducing water absorption in the colon.[10]

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GINGER

Fig.3 – Ginger (Zingiber officinale)

Synonyms: Amomum zingiber L., Ginger, Adrak, Shunthi, Sheng Jiang, Zanjabil.
Biological source: Ginger consists of the dried or fresh rhizome of the plant Zingiber officinale Roscoe.
Family: Zingiberaceae.
Part Used: Rhizome (fresh or dried).
Uses:
Ginger stimulates digestive enzymes, increases bile secretion, and improves gastrointestinal motility. This helps relieve constipation by promoting smoother intestinal movement.
Mild laxative or digestive stimulant rather than a purgative. [10]

AMLA

Fig.4 – Amla (Emblica officinalis)

Synonyms: Emblica officinalis Gaertn, Phyllanthus emblica Linn, Indian Gooseberry, Amalaki.
Biological source: Amla consists of the dried or fresh fruit of the plant Phyllanthus emblica Linn. belonging to the family Phyllanthaceae.
Family: Phyllanthaceae.
Part Used: Fruit (mainly dried or powdered form)
Uses:
Amla is rich in fiber and contains mild natural laxative properties.
Helps in relieving constipation by enhancing bowel habits.
Its high vitamin C and antioxidant content also help in cleansing the colon and improving gut health. [10]

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IV. PREPARATION METHOD

Place of Experiment:

The samples analyses were conducted in the laboratory of Vidya Niketan College of Pharmacy, Lakhewadi, Pune in Analytical Pharmaceutics department, Vidya Niketan College of Pharmacy, Lakhewadi, Pune. Evaluation tests of different samples were conducted in Institute of JBVP'S Vidya Niketan College of Pharmacy Lakhewadi, Pune.

Machines and apparatus required:

The Formulation process involved using standard lab Equipment such as a Weighing Balance, Blenders, Sieve, Heating Mental, Mortar and pestle, Microwave oven, Refregarator, Single-punch tablet press Machine, Disinteration test apparatus.

Table No. 1: Ingredients, Quantity And Functional Role.

Sr. No.	Ingredients	Quantity (mg)	Functions
1	Senna powder	300 mg	Main laxative
2	Ginger powder	250 mg	Carminative, Anti-bloating and Anti-pasmodic
3	Amla powder	70 mg	Digestive, Mild Laxative and Anti-oxidant
4	Sodium starch glycolate (SSG)	10 mg	Disintegrant
5	Talc	5 mg	Glidant
6	Magnesium sterate	5 mg	Lubricant
7	Microcrystalline cellulose (MCC)	10 mg (Adjust to make up weight)	Filler or as a binder
	TOTAL	**650 mg**	

Step 1: Collecting Ingredients

SENNA – Main Laxative

Grows naturally in dry, sunny climates.

How to Identify:

Grows as a small shrub (1 to 2 meters).
Leaves are green, slim, and grow in pairs on a branch.
Flowers are small and yellow.

How to Collect:

Choose healthy, mature leaves not too young or yellow.
Use clean hands or scissors to snip leaves from branches.
Collect during morning or early afternoon on dry days.

Cleaning:

Rinse leaves gently with clean, cold water to remove dust or bugs.
Place them on a clean cloth to air-dry the surface moisture.

Drying:

Spread the leaves on a tray in the shade dry or sun dry.
Turn them daily for even drying.
Let them dry for 3–5 days until they feel crispy and break easily.

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STEP-BY-STEP PROCESS FOR SENNA HERB POWDER:

Pre-crush (Optional):

Crush the dried, crisp leaves using hands or a mortar and pestle to reduce their volume.

Grinding:

Place a handful of crushed Senna leaves in the grinder.
Use short pulses (5–10 seconds) to avoid overheating the machine.
Continue until it becomes a fine green powder.

Sieving:

Pass the powder through a NO. 60 sieve.
Collect the fine powder in a bowl.
Regrind any coarse material left in the sieve. [11]

AMLA (Indian Gooseberry) – Digestive, Mild Laxative and Anti-oxidant

Grows on a medium-sized tree (5–8 meters).

How to Identify:

Amla fruits are round, smooth, and greenish-yellow.
Taste is sour and slightly bitter.

How to Collect:

Pluck ripe, firm, shiny fruits from the tree or collect from the ground if freshly fallen.

Cleaning:

Wash fruits in clean water to remove dirt or debris.

Preparation:

Cut fruits into thin slices with a sharp knife.
Remove the hard seed from the center.

Drying:

Spread the slices on a clean tray or cloth.
Sun-dry or shade-dry for 7–10 days.Stir or flip daily.
Slices should become hard and dry with no moisture.

STEP-BY-STEP PROCESS FOR AMLA HERB POWDER :

Pre- break:

If dried Amla slices are too hard, lightly crush them using a stone, hammer, or mortar & pestle.

Grinding:

Place a Add small batches to the grinder.
Pulse in short bursts until a light brown powder forms.
Amla may take slightly longer to grind due to its hardness.

Sieving:

Pass Use a NO. 60 sieve to separate fine powder.
Regrind the coarse bits and repeat the sieving. [12]

GINGER – Carminative, Anti-bloating and Anti-pasmodic

Grows in warm, moist soil.

How to Identify:

Fresh ginger is beige with knobby fingers.
The inside is pale yellow and aromatic.

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How to Collect:
Uproot ginger 8–9 months after planting, when leaves dry out.
Shake or brush off any soil.
Cleaning:
Wash ginger under running water.
Scrape off the skin using the edge of a spoon or knife.
Preparation:
Slice into thin rounds or pieces to speed up drying.
Drying:
Spread pieces on a dry tray.
Dry in sunlight or under a fan for 5–7 days.
Ginger is ready when it snaps easily.

STEP-BY-STEP PROCESS FOR GINGER HERB POWDER:
Pre- cut (Optional):
If the dried ginger pieces are large or hard, break into smaller bits before grinding.
Grinding:
Place Ginger is fibrous, so use short, repeated grinding cycles.
Clean the grinder often to avoid buildup.
Powder should be light brown and aromatic.
Sieving:
Sift the powder through a NO. 60 sieve.
Collect the smooth powder; grind any remaining fibers again. [13]

Step 2: Preparation of Herbal Powders
Ensure the powders (Senna, Amla, Ginger) are:
Clean
Fully dried
Finely ground (sieve through 40–60 mesh)
Free of moisture

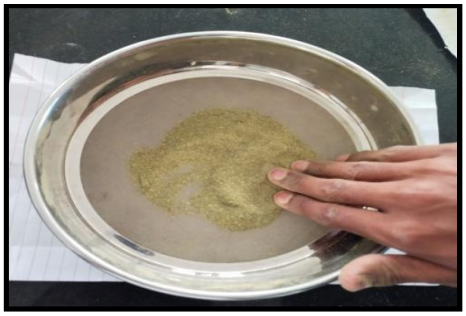

Fig.5 – Passing through No.40-mesh sieve

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Fig.6 – Herbal powders

Step 3: Measuring Ingredients

For 10 tablet batch.

Each tablet having 650mg in weight.

So we are weighing the each herb for one tablet on sensitive weighing balance.

We are going through Direct Compression method

Senna powder = 46% (Main Laxative) [15]

Ginger powder = 38% (Carminative, Anti-bloating and Anti-pasmodic) [16]

Amla powder = 11% (Digestive, Mild Laxative and Anti-oxidant) [18]

Excipient = 5%

Table No. 2: For 10 Tablet Batch

Sr. No.	Ingredients	Quantity (mg/gm)	Functions
1	Senna powder	3.0 gm	Main laxative
2	Ginger powder	2.5 gm	Carminative, Anti-bloating, Anti-pasmodic
3	Amla powder	700 mg	Digestive, Mild Laxative and Anti-oxidant
4	Sodium starch glycolate (SSG)	100 mg	Disintegrant
5	Talc	50 mg	Glidant
6	Magnesium sterate	50 mg	Lubricant
7	Microcrystalline cellulose (MCC)	100 mg (Adjust to make up weight)	Filler or as a binder
	TOTAL	**6.5 gm**	

Step 4: Preparing the Blend

A uniform mixture of two or more ingredients combined so that they are evenly distributed throughout.

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Procedure:

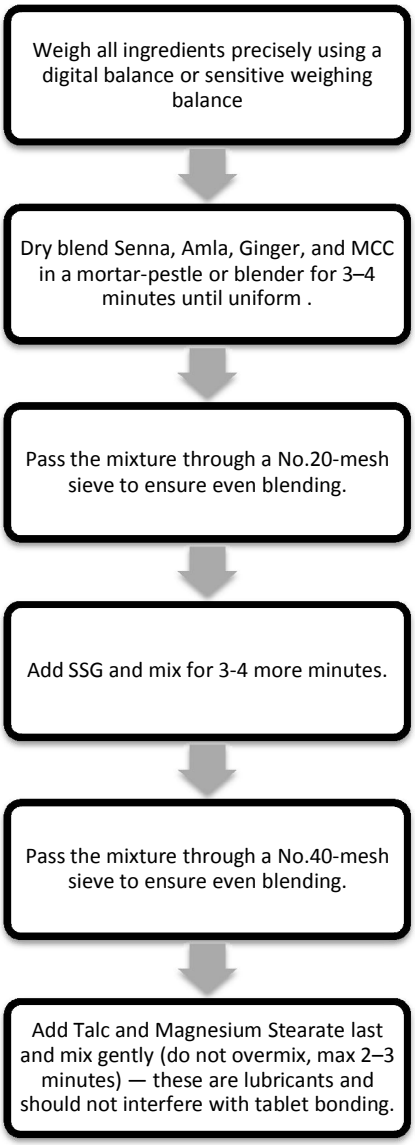

Fig.7 – Mixing ingredients in mortar-pestle

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Step 4: Tablet Compression

Equipment:

Single-punch or rotary tablet press (manual or electric)

8 mm or 9 mm round flat punch (depending on tablet size)

Fig.8 - Single-punch tablet press.

Compression Procedure:

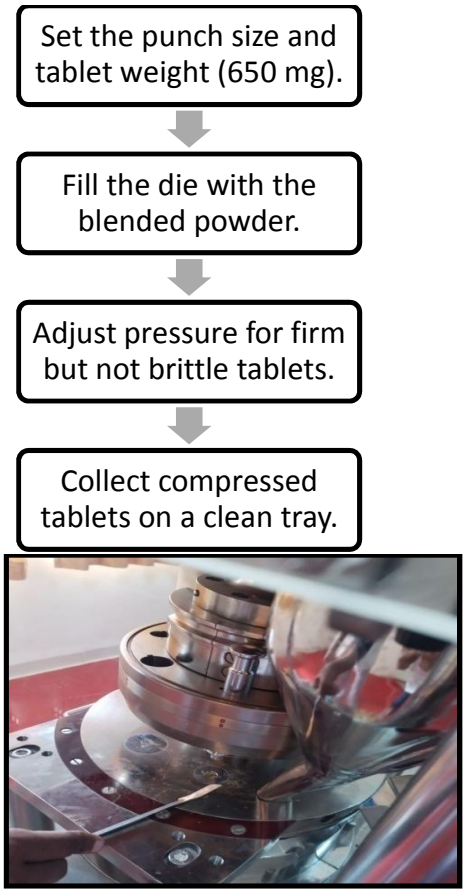

Fig. 9 – Filling the die with the blended powder

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Fig.10 – Collected compressed tablets

Step 5: Pre-Stability Study

Stability means ability of a drug product to maintain its physical, chemical, microbiological, therapeutical properties within predetermined specifications over a given period of time (self life/expiry date) under the influence of various environmental factors, such as temperature, humidity, and light.

Stability studies equipment:

The equipment used for stability testing is called stability chamber.

But our college doesn't have a stability chamber, so we kept the tablets in a hot air oven for 10-15 days. [17]

Stability study protocol:

The stability testing is one of the processes for drug development.

Stability studies are used to determine the storage conditions and packaging materials for a bulk of the prepared formulated products.

The stability studies are used to determine the expiry date of the substance.

The protocols can also depend on the drugs already in the market and the newly prepared drugs.

The protocols should reflect the regions that are proposed by the ICH. [17]

Number of batches

Sample Storage conditions

Parameters Observed in Pre-Stability Study

Number of batches:

Sr. No	Ingredients	F1 (in mg)	F2 (in mg)	F3 (in mg)	F4 (in mg)
1.	Senna powder	300	300	300	300
2.	Ginger powder	250	250	250	250
3.	Amla powder	70	70	70	70
4.	Sodium starch glycolate (SSG)	11	11	10	8
5.	Talc	3	4	5	5
6.	Magnesium sterate	3	4	5	5
7.	Microcrystalline cellulose (MCC)	13	11	10	12

Sample Storage conditions:

Condition	Duration	Purpose
Room temp (25°C / 60% RH)	7–14 days	Short-term stability observation
Accelerated (40°C / 75% RH)	Optional	Simulated stress conditions

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Parameters Observed in Pre-Stability Study:

Since this is a preliminary (14–30 days) study, we focus on physical, organoleptic, and basic disintegration parameters:

Sr. No.	Parameter	Day 0 Observation	Day 14 Observation	Result
1	Color	Dark brown	No change	Stable
2	Odor	Slightly pungent	No change	Stable
3	Texture	Smooth surface	Smooth, no cracks or sticking	Stable
4	Weight Variation	648–652 mg (avg: 650 mg)	647–653 mg (avg: 650.5 mg)	Within ±5%
5	Hardness	4.2 kg/cm²	4.1 kg/cm²	Stable
6	Friability	0.31%	0.34%	Not more than 1%
7	Disintegration Time	12 min	13 min	<15 min
8	Moisture Content (LOD)	3.6%	3.8%	<5%

EVALUATION TEST

Organoleptic Evaluation:

Color = Brown
Odor = Pungent
Taste = Bitter, slightly pungent
Shape = Round, flat or biconvex
Texture = Smooth, free from cracks or grittiness
Appearance = Uniform, no cracks, breaks.[14]

Weight Variation Test:

Weigh 5 individual tablets.

$$\text{Average weight} = \frac{646+650+643+656+648}{5} = \frac{3243}{5} = 648.6 \text{ mg}$$

% Deviation

Tablet No.	Weight	Deviation (mg)	% Deviation
1	646	4	0.61
2	650	0	0
3	643	7	1.07
4	656	6	0.92
5	648	2	0.31

All within ±5% limit = Pass the test.

Hardness Test:

Use a tablet hardness tester. [14]

Acceptable range: 3–6 kg/cm².

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Fig.11 – Hardness test for tablet

Friability Test:

Place 5 tablets in friabilator.

Rotate at 25 rpm for 4 mins.

Loss in weight < 1%.

Fig.12 – Fraibility Test for tablet

Disintegration Time:

Use disintegration apparatus (in distilled water or 0.1 N HCl).

Should disintegrate within 15–30 minutes. [14]

Fig. 13- Disinteration test apparatus

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V. RESULT AND DISCUSSION

Sr. No	Test	Result	Standard	Pass/Fail
1	Avg. Weight	648 mg	650 ± 5%	Pass
2	Hardness	4.2 kg/cm²	3–6 kg/cm²	Pass
3	Friability	0.3%	<1%	Pass
4	Disintegration Time	12 mins	<15 mins	Pass
5	Appearance/Stability	No change	No change	Pass

VI. CONCLUSION

The present study successfully demonstrated the formulation, evaluation, and short-term stability assessment of an herbal constipation tablet comprising Senna, Amla, and Ginger powders, along with appropriate excipients using the direct compression method. In conclusion, the formulated herbal tablet is pharmaceutically acceptable, safe, and potentially effective as a natural alternative for the management of constipation. This research supports the integration of traditional herbal knowledge with contemporary pharmaceutical technology and opens avenues for future clinical studies and large-scale production.

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