

A BRIEF REVIEW ON INDIAN TRADITIONAL HERBS USED IN CONSTIPATION AND IRRITABLE BOWEL SYNDROME (IBS)

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ABSTRACT

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. The multifaceted nature of constipation poses challenges to the effectiveness of conventional treatments, as these often rely on single drugs targeting specific pathways. While modern medicine offers various laxatives to manage constipation, these are often associated with undesirable side effects. In contrast, traditional herbal remedies have been employed for centuries to alleviate constipation, with growing scientific evidence now supporting their efficacy. This review seeks to explore commonly used herbal treatments for constipation, focusing on their mechanisms of action, pharmacological attributes, active compounds, and supporting clinical evidence. Prominent examples of herbal remedies discussed include Senna, Psyllium, Aloe vera, Triphala, Rhei rhizoma, Ricinus communis, Curry leaves, and Parsley. By providing insight into these natural options, this review underscores their potential as effective and safer alternatives for managing constipation.

Keywords: Constipation, Laxative, Gastrointestinal Disorder, Bowel Syndrome, Ricinus Communis L, Traditional Herbs.

I. INTRODUCTION

Constipation is a widely encountered symptom affecting many individuals. Given the advancements in understanding and managing this condition since the last technical review 15 years ago, this updated review aims to outline a practical, effective, and ideally cost-efficient approach for addressing constipation. Notably, this review will focus on adult constipation, excluding pediatric cases and secondary constipation in adults. The present work builds upon the prior technical review, integrating insights from recent studies on chronic constipation alongside targeted literature searches of peer-reviewed publications. ⁽¹⁾ Specifically, we conducted a systematic analysis of global literature to determine the prevalence of constipation across various populations. This review highlights its distribution based on geography, gender, age, and associated socioeconomic factors. Through this approach, we aim to provide a comprehensive overview of the condition and inform evidence-based practices. ⁽²⁾

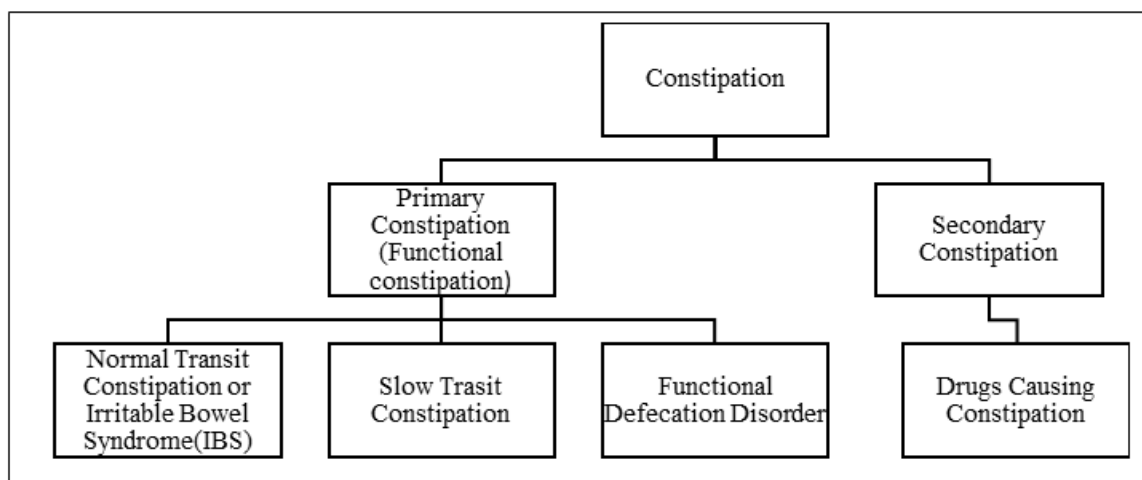
1.1. Gastrointestinal Disorders?

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. Traditionally, gastrointestinal motility has been associated with rare but well-defined conditions such as achalasia, gastroparesis, and chronic idiopathic intestinal pseudo-obstruction. However, research has increasingly demonstrated that abnormal motility plays a significant role in the development of more common gastrointestinal conditions. For instance, GERD is linked to factors such as reduced lower esophageal sphincter tone, transient relaxation of the lower esophageal sphincter, and impaired esophageal peristalsis, all of which contribute to its pathogenesis. This evolving understanding underscores the critical role of motility in both rare and widespread gastrointestinal disorders. ⁽³⁾

1.2. Definition and Classification 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⁾ Constipation is broadly categorized into two types: primary constipation, also known as functional constipation, and secondary constipation. Primary constipation arises without an identifiable underlying cause, whereas secondary constipation is associated with other medical conditions, medications, or lifestyle factors. ⁽⁵⁾



1.3. Definition and Classification of Laxative: ⁽⁶⁾

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. These humors are categorized into four distinct types:

1. Blood
2. Phlegm
3. Yellow bile
4. Black bile

Health is thought to depend on maintaining a precise balance of these humors, both in terms of their quality and quantity. Temperament, on the other hand, refers to the predominant characteristic or quality of an individual or substance, shaped by the interplay of four fundamental elements:

1. Hot
2. Cold
3. Wet
4. Dry

Classification of Constipation.⁽⁵⁾

1.3.1 Classification of Laxative Herbs:

Table 1:

Sr. No.	Scientific Name	Traditional Name	Nature	Part of Usage	Medication Form	Mode of Application
1.	Althea officinalis	Khatmi	Hot and wet	Flower	Mucilage	Compound
2.	Cassia angostifolia	Senna	Hot and dry	Leaves	Powder, Decoction	Singular, Compound
3.	Cassia fistula	Floos	Hot and dry	Fruit	Latex, Syrup	Singular, Compound
4.	Plantago ovata	Psyllium, Isabgol	Hot and dry	Seeds	Seeds powder, Decoction	Compound
5.	Aloe vera	Ghrit kumari	Cold and wet	Leaf	Latex	Compound
6.	Murraya koenigii	Kaidarya,	Hot and dry	Leaves	Powder, Tablet	Singular,

	(Curry leaves)	Kadi patta				Compound
7.	Petroselinum crispum	Parsley leaves	Hot and dry	Leaves	Powder	Singular, Compound
8.	Ricinus communis	Castor oil plant	Cold and wet	Leaves, Seeds, roots	Powder, Oil	Singular, Compound
9.	Rhei rhizoma, Rheum Officinale	Dahuang	Cold and wet	Root	Roots powder, Decoction	Compound
10.	Emblica officinalis	Haritaki, Amalaki	Cold and wet	Fruit	Latex, Syrup, Powder	Singular, Compound

1.4. Pathophysiology:

Constipation has a complex etiology, and classification systems can be perplexing. Constipation is typically categorized into primary and secondary causes. While secondary reasons are associated with organic diseases, systemic diseases, or drugs, primary causes are inherent issues with colonic or anorectal function. (7)

1.4.1 Physiology of Defecation:

Defecation is a complex process involving both voluntary and involuntary mechanisms. When stool enters the rectum, rectal distension triggers the urge to defecate, accompanied by a reduction in anal resting pressure. Proper sensory perception and the coordinated movement of stool are critical for normal anorectal function. Disruptions in the puborectalis muscle, neuropathy, or diarrheal conditions can compromise continence, leading to stool leakage. (8) The pelvic floor dynamics during rest, normal defecation, and dyssynergic defecation illustrate key physiologic changes. At rest, the internal and external anal sphincters (IAS and EAS) and the puborectalis muscle maintain continence. During defecation, these structures relax while abdominal and rectal contractions generate the force needed to evacuate stool. In individuals with dyssynergia, defecation is impaired due to issues such as inadequate push effort, incomplete anal relaxation, or failure of the anal sphincters and puborectalis to relax, resulting in incoordination and stool retention. (7)

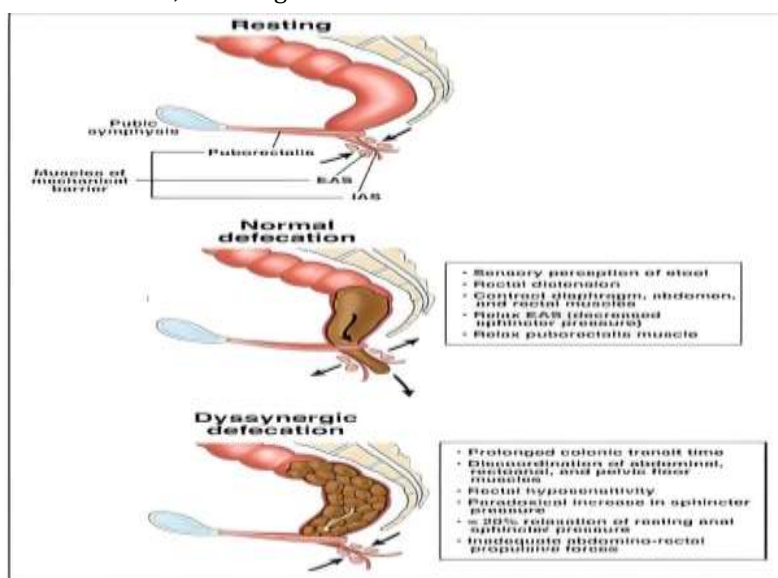


Figure 1: Normal Anatomy and Physiology of Defecation. (7)

1.4.2 Physiology of Constipation:

The underlying mechanisms of constipation are not fully understood but are believed to involve multiple factors. As noted earlier, constipation can be categorized into dyssynergic defecation (DD), slow-transit constipation (STC), or normal-transit constipation (NTC), each reflecting distinct pathophysiological patterns.

A. Primary constipation (Functional Constipation) :

Primary constipation results from inherent abnormalities in colonic motility or disruptions in the defecation

mechanism. These conditions are generally diagnosed once secondary causes have been excluded, often through a detailed clinical history. (7) (fig. 2) outlines the different phenotypes of primary chronic constipation. Management typically begins with dietary fiber supplementation and the use of laxatives to alleviate symptoms. (7)

Chronic Idiopathic Constipation
Dyssynergic defecation (with or without delayed colonic transit)
Slow transit constipation
Normal transit constipation †
Constipation predominant irritable bowel syndrome †

† IBS-C and NTC often co-exist.

Figure 2: Phenotypes of Primary Chronic Constipation. (24)

1. Irritable Bowel Syndrome with Constipation : (IBS) (9)

Patients with IBS-C commonly report hard stools, straining, and abdominal discomfort or pain related to bowel movements. Psychological issues may also be present. While most individuals with IBS-C exhibit normal colonic transit times and defecation frequency, a subset may suffer from an underlying defecation disorder.

Rome IV criteria	
FC	IBS-C
Symptoms for ≥6 mo and 2 or more of the following symptoms for >25% of defecations during past 3 mo: <ul style="list-style-type: none"> ○ Straining ○ Lumpy or hard stools ○ Sensation of incomplete evacuation ○ Sensation of anorectal obstruction/ blockage ○ Manual maneuvers to facilitate defecations; ○ <3 defecations/wk ○ Loose stools are not present, and there are insufficient criteria for IBS. 	Recurrent abdominal pain at least 1 d/wk in the past 3 mo associated with 2 or more of the following: <ul style="list-style-type: none"> ○ Related to defecation ○ Onset associated with change in frequency of stool ○ Onset associated with change in form (appearance) of stool ○ >25% of bowel movements were hard and <25% were loose stools

Figure 3: Rome IV criteria for Functional Constipation.(23)

1. Normal-transit Constipation : (NTC)

Normal-transit constipation is characterized by the subjective experience of constipation despite normal stool movement through the colon. (5) Factors contributing to symptoms often include dietary habits, lifestyle choices, behavioral patterns, and psychological influences, aligning with other functional gastrointestinal disorders. (10)

2. Slow-Transit Constipation : (STC)

Slow-transit constipation is marked by a delayed passage of stool through the colon. (5) Studies have identified physiological changes in individuals with STC, such as reduced responsiveness to cholinergic stimulation, decreased colonic electrical activity, fewer high-amplitude propagated contractions, and overall reduced colonic motility. (11)

3. Defecation Disorders : (DD)

Defecation disorders involve dysfunction in pelvic floor muscle coordination during attempted defecation. This can manifest as paradoxical contraction or insufficient relaxation of the pelvic floor muscles (dyssynergic defecation) or inadequate propulsive force (inadequate defecatory propulsion). The term "dyssynergic defecation" is preferred over "pelvic floor dyssynergia" since not all affected individuals experience urinary or sexual dysfunction. (12)

B. Secondary Constipation :

Secondary constipation arises from underlying medical conditions, medications, or lifestyle factors. (13) A

thorough history and physical examination are essential for identifying these causes. ⁽¹⁴⁾

Drugs causing constipation: Many medications can induce constipation, making it crucial to review a patient's medication history during the diagnostic process. ⁽⁷⁾

Common causes of secondary constipation include:

1. Dehydration: Insufficient water intake can lead to constipation.
2. Metabolic Disorders: Conditions like diabetes and hypothyroidism can impact bowel function.
3. Neurological Diseases: Disorders such as Parkinson's disease, multiple sclerosis, or dementia may affect normal defecation.
4. Muscle Disorders: Conditions like scleroderma, myotonic dystrophy, and amyloidosis can impair colonic motility.
5. Other Conditions: Colon cancer or pelvic organ prolapse may also contribute to constipation.
6. Medication Side Effects: Certain drugs are known to cause constipation, including:
 - a. Pain relievers, such as opioids and NSAIDs.
 - b. Iron supplements.
 - c. Some classes of antidepressants. ⁽¹³⁾

Neurologic Disorders
Parkinson's disease
Multiple sclerosis
Stroke
Spinal cord injury
Diabetic enteric neuropathy
Myopathies
Systemic sclerosis
Amyloidosis
Metabolic disorders
Hypothyroidism
Hypercalcaemia
Uraemia
Diabetes mellitus
Medications
Opiates
Anticholinergics (e.g., antidepressants, antispasmodics, antipsychotics)
Dopaminergics (e.g., levodopa, dopamine agonists, antipsychotics)
Calcium channel blockers
5-HT3 antagonists

Figure 4: Secondary causes of Slow Transit Constipation ⁽²⁴⁾

1.5 Treatment:

For patients with functional constipation, initial management typically focuses on conservative measures. These include keeping a stool diary to track bowel habits, counseling on bowel training, increasing fluid and fiber intake, and promoting regular physical activity. Over-the-counter and prescription laxatives are commonly used to alleviate symptoms, as they help to increase stool frequency and improve overall bowel function. ⁽¹⁴⁾ In cases of pelvic floor dysfunction, biofeedback therapy can be employed, where patients receive real-time feedback on the activity of the striated muscles of the pelvic floor via sensors placed around the anal or perianal region. ⁽¹²⁾ A variety of treatments have been reviewed in systematic studies, such as stool softeners, laxatives, bulking agents, 5-HT4 agonists, and other approaches like surgical interventions, dietary modifications, and educational support. ⁽¹⁵⁾ From an Ayurvedic perspective, constipation treatment may also consider an individual's unique dosha balance, as Ayurveda posits that each person has a combination of three fundamental energies or "doshas," one of which is typically dominant. These doshas influence a person's body constitution, traits, and susceptibility to health issues.

A brief overview of the three doshas includes:

1. **Vata:** Represents energy linked to movement, air, and space.
2. **Pitta:** Represents energy related to metabolism, fire, and water.
3. **Kapha:** Represents energy connected to body structure, earth, and water. ⁽¹⁶⁾

1.5.1. Herbs used for treatment of Irritable Bowel Syndrome: ⁽¹⁷⁾

Table 2:

Sr. No.	Herbal medicine	Part	Type of study	Model	Results
1.	Aloe Vera	Gel	Cross-over, placebo-RCT	IBS patients	No difference between treatment and placebo groups
			A double-blind RCT	IBS patients constipation	Effective in constipation, No effect on abdominal pain.
			Cross-over, placebo-RCT	IBS patients	No difference between treatment and placebo groups
2.	Fumaria officinalis	Whole plant	Double-blind, placebo-RCT	IBS patients	No difference between treatment and placebo groups
3.	Curcuma longa	Rhizome	Pilot study, partially blinded, RCT randomized	IBS patients	No difference between treatment and placebo groups
4.	Hypericum perforatum (HP)	Aerial parts	Open-label, uncontrolled trial	IBS patients womens	Autonomic nervous system to different stressor, improvement of Gastrointestinal symptoms of IBS
			Double-blind, placebo-RCT	IBS patients	No difference between treatment and placebo groups
5.	Mentha piperita (MP)	Essence	Double-blind, placebo-RCT	IBS patients	Peppermint-oil was effective and well tolerated
		Oil	Prospective double-blind, placebo-RCT	IBS patients	Improves abdominal symptoms
		Oil	Double-blind, placebo-RCT	IBS patients	Significantly improved the quality of life, improves abdominal symptoms
6.	Plantago psyllium	Seed	Placebo, RCT	IBS patients constipation.	Decrease Symptom severity significantly in the psyllium group, no differences in QOL
7.	Carmint (Mentha spicata, Melissa officinalis, Coriandrum sativum)	Mentha piperita, Melissa officinalis (leaf), Coriandrum sativum (fruit)	Double-blind, placebo-RCT	IBS patients	Severity and frequency of abdominal pain/discomfort were significantly lower in the Carmint group than the placebo group



Figure 5:

II. HERBS USED IN CONSTIPATION

1. CASTOR OIL PLANT:

- **Synonym:** Castor bean oil, oleum ricini, ricinus oil. ⁽¹⁸⁾
- **Biological Source:** It is fixed oil, obtained by the cold expression of the seeds of *Ricinus communis*. ⁽¹⁹⁾
- **Family:** Euphorbiaceae. ⁽¹⁹⁾
- **Part Used:** Seeds. ⁽¹⁹⁾
- **Geographical source :** Castor oil plant is primarily found in India, Brazil, America, China, and Thailand. In India, it is cultivated in Gujarat, Andhra Pradesh, and Karnataka. ⁽¹⁸⁾
- **Chemical Constituents:** The oil consists mainly of triglycerides, with 91-95% ricinoleic acid, 4-5% linoleic acid, and small amounts (1-2%) of palmitic and stearic acids. The viscosity is largely due to ricinoleic acid, while oleic acid (6%), linolenic acid (5%), stearic acid, and palmitic acid are also present. ⁽²⁰⁾

Castor Oil Plant (*Ricinus Communis*)



Figure 6:

- **Uses :**
 - Medicinal: Castor oil is a mild purgative, widely used as a laxative. It also has antifungal properties and is used in the formulation of ointments, lubricants, and emollients in cosmetics like lipsticks and hair oils. ⁽¹⁸⁾
 - Industrial: In the textile industry, castor oil aids in moisturizing fabrics, removing grease, and producing waterproof textiles. ⁽²⁰⁾
 - Therapeutic: The seeds, leaves, and roots of the castor plant have multiple medicinal uses, including treatment for constipation, diarrhea, ano-rectal issues, menstrual pain, uterine discomfort, and dermatitis. The cathartic effect of castor oil is primarily attributed to the irritant action of ricinoleic acid. ⁽¹⁹⁾

- **Marketed Product :**

Castor plant extract is used in herbal constipation tablets.

- ❖ **Brand Name:** Shree Shanker Erand Bhrust Harde Tablet.
- ❖ **Manufactured From:** Shree Shanker Ayurvedic Pharmacy.
- ❖ **Net Weight:** 200 gm.

2. SENNA :

- **Synonyms:** Senna leaf, Tinnevelly senna, Alexandrian senna, Cassia senna, Indian senna, Senai-ki-patti, *Cassia angustifolia*. ⁽²¹⁾
- **Biological source:** Senna consists of the dried leaflets of *Cassia angustifolia* (Alexandrian senna) or *Cassia senna Vahl* (Tinnevelly senna). ⁽²¹⁾
- **Family:** Leguminosae. ⁽²¹⁾
- **Part Used:** Leaves, Fruit. ⁽²¹⁾
- **Geographical Source:** Senna is primarily cultivated in the Tinnevelly, Madurai, and Ramanathapuram districts of Tamil Nadu. Additional cultivation occurs in Cudappa (Andhra Pradesh), and senna is also collected from Kutch (Gujarat) and Rajasthan. ⁽¹⁹⁾
- **Chemical Constituents:** Senna contains two key anthraquinone glycosides, sennoside A and sennoside B (no less than 2.5%), which are responsible for its purgative effect. ⁽¹⁹⁾ Additionally, senna leaf contains sennosides C and D, aloe-emodin, rhein-8-glucoside, rhein-8-2 diglucoside, phytosterols, mucilage, resin, myricyl alcohol, and salicylic acid.. ⁽²¹⁾

Senna (Cassia angustifolia) (22)



Figure 7:

- **Uses:**
 - Purgative: Senna is commonly used as a natural laxative for treating constipation. ⁽²¹⁾
 - Mechanism of Action: The anthraquinone glycosides in senna are absorbed in the intestinal tract, where they are broken down and excreted in the colon. These excreted compounds irritate the colon, stimulating peristalsis and increasing bowel movements. ⁽¹⁹⁾
 - Effect on Stool: Senna promotes soft, bulky stools by reducing water absorption in the colon. ⁽²¹⁾
 - Side Effects: The gripping or cramping effect of senna is thought to be due to its resin or emodin content. To mitigate this, senna is sometimes combined with carminative agents to reduce discomfort. ⁽¹⁹⁾
 - Parenteral Administration: When administered parenterally, senna is secreted into the colon, where it exerts its pharmacological effects. ⁽²¹⁾



Figure 8:

- **Marketed Product :**
 - ❖ **Brand Name :** Bizzico
 - ❖ **Manufactured From:** Health Point Pvt.Ltd.
 - ❖ **Net Weight:** 8mg

3. ISAPGOL:

- **Synonyms:** Ispaghula, Isabgul, Indian Psyllium, Isabgol. ⁽¹⁹⁾
- **Biological source:** Isapgol is derived from the dried seeds of *Plantago ovata* (also known as *Plantago indica* or *Plantago afra*) Forskal. The seeds and their dried coats, commonly known as Isapgol husk, are used in the pharmaceutical industry. ⁽¹⁹⁾
- **Family:** Plantaginaceae. ⁽¹⁹⁾
- **Part Used:** Seeds. ⁽¹⁹⁾



Figure 9:

Isabgol (*Plantago ovata*)

- **Geographical Source:** Isapgol thrives in dry, cool climates with well-drained loamy soil, ideally with a pH

range of 7.5 to 8.5. Excessive rainfall and cloudy weather during maturity can reduce yield. ⁽¹⁸⁾ Major cultivation regions in India include Gujarat, Punjab, and South Rajasthan. Sidhpur in North Gujarat is the hub for husk processing. Smaller areas around Pune in Maharashtra also support its cultivation. It is estimated that about 50,000 hectares are under Isapgol cultivation in India. ⁽¹⁹⁾

- **Chemical Constituents:** The seeds and husk are rich in mucilage, primarily found in the epidermis of the seeds. This mucilage is composed of pentosans and aldobionic acid, which hydrolyze into xylose, galacturonic acid. Other components of the seeds include fixed oils and proteins. The purity of Isapgol is measured by its swelling factor, a result of the mucilage’s water-absorbing properties. ⁽¹⁹⁾
- **Uses:**
 - **Therapeutic:** Both the seeds and husk act as demulcents, laxatives, and emollients, commonly used in the treatment of chronic constipation, amoebic dysentery, and bacillary dysentery. The husk is preferred over the seeds due to its higher mucilage content and lower irritant potential.
 - **Other Uses:** The mucilage is employed in tablet formulations and as a stabilizer in the ice cream industry. Crushed seeds are also applied as poultices for relieving rheumatic pain.
 - **Industrial Applications:** Companies like Gujarat Drug Chemical Ltd. in Mehsana manufacture Isapgol-based products, including specialized polysaccharide formulations created through cation exchange resin treatment and spray drying. ⁽¹⁹⁾



Figure 10:

- **Marketed Product :**
 - ❖ **Brand Name:** Panacharya Esabgoli Tablet.
 - ❖ **Manufactured From :** Sanjeevan Anusandhan Pvt.Ltd.
 - ❖ **Net weight:** 675gm.

III. FORMULATION METHODS AND MATERIALS

A. Materials :

The active ingredients include powdered extracts of Indian Senna (*Cassia angustifolia*), Psyllium husk (*Ispaghula*), Bael fruit pulp (*Aegle marmelos*), and Stevia.

B. Formulation Methods :

1. Ingredient Measurement.
2. Powder Blending.
3. Alkalizing Agent Addition.
4. Flavoring and Sweetening (Optional).
5. Binder Incorporation.
6. Tablet Compression.
7. Drying (if necessary).

C. The effervescent tablet of 500 mg was prepared as followings:

Table 3: Ingredients with their properties. ⁽²²⁾

Sr. No	Ingredients	Properties
1.	Ricinus communis	Purgative
2.	Indian Senna	Natural Laxative
3.	Ispaghula	Laxative, Bulking agent, Regulates bowel movement

4.	Bael Fruit	Laxative
5.	Sodium Bicarbonate	Effervescent Agent
6.	Talc	Lubricant
7.	Liquorice, Stevia	Sweetener
8.	Tragacanth, Maize Starch	Binders
9.	Guar Gum	Viscosity Builder
10.	Peppermint Oil	Flavouring Agent

Table 4: Formulation table of herbal effervescent tablets for constipation (22)

Sr. No	INGREDIENTS	F1 (in mg)	F2 (in mg)	F3 (in mg)	F4 (in mg)
1.	Bael	100	100	100	100
2.	Indian Senna	50	50	50	50
3.	Ispaghula	50	50	50	50
4.	Stevia	20	30	10	15
5.	Sodium Bicarbonate	200	200	215	215
6.	Citric Acid	50	50	65	50
7.	Maize Starch	20	10	-	10
8.	Talc	10	10	10	10

IV. CONCLUSION

Constipation is a common gastrointestinal issue that affects people of all ages and backgrounds, leading to a noticeable decline in quality of life. Herbal formulations present promising treatments offering benefits such as quicker absorption, better patient adherence, less side effects and flexible dosing options over the allopathic medicines. Herbal formulations can interact with allopathic medicines or prescription drugs, in a number of ways, which can lead to adverse effects. These formulations provide a safe, effective, and accessible treatment choice, grounded in the long-standing tradition of herbal remedies. As we advance in developing more effective solutions for managing constipation, it will be crucial for healthcare providers, researchers, and the pharmaceutical sector to work together, fostering innovation and enhancing patient care.

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