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REVIEW ARTICLE:- ANTI-DIARRHOEAL ACTIVITY OF *SOYMIDA FEBRIFUGA* BARK EXTRACT

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ABSTRACT

Diarrhoea is one of the leading causes of morbidity and mortality worldwide, especially in developing countries. The search for safe and effective plant-derived anti-diarrhoeal agents has gained momentum due to the limitations and side effects of conventional drugs. *Soymida febrifuga* (Roxb.) A. Juss., belonging to the family Meliaceae, is a traditional medicinal plant widely used in Indian folk medicine. Various parts of the plant, especially the bark, have been reported to possess anti-diarrhoeal, antimicrobial, antioxidant, and anti-inflammatory activities. This review aims to summarize the pharmacological evidence, phytochemical constituents, and traditional uses of *Soymida febrifuga* bark with special emphasis on its anti-diarrhoeal potential. The available literature suggests that the activity may be attributed to a combination of antimicrobial effects against enteric pathogens, antisecretory action through modulation of ion transport, and antioxidant-mediated intestinal protection. Further experimental and clinical studies are necessary to establish its safety, efficacy, and active phytoconstituents.

1. INTRODUCTION

Diarrhoea is characterized by the passage of frequent loose or watery stools, often associated with dehydration and malnutrition. WHO reports diarrhoea as a leading cause of child mortality Worldwide. Current anti-diarrhoeal drugs (loperamide, diphenoxylate, etc.) have limitations such as constipation and toxicity. Medicinal plants are an important source of novel anti-diarrhoeal agents. *Soymida febrifuga* (red cedar, “Rohituka”) is traditionally used in Ayurveda and Siddha medicine for gastrointestinal disorders, fevers, ulcers, and skin diseases. Diarrheal diseases remain a significant public health concern in India, particularly

among children under five years of age. They are the third leading cause of childhood mortality in the country, responsible for approximately 13% of all deaths in this age group.

The prevalence of diarrheal diseases exhibits both seasonal and age-related variations. A study observed an overall period prevalence of 25.2% over a 15-day recall period among children under five. The highest prevalence was during the summer months (42.6%), and the lowest during winter (13.5%). Children aged 6–11 months were most affected, with a prevalence rate of 49.1%.

Causes

A number of diseases and conditions can cause diarrhea, including:

- **Viruses.** Viruses that can cause diarrhea include Norwalk virus, also known as norovirus, enteric adenoviruses, astrovirus, cytomegalovirus and viruses that cause hepatitis. Rotavirus is a common cause of sudden childhood diarrhea. The virus that causes coronavirus disease 2019 (COVID-19) also has been linked to gastrointestinal symptoms, including nausea, vomiting and diarrhea.

- **Bacteria and parasites.** Exposure to certain bacteria, such as Escherichia coli, or parasites through contaminated food or water can lead to diarrhea. When traveling in developing countries, diarrhea caused by bacteria or parasites is often called traveler's diarrhea. Clostridioides difficile, also known as C. diff, is another bacterium that causes diarrhea, and it can occur after a course of antibiotics or during a hospital stay.

- **Medicines.** Many medicines, such as antibiotics, can cause diarrhea. Antibiotics get rid of infections by killing bacteria that cause illness, but they also kill good bacteria that are helpful in the body. This disturbs the natural balance of bacteria in the intestines, leading to diarrhea or an infection such as C. diff. Other medicines that cause diarrhea are anticancer drugs and antacids with magnesium.

2. Botanical Profile of Soymida febrifuga

- **Family:** Meliaceae
- **Common Names:** Red cedar, Rohituka
- **Distribution:** India, Sri Lanka, Myanmar
- **Morphology:** Medium-sized deciduous tree; bark reddish-brown; leaves pinnate; flowers small and greenish; fruit a capsule.

- **Parts used:** Bark, leaves, root, fruit.

3. Traditional Uses

- **Ayurveda:** Used for diarrhoea, dysentery, fever, and liver disorders.
- **Folk medicine:** Decoction of bark used in treating diarrhoea, stomachache, and intestinal infections.

Part used	Traditional use	Phytochemicals Present	Mode of Action (inferred)
Bark	Treatment for diarrhoea/dysentery	Bitter constituents: quassinoids, flavonoids, tannins, glycosides	Astringent, antimicrobial, anti-inflammatory

4. Phytochemical Constituents

The bark of *S. febrifuga* contains:

- Alkaloids
- Tannins
- Flavonoids
- Saponins
- Terpenoids
- Phenolic compounds
- Glycosides

Tannins and flavonoids are mainly responsible for anti-diarrhoeal activity due to their ability to reduce intestinal motility and secretion.

Test	Extracts	
	Aqueous	Ethanol
Alkaloids	+	+
Carbohydrates	+	+
Sugar	-	-
Saponins	+	-
Tannins	+	+
Flavanoids	+	+

5. Pharmacological Studies on Anti-diarrhoeal Activity

5.1 In vivo Studies

- **Castor oil–induced diarrhoea model (rats/mice)**

Ethanolic nd methanolic bark extracts significantly reduced the frequency of diarrhoeal stools and delayed onset of diarrhoea. Anti-diarrhoeal activity was determined by calculating percentage protection using following formula:

Inhibition= $\boldsymbol{MWFC - MWFT / MWFC} \times 100$

MWFC = Mean weight of feces in the control group.

MWFT = Mean weight of feces in the test group.

- **Magnesium sulphate–induced diarrhoea**

Extracts showed dose-dependent reduction in intestinal fluid accumulation.

Group 1: Control

Group 2: Standard (Loperamide 3 mg/kg)

Group 3: 100 mg/kg of MESFB

Group 4: 200 mg/kg of MESFB

Group 5: 400 mg/kg of MESFB

- **Gastrointestinal motility test (charcoal meal method)**

Bark extract inhibited intestinal propulsion, confirming antimotility action.

$$\text{Movement of charcoal} = \frac{\text{Mean distance travelled by charcoal meal}}{\text{Mean length of intestine}}$$

5.2 Possible Mechanisms

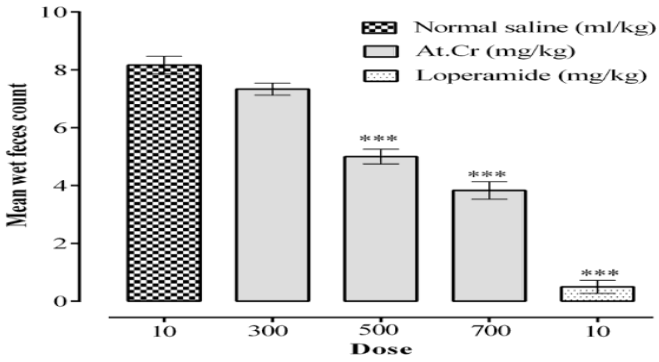
- Inhibition of prostaglandin synthesis → reduces intestinal secretion.
- Tannins → denature intestinal mucosa proteins, reducing peristalsis.
- Flavonoids → inhibit release of autacoids and prostaglandins, prolonging intestinal transit.

6. Toxicity and Safety Profile

- Acute toxicity studies indicate bark extract is safe at therapeutic doses.
- No severe behavioural changes or mortality reported in experimental animals.

7. Comparative Studies

- The anti-diarrhoeal efficacy of *S. febrifuga* bark is comparable to standard drugs like loperamide in animal models.
- However, more clinical studies are required for validation.



Typical Dose: 4 mg initially, then 2 mg after each loose stool; max 8–16 mg/day depending on guidelines. Caution: Not recommended for children under 3–6 years (risk of toxic megacolon), bloody diarrhoea, or high fever. Side effects include constipation, dizziness.

8. Future Perspectives

Need for **isolation of active principles** (e.g., tannins, flavonoids) responsible for anti-diarrhoeal activity. Development of standardized **herbal formulations**. Conducting **clinical trials** for efficacy and safety. Exploring **synergistic effects** with other medicinal plants.

9. CONCLUSION

Soymida febrifuga bark extract possesses significant anti-diarrhoeal activity, likely due to its tannins and flavonoids. Preclinical studies strongly support its traditional use against diarrhoea. With further pharmacological and clinical studies, it has the potential to be developed into a safe and effective natural anti-diarrhoeal drug.

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