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A REVIEW ON THERAPEUTIC BENEFITS OF HELICTERES ISORA: FOCUS ON PHARMACOLOGICAL ACTIVITIES

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ABSTRACT
Helicteres isora L., commonly known as the Indian screw tree, is a well-known medicinal plant widely used in traditional systems such as Ayurveda and Siddha. Various parts of the plant, particularly the fruits and bark, have been employed in folk medicine for the treatment of gastrointestinal disorders including diarrhea, dysentery, and intestinal spasms. Phytochemical investigations reveal the presence of bioactive compounds such as flavonoids, tannins, alkaloids, saponins, and sterols, which are believed to contribute to its pharmacological actions. Experimental studies have demonstrated significant anti-diarrheal activity, attributed to the inhibition of intestinal motility and fluid secretion, as well as antibacterial effects against enteric pathogens. Similarly, antispasmodic effects have been observed in isolated tissue models, suggesting calcium channel blockade and modulation of smooth muscle contraction as possible mechanisms. These findings provide scientific support for the traditional use of H. isora in managing gastrointestinal disorders.

KEY WORDS - *Helicteres isora, Antispasmodic activity, Medicinal plants, Herbal therapeutics , gastrointestinal motility.*

INTRODUCTION
Gastrointestinal (GI) disorders such as diarrhea, dysentery, and intestinal spasms continue to be major global health concerns, particularly in developing countries. Diarrhea is characterized by frequent loose or watery bowel movements, leading to dehydration and electrolyte imbalance, and remains one of the leading causes of morbidity and mortality, especially among children. Intestinal spasms or hypermotility often accompany diarrheal conditions, causing abdominal discomfort and pain. Medicinal plants have long served as valuable sources of therapeutic agents, offering a wide range of bioactive compounds with fewer side effects compared to conventional drugs. Among these, *Helicteres isora* L. (family Sterculiaceae), commonly known as the Indian screw tree, has gained significant attention due to its diverse pharmacological activities. Traditionally, various parts of this plant—particularly the fruits, roots, and bark—have been used in Ayurveda, Siddha, and folk medicine for treating diarrhea, stomach pain, dysentery, and intestinal disorders.

The present review aims to comprehensively summarize the therapeutic benefits of Helicteres isora with special emphasis on its anti-diarrheal and antispasmodic properties. It highlights traditional uses, phytochemical composition, pharmacological findings, and proposed mechanisms of action, while also identifying research gaps and future prospects. This compilation seeks to provide a scientific basis for the traditional claims and to support further development of *H. isora* as a potential herbal remedy for gastrointestinal disorders.

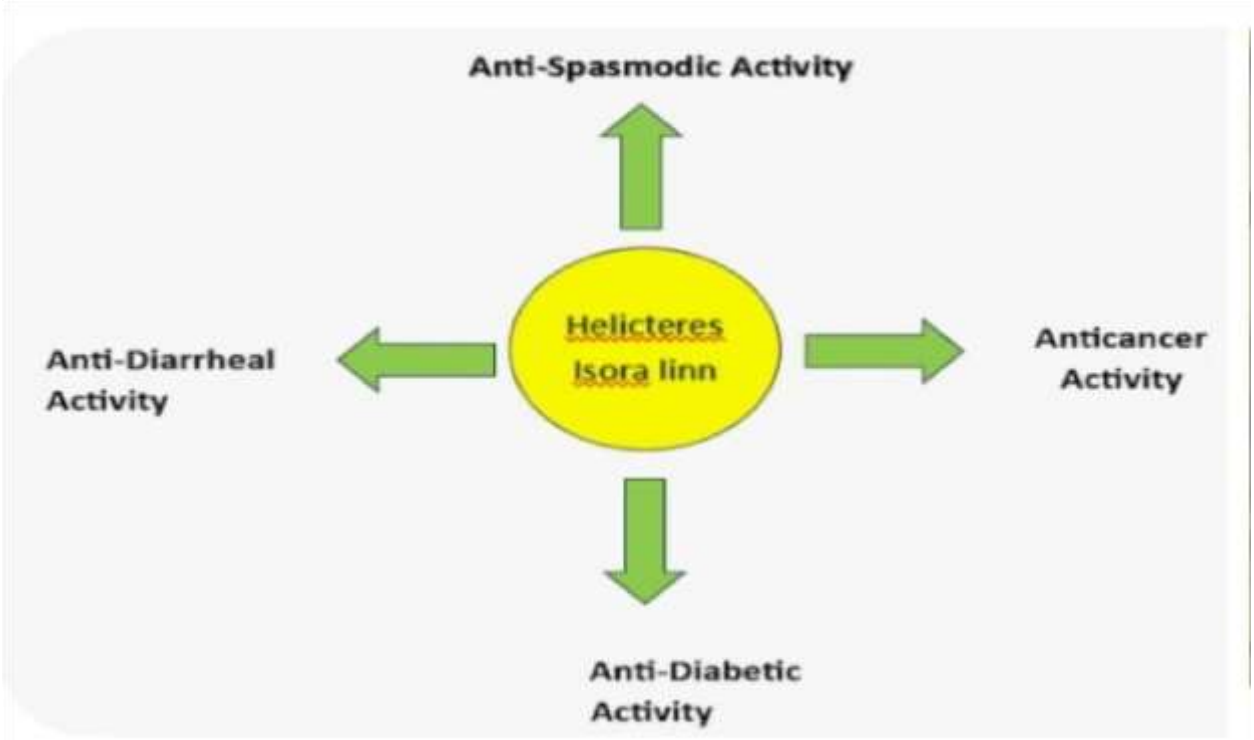
The geographical source of Helicteres isora is tropical Asia, specifically found throughout the Indian subcontinent, southern China, and Southeast Asia, with extensions into parts of Australia. It is particularly common in the dry deciduous forests of central and western India but also grows in other regions like the Malay Peninsula and Java.

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Fig .No 1 Helicteres Isora Linn

Therapeutic Benefits



a. Antidiarrheal Activity

- Extracts from the fruit, bark, and roots of *Helicteres isora* show significant antidiarrheal activity**.**
- Mechanism of action:
  - Reduces intestinal motility (slows peristalsis).
  - Decreases fluid and electrolyte secretion in the intestine.
  - Tannins, flavonoids, and alkaloids in the plant help inhibit prostaglandin synthesis and suppress intestinal hypersecretion.
- Experimental evidence:
  - Studies in animal models (e.g., castor oil-induced diarrhea in rats) showed a reduction in fecal output and intestinal transit.

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b. Antispasmodic Activity

- The plant exhibits smooth muscle relaxant properties on intestinal and uterine tissues.
- Mechanism of action**:**
  - o Likely due to the presence of flavonoids, saponins, and phenolic compounds, which inhibit calcium ion influx in smooth muscles. o Leads to relaxation of intestinal muscles, reducing spasms and abdominal cramps associated with diarrhea and dysentery.

Other reported pharmacological activities:

- Antimicrobial
- Antioxidant
- Antidiabetic
- Hepatoprotective
- Antihyperlipidemic

Botanical Description

Taxonomic Classification

Kingdom	Plantae
Divisions	Angiospermae
Class	Dicotyledonae
Order	Malvales
Family	Malavaceae
Genus	Helicteres

Table No 1

Morphological Characteristics



Fig.No 2 Morphological characteristics

-Height 5 to 8 meters
-Bark-grey
-Leaves-alternatively arranged, hairy, ovate leaves.
-Flowers-brick red/orange red
-Fruits-twisted wit screw at pointed end, green coloured (raw),
- brown/grey in colour (dried)
-Seeds black/brown & highly polished & rhomboid and
-rectangular sized

Geographical Distribution and Habitat

- Native Range**:** Indian subcontinent and Southeast Asia.
- Distribution:
  - o Widely found throughout India, Sri Lanka, Nepal, Bangladesh, Thailand, and Malaysia**.**
- Habitat**:**
  - o Grows in dry deciduous forests, scrublands, and rocky or sandy soils. Common along roadsides, forest margins, and open fields up to 1200 m altitude.

Vernacular (Common) Names

Language Name
Marathi - muradsheng
English - Indian Screw Tree
Hindi - Marorphali, East Indian Screw Tree
Sanskrit - Avartani, Mriga-shinga
Tamil - Valampuri, Idampuri
Telugu- Valumpariki

Medicinal Uses

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a. Gastrointestinal Ailments

- Diarrhea and Dysentery:
  - The most prominent traditional use.
  - Fruit and bark extracts reduce intestinal motility and secretion.
  - Tannins act as natural astringents to prevent dehydration.
- Flatulence and Indigestion:
  - Powdered fruit acts as a digestive stimulant and carminative.
- Intestinal Worms (Anthelmintic):
  - Decoctions used to expel intestinal parasites.
- Gastroenteritis and Abdominal Cramps:
  - Traditional healers prescribe the decoction as an antispasmodic remedy.

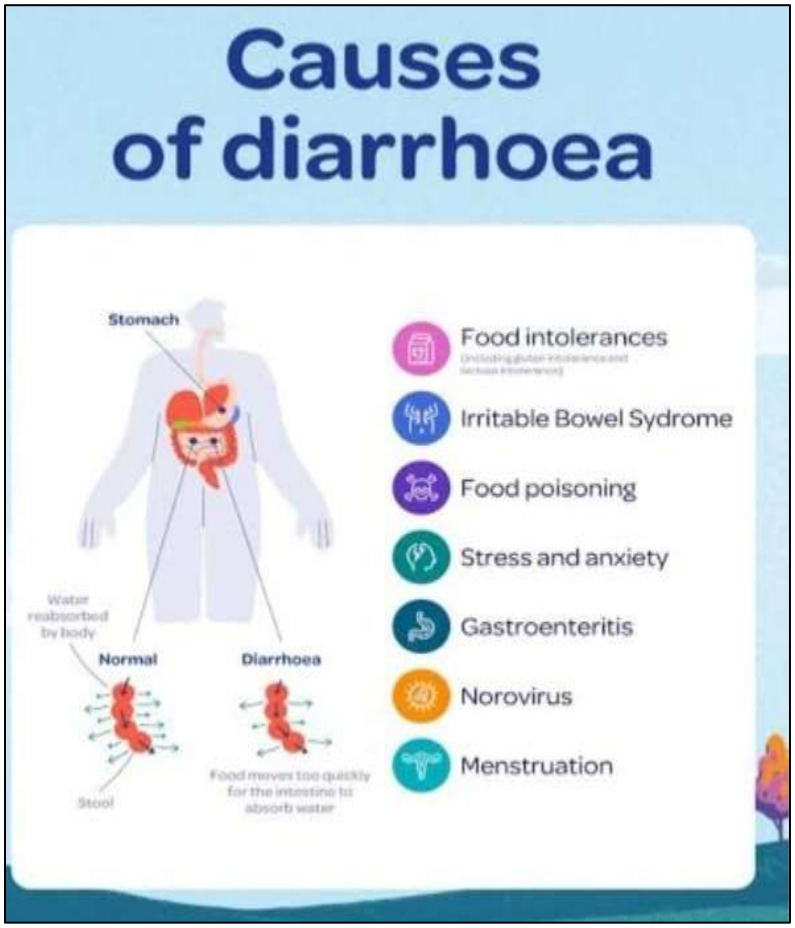
b. Pain and Inflammation

- Anti-inflammatory:
  - Paste or poultice of leaves and bark applied to swollen joints, boils, and inflammatory lesions.
  - Reduces local pain and redness.
- Analgesic:
  - Root and fruit extracts used in folk medicine to relieve abdominal pain and body ache.
- Arthritis and Rheumatism:
  - Decoction taken orally or applied topically for joint stiffness and muscular pain.

c. Other medicinal Uses

- Diabetes:
  - Fruit powder or extract taken to reduce blood glucose levels.
- Respiratory ailments**:**
  - Bark decoction used for cough, cold, and sore throat.
- Skin disorders:
  - Paste of leaves used for eczema, ulcers, and skin eruptions.
- Gynecological uses:
  - Decoction used to regulate menstrual disorders and uterine pain in traditional practices.

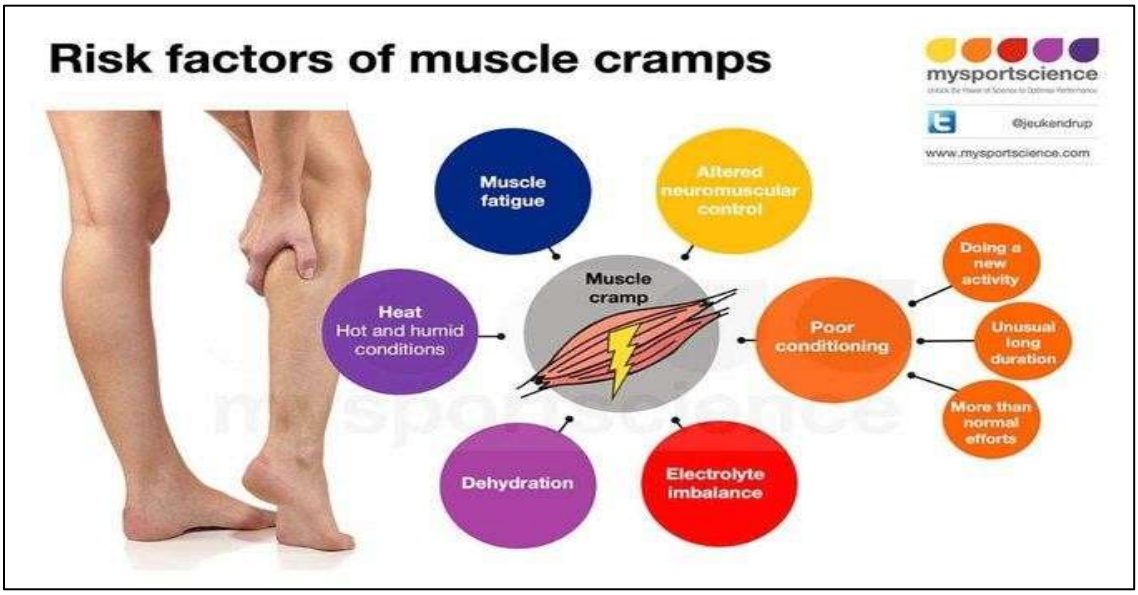
Pharmacological Studies
Anti-Diarrheal Activity



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Helicteres isora has been traditionally used for treating diarrhea, and modern research supports this traditional knowledge.
In vivo studies have demonstrated that extracts of the plant can significantly reduce the number of diarrheal feces in animal models.
The antibacterial activity against enteric pathogens suggests a potential mechanism for its effectiveness against infectious diarrhea.
The presence of bioactive compounds like tannins, polyphenols, and antioxidants also contributes to its overall medicinal properties.

Antispasmodic Activity
Antispasmodic activity, meaning they can relieve muscle spasms and intestinal cramps. Studies have shown this activity both in lab settings (in vitro) and in live animal models (in vivo) by observing its ability to relax smooth muscles and slow down gastrointestinal motility. This activity was observed against spasm-inducing agents like acetylcholine, histamine, and barium chlorideand the drug acts through multiple mechanisms, including blocking muscarinic and histaminic receptors and directly affecting smooth muscle.



2. Antimicrobial Activity
H. isora exhibits broad-spectrum antimicrobial activity against both Gram-positive and Gramnegative bacteria, as well as some fungi.
Extracts & Pathogens: Methanolic and ethanolic extracts have shown strong inhibitory activity against Staphylococcus aureus, Escherichia coli, Pseudomonas aeruginosa, and Candida albicans.

Mode of Action: The antimicrobial effect is likely due to disruption of microbial cell walls, inhibition of protein synthesis, and interference with nucleic acid metabolism, attributed to tannins and saponins present in the plant.This supports its traditional use in treating gastrointestinal infections and skin disorders.

Antidiabetic Activity
Several studies have demonstrated the hypoglycemic and antidiabetic potential of H. isora.

Mechanism: The activity is mainly attributed to the presence of flavonoids, alkaloids, tannins, and phenolic compounds which enhance insulin secretion, glucose uptake, and inhibition of α-amylase and α-glucosidase enzymes.

Experimental Evidence: Ethanolic and aqueous extracts of H. isora fruits have shown a significant reduction in blood glucose levels in streptozotocin- and alloxan-induced diabetic rats, comparable to standard drugs like glibenclamide.

Bioactive Compounds: Betulinic acid, helicteric acid, and isorin have been implicated in pancreatic β-cell regeneration and improved glucose tolerance.

Future Perspectives for Therapeutic Benefits of Helicteres isora

1. **Need for Clinical Trials** o Rigorous human studies to establish safety, efficacy, and optimal dosing for antidiarrhoeal and antispasmodic use.
2. **Standardization of Extracts** o Development of well-characterized, reproducible extracts to ensure consistent therapeutic outcomes.

3. **Molecular Mechanism Studies**
   o Investigate the cellular and molecular pathways underlying antispasmodic and antidiarrhoeal activity.

4.**Bioavailability and Pharmacokinetics Research** o Study absorption, metabolism, distribution, and excretion to optimize dosage forms and improve therapeutic efficacy.

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CONCLUSION

- **Summary of Key Findings:**
  - *Helicteres isora* demonstrates significant antidiarrhoeal and antispasmodic activity in preclinical studies.
  - Acute toxicity is low, and sub-chronic studies show moderate safety at therapeutic doses.
  - Traditional usage and preclinical data support its potential as a natural remedy for gastrointestinal disorders.
- **Significance in Modern Herbal Therapeutics:**
  - Offers a promising herbal alternative or adjunct for managing diarrhoea and intestinal spasms.
  - Encourages integration of standardized extracts into evidence-based phytotherapy after clinical validation.
  - Highlights the need for future research to optimize safety, efficacy, and mechanistic understanding.

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