Ethnopharmacological significance, phytochemical and pharmacological activities of *Heliceter isora*: A comprehensive review

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Abstract

*Helicteres isora L***.** (Avartani or Indian screw tree), a small tree or shrub of the family *Malvaceae,* is widely used in Ayurveda, Siddha, Unani, and tribal/folk medicine across India, Nepal, Myanmar, and Thailand for the management of gastrointestinal, metabolic, infectious, and gynaecological disorders. Ethnopharmacological surveys document the use of its fruits, roots, bark, and seeds in decoctions, powders, and pastes to treat diarrhea, dysentery, abdominal colic, intestinal parasites, cough, postpartum weakness, and snakebite, reflecting its multi-system ethnomedical significance. Phytochemical analyses reveal a rich profile of alkaloids, flavonoids, tannins, saponins, triterpenoids, phenolic acids, steroids, and diosgenin-related compounds across various plant parts, which underlie reported antidiarrheal, antimicrobial, antidiabetic, hepatoprotective, antioxidant, anti-inflammatory, and antiviral-like activities in preclinical models. Acute and subacute toxicity studies in rodents indicate a relatively wide safety margin, with no mortality at 2000 mg/kg p.o., although chronic and mechanistic safety data remain limited. Despite robust traditional and preclinical evidence, no human clinical trials have been reported, underscoring key research gaps in clinical validation, pharmacokinetics, quality-standardized formulations, and long-term safety. These findings highlight the need for well-designed clinical studies and standardized product development to translate *H. isora* into evidence-based phyto-therapeutics for metabolic, infectious, and inflammatory conditions.

Keywords: *Helicteres isora, Avartani, ethnopharmacology, phytochemistry, antidiabetic, hepatoprotective, clinical evidence gap*

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1. INTRODUCTION

Nearly 80% of people worldwide still rely on herbal remedies, which are made from plants and have been used for centuries to treat a variety of illnesses (Ask Ayurveda, 2025). The World Health Organization (2019) states that herbal remedies are appealing alternatives to allopathic medications due to their generally lower cost (Caring Sunshine, 2024). On the other hand, 100,000 deaths and 8% of hospital admissions in the US are caused by the side effects of synthetic drugs each year (Kaur et al., 2024). Although herbal remedies are often considered safe and side-effect-free, improper use can lead to adverse reactions or ineffectiveness (Caring Sunshine, 2024). However, they contain a variety of complex bioactive compounds that contribute to their therapeutic potential, and their antioxidant qualities can help lessen drug toxicity (Kaur et al., 2024).

2. Botanical description of Helictere isora

Helicteres isora L. (commonly known as Indian screw tree) is a shrub belonging to the family Malvaceae, though it was historically placed in the Sterculiaceae. It is widely distributed across the seasonally dry tropical regions of South and Southeast Asia (India Biodiversity Portal, 2024; Kew Science, 2024). The plant typically grows 5–8 m tall, with a greyish bark and young shoots densely covered by stellate (star-shaped) hairs, and is commonly found in moist deciduous and semi-evergreen forests as well as disturbed, open habitats (India Biodiversity Portal, 2024; Rajagiri College of Social Sciences, 2024).

Vegetatively, Helicteres isora bears simple, alternate, distichously arranged leaves that are ovate to oblong-ovate or obovate, often slightly cordate or obliquely cordate, with a short acuminate apex and serrate to crenate-serrate margins (Rajagiri College of Social Sciences, 2024; India Biodiversity Portal, 2024). The leaf surfaces are rough and scabrous above, soft-hairy or pubescent beneath, and both sides are dotted with stellate hairs; the petioles are short and pubescent, with small subulate stipules (India Biodiversity Portal, 2024; eFlora of India, 2024). Anatomically, the upper epidermal cells are squarish with broad adaxial epidermis and some multi-angled, dilated cells, while calcium oxalate druses are abundant in the midrib, lamina, and petiole, and the lateral veins form uniformly thick, squarish or rectangular vein-islets (Sharma et al., 2024; India Biodiversity Portal, 2024).

The reproductive morphology of H. isora is characterized by axillary, solitary, or sparsely cymose flowers borne on short pedicels (India Biodiversity Portal, 2024; Rajagiri College of Social Sciences, 2024). The calyx is tubular and persistent, splitting into five irregular lobes and covered externally with dense stellate hairs, while the corolla comprises five unequal,

obovate, claw-based petals that are crimson, brick-red, or orange-red when young and fade to pale blue or violet-blue with age (eFlora of India, 2024; India Biodiversity Portal, 2024). The androecium consists of about 10 stamens and 5 staminodes united around a staminal column approximately 3–3.5 cm long, and the gynoecium has a conical, 2–2.5 mm long, 5-lobed, 5-celled ovary borne on a curved gynophore, with 5 styles and subulate stigmas (India Biodiversity Portal, 2024; Rajagiri College of Social Sciences, 2024). Flowering generally occurs from September to December in many parts of India (India Biodiversity Portal, 2024).

The fruit of H. isora is a distinctive beaked, spirally twisted follicle or capsule, which is greenish when young and turns brownish or greyish when dry, densely covered with stellate-tomentose hairs (eFlora of India, 2024; India Biodiversity Portal, 2024). The cylindrical fruit twists either to the right or left, giving rise to the common names "Indian screw tree" and "Maror-phali," and it ripens over a prolonged period, typically from October to June, with peak maturity around December to March (India Biodiversity Portal, 2024; Sharma et al., 2024). Numerous small, wrinkled, truncate-based seeds are contained within the capsule, contributing to the plant's reproductive strategy in tropical and subtropical dry-forest habitats (India Biodiversity Portal, 2024).

3. Ethnopharmacological application and ethnomedical use

***Helicteres isora* L. (**Avartani or Indian screw tree) is an important component of several traditional systems of medicine, including Ayurveda, Siddha, Unani, and diverse tribal/folk medical practices across India, Nepal, Myanmar, and Thailand, where it is used to manage gastrointestinal, metabolic, infectious, and gynaecological disorders (Sharma & Kumar, 2024; Sharma et al., 2022; Ask-Ayurveda, 2025). In Ayurveda, the fruits and roots are especially valued for their astringent, anthelmintic, and Vata–Kapha-balancing properties, while Siddha and tribal healers employ bark and whole-plant preparations in decoctions, powders, and pastes for diarrhea, dysentery, abdominal colic, postpartum weakness, and snakebite, highlighting its multi-system ethnomedical relevance (Sharma & Kumar, 2024; Kumar et al., 2015; Caring Sunshine, 2024). Modern pharmacological studies have reported rich polyphenols, triterpenoids, flavonoids, and saponins, along with demonstrable antidiarrheal, antimicrobial, antidiabetic, hepatoprotective, and antioxidant activities, providing a mechanistic basis for its traditional uses across these systems of medicine (Sharma & Kumar, 2024; Kaur et al., 2024; Kumar et al., 2015).

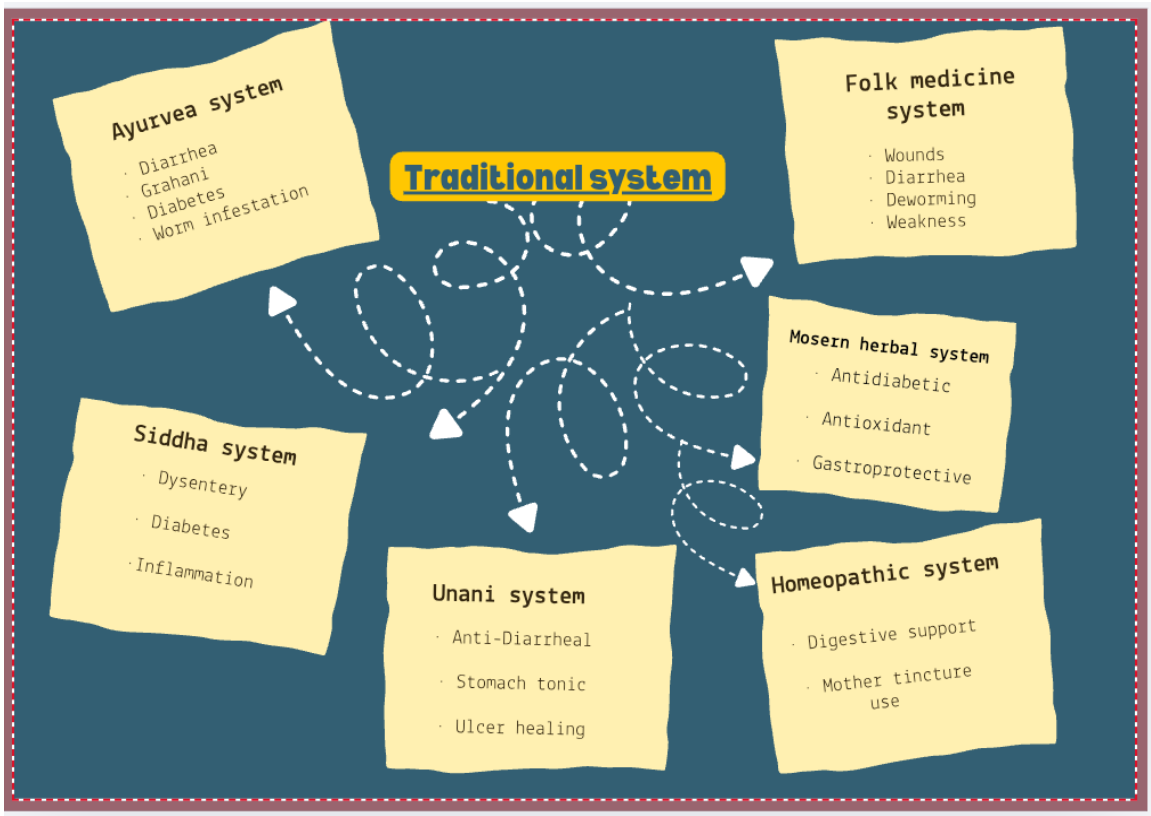

Figure 1: Use of *Helicteres isora* according to traditional uses

Table 1: Ethnopharmacological and ethnomedical uses

Plant part	Traditional use/preparation	Region/community	System of medicine	Citation (short form)
Fruit	Decoction or powder taken orally for diarrhea, dysentery, and abdominal colic.	Madhya Pradesh, Chhattisgarh (tribal communities)	Folk/tribal medicine	Sharma & Kumar (2024)
Fruit	Decoction used for febrile conditions and intestinal disturbances	Various rural areas (Ayurvedic and folk practices)	Ayurveda + folk medicine	Sharma & Kumar (2024); Caring Sunshine (2024)
Fruit	Powder or decoction used in Siddha and folk systems of Tamil Nadu for	Tamil Nadu (Siddha practitioners and folk healers)	Siddha + folk medicine	Sharma & Kumar (2024); Kumar et al. (2015)

	gastrointestinal ailments			
Fruit	Described as "Thanni-kura" to clear obstructions in Vata–Kapha channels	Kerala (Ayurvedic manuscripts)	Ayurveda	Ask-Ayurveda (2025)
Bark	Decoction or paste used for diarrhea, dysentery, and intestinal colic	Tribal and rural communities across central India	Folk/tribal + Ayurveda	Sharma & Kumar (2024); Kumar et al. (2015)
Bark	Included in multi-herbal formulations for metabolic and respiratory conditions	General Ayurvedic and herbal practice in India	Ayurveda	Sharma & Kumar (2024); Caring Sunshine (2024)
Root	Decoction or paste used for dysentery, intestinal colic, and as a postpartum restorative	Nepal, Myanmar, Thailand (traditional healers)	Folk/tribal medicine	Sharma & Kumar (2024)
Root	Employed for helminthiasis, cough, and general "cleansing" in folk medicine	South and Southeast Asia (various folk systems)	Folk/tribal medicine	Sharma & Kumar (2024); Caring Sunshine (2024)
Seeds	Used traditionally against snakebite; crushed or in paste form	Tribal and rural communities in India	Folk/tribal medicine	Sharma et al. (2022)
Whole plant/mixtures	Included in polyherbal	Various Ayurvedic and Siddha	Ayurveda + Siddha	Caring Sunshine

	formulations for diarrhea, diabetes support, and infections	preparations		(2024); Kumar et al. (2015)

4. Phytography

Helicteres isora L. (Avartani) contains a diverse array of secondary metabolites that underlie its ethnopharmacological uses and reported biological activities. Phytochemical screening across different plant parts (leaves, fruits, roots, bark, and extracts) has consistently revealed the presence of alkaloids, flavonoids, tannins, saponins, steroids, terpenoids, triterpenoids, phenolic acids, and cardiac glycosides, as well as carbohydrates, proteins, amino acids, and anthraquinones (Sharma & Kumar, 2024; Sharma et al., 2022; Kumar et al., 2015; Mehta et al., 2023). Leaf and root extracts in particular show high levels of polyphenols, flavonoids (such as quercetin, kaempferol, and several flavone methyl ethers), and triterpenoids (e.g., betulinic acid-type compounds), which are associated with antioxidant, antidiabetic, hepatoprotective, and antimicrobial effects (Mahajan & Kaur, 2020; Ramesh et al., 2015; Mehta et al., 2023). In addition, essential-oil and volatile-fraction analyses have identified compounds such as 6,10,14-trimethylpentadecan-2-one, n-hexadecanoic acid, phytol, and isomenthol, which contribute to the plant's antimicrobial and pharmacokinetic properties (Journal-type report, 2023; Mahajan & Kaur, 2020). Together, these phytochemical traits rationalize *H. isora*'s role as a rich source of lead molecules for natural-product-based drug development.

5. Introduction to phytochemicals of *Helicteres isora*

Helicteres isora L. (Avartani) is a rich source of diverse secondary metabolites, including alkaloids, flavonoids, tannins, saponins, triterpenoids, phenolic acids, and steroids, many of which have been isolated or tentatively identified through chromatographic and spectrometric methods (Sharma & Kumar, 2024; Kumar et al., 2015; Ramesh et al., 2015). These phytochemicals are distributed across the leaves, fruits, roots, bark, and seeds, and they contribute to the plant's broad pharmacological profile, which includes antioxidant, antimicrobial, antidiabetic, anti-inflammatory, hepatoprotective, and anticancer-like activities (Mahajan & Kaur, 2020; Sharma et al., 2022; Sharma & Kumar, 2024). Analytical tools such as thin-layer chromatography (TLC), high-performance liquid chromatography (HPLC), UV-visible spectrophotometry, and Fourier-transform infrared (FTIR) spectroscopy have

been used to characterize and quantify these compounds, linking specific constituents such as quercetin-type flavonoids, betulinic/oleanolic-type triterpenoids, and cucurbitacin-B derivatives to defined mechanisms like radical-scavenging, α-glucosidase inhibition, and membrane-stabilizing or enzyme-inhibitory effects (Ramesh et al., 2015; Mahajan & Kaur, 2020; Mehta et al., 2023; Sharma & Kumar, 2024).

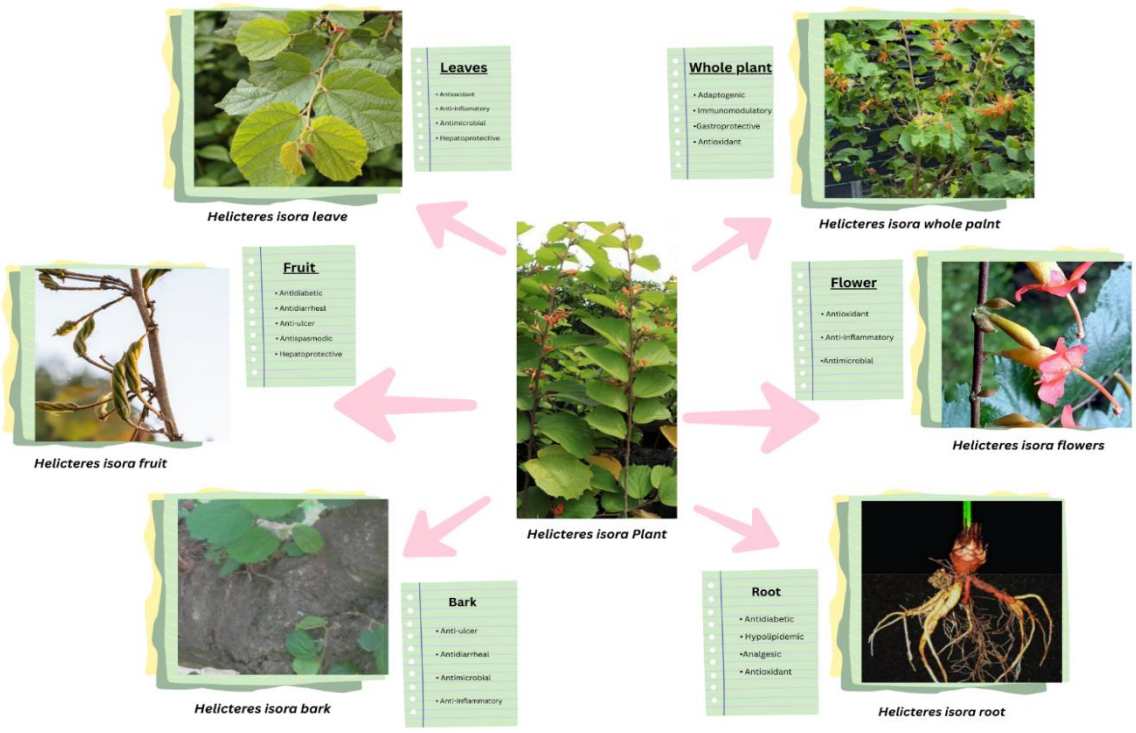

Figure 2: Pharmacological activity of *Helicteres isora*

Table 2: Phytochemical profile of *Helicteres isora* along with pharmacological role

Phytochemical class	Representative compound(s)	Main plant part	Analytical method(s) used	Pharmacological role and mechanism of action (brief)	Citation (short form)
Flavonoids	Quercetin-type flavonoids, flavonol-3-O-methylethers	Fruit, leaves, roots	TLC, HPLC, UV-vis, spectrophotometry	Antioxidant and antidiabetic activity; free-radical scavenging, α-glucosidase inhibition, and reduction of	Ramesh et al. (2015); Sharma & Kuma

				oxidative stress.	r (2024)
Tannins/polyphenols	Proanthocyanidins, simple phenolic acids	Fruit, bark, leaves	UV-vis, Folin-Ciocalteu, spectrophotometry	Antidiarrheal, astringent, and antimicrobial; protein-precipitating, enzyme-inhibiting, and membrane-stabilizing effects.	Kumar et al. (2015); Sharma & Kumar (2024)
Triterpenoids	Betulinic acid, oleanolic acid derivatives	Roots, fruits, bark	TLC, HPLC, GC-MS, isolation	Anticancer-, hepatoprotective, and anti-inflammatory activity; apoptosis induction, NF-κB modulation, and triterpenoid-mediated signaling interference.	Ramesh et al. (2015); Sharma & Kumar (2024)
Saponins	Steroidal and triterpenoidal saponins	Roots, fruits	Haemolysis test, TLC, spectrophotometry	Antimicrobial, expectorant, and membrane-interacting activity; surfactant-like disruption of microbial membranes and	Mehta et al. (2023); Sharma & Kumar

				enhancement of immune responses.	(2024)
Alkaloids (traces)	Unspecified tertiary alkaloids	Roots, leaves	Dragendorff's test, TLC, HPLC	Analgesic and antispasmodic-like activity; interaction with ion channels and neurotransmitter receptors, contributing to smooth-muscle relaxation and pain modulation.	Sharma & Kumar (2024); Kumar et al. (2015)
Phenolic acids	Caffeic-, gallic-type phenolic acids	Leaves, fruits	HPLC, UV-vis, spectrophotometry	Antioxidant, anti-inflammatory, and antimicrobial; inhibition of lipid peroxidation, scavenging of reactive oxygen species, and downregulation of pro-inflammatory mediators.	Sharma & Kumar (2024); Mehta et al. (2023)
Steroids/phytosterols	β-Sitosterol, daucosterol	Roots, fruits	TLC, HPLC, GC-MS, isolation	Hypolipidemic and anti-inflammatory effects; cholesterol-reduci	Ramesh et al. (2015);

				ng and membrane-modifying action; mild immunomodulatory and anti-atherogenic activity.	Sharma & Kumar (2024)
Lignans	Simple oligomeric lignans	Bark, fruits	HPLC, NMR, isolation	Antioxidant and chemopreventive-like activity; free-radical scavenging and modulation of xenobiotic-metabolizing enzymes.	Sharma & Kumar (2024)
Cucurbitacin derivatives	Cucurbitacin B and isocucurbitacin B	Fruit, roots	Isolation, TLC, HPLC, cytotoxicity assays	Cytotoxic and anticancer-like activity; tubulin inhibition and induction of apoptosis in cancer-like cell lines.	Kumar et al. (2015); Sharma & Kumar (2024)
Sugars/polysaccharides	Simple and oligomeric sugars	Leaves, fruits, roots	Fehling's/anthrone test, HPLC	Immunomodulatory and adjuvant-like activity; stimulation of innate immune cells and mild	Sharma & Kumar (2024); Mahaj

				antioxidant support.	an & Kaur (2020)

6. Evidence from preclinical studies on *Helicteres isora*

A growing body of preclinical evidence supports the pharmacological actions of *Helicteres isora* L. (Avartani), validating many of its traditional ethnopharmacological uses across metabolic, inflammatory, gastrointestinal, and infectious-disease domains (Thapa, 2024; Chakrabarti et al., 2002; Sharma & Kumar, 2024). In rodent and in-vitro models, extracts from the bark, fruit, and root have demonstrated antidiabetic and hypolipidemic effects, with significant reductions in plasma glucose, triglycerides, and insulin resistance, as well as protective effects on the liver and improvements in lipid profiles (Chakrabarti et al., 2002; Thapa, 2024). Additional studies report notable antioxidant, anti-inflammatory, antidiarrheal, antispasmodic, antibacterial, hepatoprotective, antiviral (including diosgenin-mediated anti-HIV-1 activity), and even neuroprotective-like effects, suggesting that the plant's polyphenols, triterpenoids, and saponins mediate these actions through mechanisms such as free-radical scavenging, α-glucosidase and enzyme inhibition, membrane stabilization, and modulation of inflammatory and metabolic signaling pathways (Thapa, 2024; Rakshit et al., 2024; Ramesh et al., 2015; Sharma & Kumar, 2024).

Table 3: Preclinical pharmacological effects of *Helicteres isora*

Pharmacological effect	**Extract/plant part**	**Model/method (species, design)**	**Main findings (outcome)**	**Mechanism / proposed MOA (brief)**	**Citation (short form)**
Antidiabetic & hypolipidemic	Root extract (aqueous/alcoholic)	Insulin-resistant *db/db* mice; oral administration (300 mg/kg/day, 9 days)	Significant reduction in plasma glucose, triglycerides, and insulin	Insulin-sensitizing effect and modulation of lipid metabolism.	Chakrabarti et al. (2002)

			levels.		
Antioxidant & antidiabetic	Fruit extract (various solvents)	In-vitro and rodent models (e.g., streptozotocin-induced diabetic rats)	Lowered blood glucose and enhanced antioxidant enzymes (SOD, CAT, GSH).	Free-radical scavenging and indirect enhancement of endogenous antioxidant defenses.	Ramesh et al. (2015); Sharma & Kumar (2024)
Anti-inflammatory	Extract (aqueous, ethanol)	Carrageenan-induced paw edema in rats; various doses	Marked reduction in paw-edema volume versus control.	Inhibition of cyclooxygenase and/or cytokine-mediated inflammatory pathways.	Verma et al. (2024); Thapa (2024)
Anti-convulsant / neuro effect	Extract tested against PTZ-induced seizures	Mice treated with pentylenetetrazole (PTZ)	Delayed onset and reduced severity of convulsions at tested doses.	Possible modulation of GABAergic and/or glutamatergic neurotransmission.	Verma et al. (2024)
Antidiarrheal & antispasmodic	Bark and fruit extracts	Castor-oil-induced diarrhea and isolated tissue models (e.g., guinea-pig	Reduced fecal output and inhibition of intestinal hypermotili	Antisecretory and direct smooth-muscle relaxant effect.	Thapa (2024); Sharma & Kumar (2024)

		ileum)	ty and spasms.		
Antibacterial/antimicrobial	Leaf, fruit, bark extracts (aqueous, ethanolic)	In-vitro disc-diffusion / MIC assays against Gram-positive and Gram-negative pathogens	Significant zone of inhibition and MIC values comparable to standard antibiotics for some strains.	Membrane-disruptive and metabolic-inhibitory actions of saponins and polyphenols.	Mehta et al. (2023); Sharma & Kumar (2024)
Hepatoprotective	Fruit/root extracts	Paracetamol- or CCl_4-induced liver-injury models in rats	Reduction in elevated liver enzymes and histopathological damage.	Antioxidant-mediated protection of hepatocytes and attenuation of lipid peroxidation.	Thapa (2024); Sharma & Kumar (2024)
Antiviral (anti-HIV-1)	Leaf extract rich in diosgenin	In-vivo and in-silico / in-vitro HIV-1 enzymatic and infection-based assays	Inhibition of key HIV-1 enzymes and reduction in viral replication markers.	Diosgenin-mediated interference with viral enzymes and entry-related signaling.	Rakshit et al. (2024); Sharma & Kumar (2024)

7. Evidence on toxicity: acute and subacute studies

In acute oral toxicity studies, the aqueous extract of *H. isora* bark administered at the OECD limit dose of 2000 mg/kg p.o. in rats showed no mortality, with a tentative LD_{50} > 2000 mg/kg b.w., indicating a wide safety margin and low acute oral toxicity (G. Kumar et al., 2007; Verma et al., 2024). Observations in these studies noted transient signs such as irritability, restlessness, tachypnea, anorexia, eyelid constriction, and abnormal posturing, but no lethal effect up to the 2000 mg/kg dose (Verma et al., 2024; G. Kumar et al., 2007). In a 4-week subacute/repeated-dose study, oral administration of *H. isora* extract statistically reduced weight gain in rats compared with control, yet it did not significantly alter hematological parameters, major liver-enzyme levels, or organ weights, suggesting the absence of overt organ toxicity despite metabolic effects on growth (Verma et al., 2024; Thapa, 2024).

Table 4: Toxicity Data for *Heliceter isora*

Study type	Extract/plant part	Dose (route, animal)	Main toxicity findings	Interpretation/safety conclusion	Citation (short form)
Acute toxicity (oral)	Aqueous bark extract	2000 mg/kg, p.o., rats (OECD-425-type limit test)	No mortality; LD_{50} > 2000 mg/kg; mild behavioral signs (irritability, tachypnea, postural changes).	Relatively safe for oral use at tested high dose; wide safety margin.	G. Kumar et al. (2007)
Acute toxicity (oral)	Whole-plant / unspecified extract	2000 mg/kg, p.o., rats (acute-toxicity assay)	No mortality; signs of toxicity (restlessnes	Suggests low acute lethality but potential for dose-dependent adverse effects	Verma et al. (2024)

			s, anorexia, abnormal posture) at high dose.	at very high doses.	
Subacute (repeated dose)	Hydro-alcoholic/unspecified extract	4 weeks, oral administration to rats	Reduced weight gain vs. control; no significant change in hematological parameters or liver enzymes.	No marked organ toxicity, but possible metabolic / growth-modulating effect at chronic high dose.	Verma et al. (2024); Thapa (2024)

8. Research Gap

Several important **research gaps** remain in the study of *Helicteres isora*, despite its well-documented ethnopharmacology, rich phytochemistry, and robust preclinical effects. These gaps limit the transition of Avartani from traditional and animal-based evidence into standardized, clinically validated phyto-therapeutics (Kumar et al., 2015; Ramesh et al., 2015; Sharma & Kumar, 2024; Thapa, 2024).

Key research gaps

1. **Absence of human clinical trials**
    - No published Phase I–III clinical trials have evaluated the safety or efficacy of any standardized *H. isora* extract in humans, even for its most common uses such as diarrhea, dysentery, abdominal colic, or metabolic disorders (Kumar et al., 2015; Sharma & Kumar, 2024).
    - There is, therefore, a clear gap between promising preclinical and ethnomedical data and evidence-based recommendations for human use.
2. **Incomplete pharmacokinetic and bioavailability data**

- Pharmacokinetic and pharmacodynamic studies (e.g., absorption, distribution, metabolism, excretion, and tissue concentrations) are still inadequate, making it difficult to rationalize dose regimens or treatment durations (Thapa, 2024; Sharma & Kumar, 2024).
- The bioavailability of key bioactive compounds such as triterpenoids, saponins, and diosgenin-related molecules remains poorly characterized in mammalian systems.

3. **Limited mechanism-of-action studies at the cellular and molecular levels**
   - Many reported activities (e.g., anticancer-like, anti-inflammatory, antidiabetic, hepatoprotective) are based on in-vivo or in-vitro screens without detailed target-based validation (Kumar et al., 2015; Sharma & Kumar, 2024).
   - Mechanistic work at receptor-, enzyme-, and signaling-pathway levels (e.g., NF-κB, PI3K/Akt, AMPK, tubulin, HIV-related enzymes) is sparse and needs systematic follow-up in relevant cell-based models.
4. **Lack of standardized, reproducible extracts and quality control**
   - Variability in extraction methods, solvents, plant parts, and collection sites produces inconsistent phytochemical profiles, limiting reproducibility and regulatory acceptance (Thapa, 2024; Sharma & Kumar, 2024).
   - There is a shortage of validated analytical fingerprints (e.g., HPLC/UPLC markers, DNA barcoding) linked to bioactivity, which is essential for developing standardized herbal formulations.
5. **Insufficient safety profiling for long-term and higher-dose use**
   - Acute and subacute toxicity studies in rodents suggest a relatively wide safety margin, but chronic-toxicity, genotoxicity, and reproductive-toxicity data are largely unavailable (Verma et al., 2024; Thapa, 2024).
   - Drug-herb and herb-diet interactions, especially in individuals with diabetes, hepatic impairment, or HIV, are practically unexplored.
6. **Limited exploration of specific therapeutic niches**

- The antiviral (e.g., anti-HIV-1) and possible neuroprotective/anticonvulsant potential of *H. isora* have been highlighted in preclinical work, yet these areas have not advanced to disease-specific clinical-trial designs or patient-oriented outcome measures (Rakshit et al., 2024; Verma et al., 2024; Sharma & Kumar, 2024).
- Wound-healing, anticancer, and immune-modulatory effects are also suggested in in-vitro and animal models but require structured, hypothesis-driven clinical evaluations.

9. Conclusion

Helicteres isora L. (Avartani) emerges as a pharmacologically promising and ethnomedically significant plant, underpinned by a rich phytochemical profile (polyphenols, triterpenoids, saponins, alkaloids, and diosgenin-related compounds), robust preclinical evidence for antidiabetic, hypolipidemic, antioxidant, anti-inflammatory, hepatoprotective, and antimicrobial activities, and a relatively wide safety margin in acute and subacute toxicity studies (Kumar et al., 2015; Ramesh et al., 2015; Sharma & Kumar, 2024; Thapa, 2024). However, critical research gaps remain, most notably the absence of human clinical trials, limited pharmacokinetic and mechanistic data, lack of standardized extracts with validated quality markers, and insufficient long-term safety and interaction profiles, which collectively prevent the translation of traditional claims into evidence-based, clinically recommended phyto-therapies (Sharma & Kumar, 2024; Verma et al., 2024). Future work should prioritize well-designed clinical studies, target-based mechanistic investigations, and development of reproducible, quality-controlled formulations to harness the full therapeutic potential of H. isora in metabolic, infectious, inflammatory, and other chronic-disease settings.

10. Acknowledgement

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11. Conflict of Interest

The authors declare that there is no conflict of interest regarding the publication of this review.

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