A review on: Avartani (Helicteres isora)

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# Abstract :

The whole plant of Helicteres isora Linn showed excellent medicinal merits from ancient time. The leaves, seeds, fruits and roots of this plant have been used in Ayurvedic medicine. It has great medicine importance. It have been recommended for the treatment of diarrhoea, dysentery, abdominal colic pain, intestinal parasites. Phytochemicals present in Avartani like gallic acid, caffeic acid, vanillin, and pcoumaric acid. Qualitative phytochemicals screening of, aqueous ethanol extract, pet Ether extract, chloroform extract, ethyl acetate extract, butanol extract of Avartani roots.

Helicteres isora has Pharmacological actions like anti-oxidant, anticancer, antidiabetic, hypolipidemic, antibacterial,

* antiimflammatory,
* hepatoprotective,
* Brain oxidant potency,
* Anti-diarrheal actions

**KEYWORDS:** Avartani, Ayurveda, Helicteres isora Linn., Marodphali, Anti- diarrheal

# Introduction:

The definition of Helicteres is a large genus of tropical trees and shrubs (family Sterculiaceae) with axillary flowers and fruits consisting of five twisted carpels. The origin of Helicteres is NL, fr. Gk heliktēres, pl. of heliktēr anything twisted, fr. helik-, helix spiral. Isora is a Japanese name for boys meaning God of the seashore[1]. Avartani [Helicteres isora Linn. (H. isora)] is a medicinal plant which is used in several diseases. It is commonly known as Marodphali, Marorphali, Enthani etc. due to screw like appearance of its fruit. It is not described broadly in old text of Ayurveda,

i.e. Samhitas and Nighantu. This plant maybe comes from outside so that it is neglected by Ayurvedic authors. In the description of the Ayurvedic plant Murva, Avartani is also confused with Murva, but later it is confirmed with a separate plant rather than Murva (Marsdenia tenacissima

W. & A.). The leaf of Avartani shows similarity with Parushaka (Grewia asiatica Linn.)

1. **Avartani (H. isora):** The botanical name of Avartani is H. isora, which belongs to the family Sterculiaceae. It is commonly known as Murva, Avartani, Avartaphala in Sanskrit, Marodphali, Marorphali, Enthani, Gomathi in Hindi, Kewad, Muradsheng in Marathi, etc (Table 1). The scientific classification of Avartani (H. isora) is shown in Table 2

## Table 1

Name of Avartani in different languages.

## Languages Names

Sanskrit : Murva, Avarta Avartaphala

Hindi Marodphali, Marorphali, Enthani, Gomathi

Marathi Kewad, Muradsheng

Bengal Antmora

Gujarat Maradashingh,

Tamil Balampari

Telugu Guvadarra

Kannada Pedamuri Malayalam Ishwarmue Oriya Murmuriya

English East India screw tree, Indian screw tree

Table 2

Scientific classification of Avartani. Kingdom Plantae

Class Angiosperms Sub-class Eudicots Order Malvales

Family Malvaceae Subfamily Helicteroideae Genus Helicteres

Species H. isore

**Figure 1.** Different parts of Avartani (H. isora). A: A plant of Avartani; B: Flowering twig; C: Stem bark; D: Immature pod; E: A mature flower; F: A leaf; G: Mature pod of Avartani

## Ayurvedic guna (properties) and Ayurvedic karma (action)

The Ayurvedic guna (properties) are given in Table 3. Ayurvedic karma are atisaraghna (anti-diarrheal), sulaprashmana (analgesic), krimighna (wormicidal), raktashodhaka (blood purifier), Mutra-sangrahniya (urine conservative)[3]

## Table 3 : Ayurvedic guna (properties)

Guna Laghu, Ruksha

Rasa Kasaya

Vipaka Katu

Virya Sita

## Folklore:

In Konkan, the fruits are used as a remedy for snake bite. The fruits are used in diarrhoea as well as constipation of new born baby[4]. In the aqueous extract of its

root, one teaspoonful tid is given for 3-7 d for the treatment of dogbite in Utter Pradesh[5]. Tribals of Singbhum district of Bihar use the fruits as an amulet in neck to treat disease of malnutrition, which is locally known as Dubli disease among children[6]

## Phytoconstituents :

* 1. Fruit Satake et al. isolated three new compounds which are 49- O-b -D- glucopyranosyl rosmarinic acid (2), 4,49- O-di-b -D-glucopyranosyl rosmarinic acid

(3) and 2R-O-(49-O-b -D-glucopyranosyl caffeoyl)-3-(4-hydroxyphenyl), lactic acid named as 49-O-b -Dglucopyranosyl isorinic acid (4) were isolated together with rosmarinic acid (1) from the fruit of

H. isora (Sterculiaceae), an Indonesian medicinal plant[7]. The structures of these compounds, including the absolute stereochemistry of (4), were elucidated by spectroscopic analysis and chemical means. Compound (3) had greater scavenging activity against superoxide anion produced with xanthine and xanthine oxidase than rosmarinic acid (1)[7].

## Leaves :

Ramesh et al. resulted in the isolation and characterization of a new flavones methyl ether, 7,4 1 di-o-methyle isoscutellarein

i.e. (5,8-dihydroxy-7,4 1 flavones) along with kaempferol-3-o-galactoside (trifolin) and herbacetin-8-oglucoronide (hibifolin) from the leaves of H. isora[8].

## Stem bark:

Saraswatiibhai led to the identification of choloplast, pigments, phytosterols, hydroxyl carboxylic acid, orangeyellow colouring matter, saponins, phlobotannis, sugar ang lignins[9]

## Seed :

A preliminary study of phytoconstituents of seeds by Nair and Grampurohit showed the presence of phytosterols, fixed oils and fats, phenolic compounds and tannins and amino acid and carbohydrates[10].

## Root ;

Cucurbitacin B and isocucurbitacin B have been isolated from its root[11].

## Pharmacological activity :

* 1. Antioxidant activity Kumar et al. reported the antioxidant and anticancer activity using various solvent extracts (hexane, IPA and acetone) and crude protein[12]. Dot plot assay confirmed the presence of antioxidant activity. Acetone fruit extract of H. isora showed 96.44% strong antioxidant activity compared to hexane, and IPA. Acetone extract exhibited better cytotoxicity against human lung cancer cells (NCI-H460); whereas acetone and crude protein extracts showed activity against reactive oxygen species. The investigation revealed the antioxidant and anticancer activity of H. isora dried fruit extracts[12]

## Hypolipidaemic activity:

Kumar et al. reported that the continuous treatment with the bark extract of H. isora brought down the above lipid parameters in the diabetic rats to almost normal levels[13]. The effect of bark extracts of

H. isora on serum high density lipoprotein, low density lipoprotein, very low-density lipoprotein has been studied. The treatment with H. isora bark extract carried down these lipoproteins in the diabetic rats to nearly normal levels. Cholesterol and phospholipids levels were significantly lowered (P<0.05) in streptozocin induced diabetic rats. But the treatment of H. isora bark extract significantly increased these

erythrocyte cholesterol and phospholipids levels in the diabetic rats, which were normalized after 21 d of treatment. The ratio of cholesterol and phospholipids was significantly higherr (P<0.05) in streptozotocin induced diabetic rats. The treatment of bark extract reversed the increased levels of these lipid ratios and normalized soon after[13]. Boopathy Raja et al. studied that the fruit of H. isora has the active principle to counteract the hyperlipidemic condition occurring in streptozotocin induced diabetic rats[14]

## Antibacterial and antiplasmid activities:

Shriram et al. reported organic extracts of

H. isora as a new and safe plasmid curing agent[15]. These finding resulted in the possibility of a new type of combination between antibiotics and potential drugs effective against plasmid encoded multiple antibiotic resistance. The concentrations of the curing agents used in this study were sub inhibitory since bacteria were already resistant to these concentrations of compound. It can be assumed that bacteria are less likely to develop any mechanism to counter the plasmid curing property of the acetone extract of H. isora[15].

## Cardiac antioxidant and antiperoxidative potency :

Kumar et al. reported that the activities of cardiac antioxidant enzymes were significantly decreased in diabetic control rats[16]. They presented significant increases in the diabetic rats treated with hemagglutination inhibition (HI).

Administration of HI to normal rats increased the antioxidant levels with no other significant differences. The effect produced by HI was comparable with that of tolbutamide. The results show that the antioxidant effect of aqueous extract of HI (200 mg/kg, p.o.) was significantly higher

than that of in the tolbutamide treated rats[16]

## Brain antioxidation potency:

Kumar et al. concluded that in diabetes, brain tissue was more vulnerable to oxidative stress and showed increased lipid peroxidation[17]. The above observation shows that the aqueous extract of bark of H. isora plant possesses antioxidant activity, which could exert a beneficial action against pathologic alterations caused by the presence of free radicals in streptozocin diabetes[17].

## Anticancer activity:

Varghese et al. reported that the drug has a potent action against human breast cancer[18]. The cytotoxic activity of the drug is due to the presence of alkaloids and flavonoids. Our further plan is to isolate and evaluate these active principles and elucidate exact mechanism of action

## Antinociceptive activity:

Venkatesh et al. reported that the aq. ethanol, petroleum ether and chloroform extract showed significant antinociceptive activity. Phytochemical analysis of the active extracts indicated that their major constituents are sterol, triterpenoids (petroleum ether extract), and their glycosides (chloroform and aqueous ethanol extracts) may be responsible for observed pharmacological activity[19].

## Hepatoprotective activity :

Chitra et al. reported that ethanolic root extracts of H. isora demonstrated hepatoprotective activity against carbon tetrachloride induced liver damage in rats[20]. The parameters studied were serum total bilirubin, total protein, alanine transaminase, aspartate transaminase and alkaline phosphatase activities. Results of biochemical studies of blood samples of

CCl4 treated animals showed significant increase in the levels of serum markers and decrease in total protein level reflecting the liver injury caused by CCl4 [20]

## Anti-diarrheal activity:

The fruits are demulcent and astringent and are useful in the gripping of bowels and flatulence of children. The bark is useful in dysentery and diarrhoea[21].

## Wormicidal activity:

The pods are fried and given to children to kill intestinal worms[22]

## 5. Conclusion:

Numerous studies have been conducted on different parts of Avartani (H. isora). A detailed and systematic study is required for identification, cataloguing and documentation of plants, which may provide a meaningful way for promoting traditional knowledge of the medicinal herbal plant.

## Conflict of interest statement

We declare that we have no conflict of interest

## Anti-diarrheal activity

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## Anti-inflammatory activity:

The ethanolic extract of the plant shows remarkable antiinflammatory activity against cyclooxygenase-2(COX-2), an important enzyme produced during inflammation. The hexane fruit extract

shows significant activity against the production of prostaglandin E2 (PGE-2) and tumor necrosis factor-alpha (TNF-α), whereas dichloromethane fruit extract shows a significant inhibitory activity on cyclooxygenase2(COX-2) in Human rectum adenocarcinoma cells (RCM-1) and Human monocytic leukemia cell lin (THP-1 cells)

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## Conclusion:

Avartani is widely used for curing various disease due to its great therapeutic potential. In the developing countries increased cost of medicine as well as their side effects has become burning public health concern.



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