Pharmacognostic and Pharmacological Study of Helicteres isora. Linn. - A Review

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Authors’ contributions
This work was carried out in collaboration among all authors. All authors read and approved the final manuscript.

ABSTRACT

Aim: In this article we compiled the whole plant of Helicteres.isora Linn showed excellent medicinal merits from ancient time belonging to the family Sterculiacea, which commonly known as murud sheng.

Study Design: The Pharmacognostic study i.e. microscopic and macroscopic study with preliminary phytochemical test on different parts of plant performed in a Datta Meghe college of pharmacy,Datta meghe Institute of Medical sciences, Wardha, in collaboration with Balkh university,Mazar-e-Sharif during the period of January 2021 to Septmber 2021.

Methodology: In the preliminary study focus on all pharmacognostic, by microscopic identification,by TLC, HPTLC by fingerprint application and phytochemical test of root extract, stem, leaf and fruit powder from different researchers study, which showed the presence of carbohydrates, protein, alkaloids, cardiac glycoside, flavonoids, tannins, essential oil etc which shows number of medicinal merits

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Results: During the study all investigators investigate, different region shows minute change in organoleptic characterist cis as well as phytochemical constituents and pharmacological study exhibits activities like Fruit showed Antioxidant, Antidiabetic and Antihyperlipidemic activity, Bark extract showed Antihelminctic activity, Root extract as Anticancer.

Conclusion: According to study we conclude that Helicteres Isora Linn whole plant parts as well chemical constituents in every part is effective and used medicinally so further investigations are necessary to find out the active bio active molecules responsible to cure different disorders.

Keywords: Helicteresisora, pharmacognostic study, pharmacological study, phytochemicals.

1. INTRODUCTION

Medicinal plant are used since Ancient times and Helicteres. isora Linn. is one of those plants which consists of various herbal ingredients of Asian medicine, particularly those used in the west. Pharmacological and Pharmacognostical studies of earlier researcher prove its medicinal efficacy [1,2]

Biological source: It consist of whole plant of Helicteres. Isora

Botanical Name: Avartani

Family: Sterculiacea

Vernacular Names

English – screw tree
Sanskrit – Mriga –shinga
Marathi – Murudsheng
Hindi – Marodphali

2. DESCRIPTION

Helicteres.isora Linn, is an large shrub used, specially the root juice of this plant has been used in the treatment of diabetes by several ethic groups in different parts of India. Ethanolic extract of H.isora root caused significant reduction in plasma glucose, triacylglycerol and insulin levels at 300 mg/kg dose after 9 days of administration to insulin resistant and diabetic mice [3]. Fruits are employed in intestinal disturbances such as colic, flatulence and diarrhea. With castor oil, powder of the seeds forms an excellent application in ottrorhea, ulcers in the ear [4,5].

2.1 Ayurvedic Description

Rasa – Kasaya,Gana-lagu , sinighdha, veerya-sheeta , vipak – katu.

Cultivation and Harvesting

Helicteres isora is a gregarious species common in evergreen forests and secondary jungles along roads and forest. It is a tall shrub or a small tree common in central and Western Indian, as far west as Jammu, Sri Lanka and also common on hill slopes, Panchkula (Morni), Yamunanagar (kalesar) [6] Helicteres isora linn is found in relatively dry area upto 300 m altitude, the habitats including teak forests, brushwood and roadsides or simply all over India [7,8].

2.2 Morphological Description

2.2.1 Leaves

simple, alternate, bifarious subsessible, broadly ovate- oblong margin serrate pubescent on both the surface, often lobed. They are 7.5-15.0 cm long, alternate in two opposite rows [9].

2.2.2 Flowers

solitary which appear in the August –December, 1 to 2 in. long, with red reflexed petals turning pale blue when old.

2.2.3 Fruits

1 to 2 in (5-6.3 cm ) long, greenish brown, beaked, cylindrical with spirally twisted carpels, commonly called as migashringa in Sanskrit where the name is derived from ‘Mriga’ meaning ‘Deer’ and ‘shringa’ meaning ‘horn’ [10,11]. Get ripen in March. Helicteres.isora fruits short stalked with rough and twisted brown follicles. Each follicle contains 15-28 brown cubical seeds.

2.2.4 Bark

color of the stem is gray,young parts covered with stellate hairs [9,12]
3. RESULTS AND DISCUSSION

3.1 Pharmacognostic Activity of Helicteres Isora Linn

As per P. Kanthale et al. [1] in their research revealed that they take a fresh fruit dried in shed, extracted by distilled water and go through phytochemical studies they found that the bioactive components i.e. alkaloids, glycosides, flavonoids, tannins, cardiac glycosides, anthraquinones and saponins show application to cure dysentery, abdominal pain, diarrhoea, after doing assay they revealed that it helps to detect the adulteration. In that they did the microscopy of leaf in that they discuss about T. S. of leaf, stomata, trichome on that phytochemical effects observed of Helicteres Isora Linn Fig. 2 shows microscopic characterisitcs, they conclude that secondary biological components present in leaf, fruit, roots and stem showed synergistic pharmacological application [13].

M. Chitra [3] investigate all the microscopic and macroscopic characteristics of leaf part for botanical identification and authentication of Helicteres Isora Linn plant, Macroscopic analysis i.e. external features of plant done as per Kokate et al. and in microscopic study on midrib, lamina, epidermal trichome, vascular tissue, venation pattern, crystal distribution and petiole microscopy studied in article, during examination they suggest that with physical evaluation phytochemical study, quality control and quality assurance study needful for authentication.

S. Pandey [7] give explorer on morphological, phytochemical and morphological study of Helicteres Isora Linn, they call Helicteres Isora Linn is Indian screw tree which shows presence of carbohydrate, saponin, tannin, protein,steroid, anthraquinone glycoside cardiac glycosides, phenolic compound, terpenoid and alkaloidal salt as per D. Tambekar et al. [14] and S. Mahire et al. [15] after extraction of plant M. Bean et al. [16] identified that it contains two cytotoxic compound Cucurbitacin B and isocucurbitacin B, they also discuss bark study, seed, fruit, leaf, root and flower study and all shows plethora amount of chemical constituents which have medicinal activity during investigation.

Fig. 1. Roots and Flower of Helicteres isora Linn
P. Harde et al investigated by doing HPTLC on Olenic acid from extracted from roots of Helicteres Isora Linn researchers procured fresh plant from three different region developed method in methanolic extract which shown in Fig. 3-A and The HPTLC fingerprint graph of all samples against standard observed correlation coefficient on 0.9982 of H. isora scanned at 529 nm. Shown in Fig. 3-C Different region shows minute different percent of chemical constituents

Table 1. Amount of oleanolic acid in the roots of H. isora samples

| Sample     | Location   | %Total sapogenins | %Amount of oleanolic acid |
|------------|------------|-------------------|--------------------------|
| H.isora (root) | Gujarat    | 0.895             | 0.075                    |
|             | Punjab     | 0.944             | 0.076                    |
|             | Maharashtra| 0.753             | 0.020                    |

Fig. 2. 1) T. S. of Stem 2) Stomata upper epidermis 3) Stem vessels 4) Trichome 5) Lower epidermis of Helicteres Isora Linn

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Fig. 3. A- Calibration graph of Olenoic acid, B-Densitometric chromatogram of sapogenin extract of roots of H. isora
3.2 Pharmacological Activity of Helicteres isora Linn

3.2.1 Antidiabetic Activity

R. Sahane et al. [8] investigated the Antidiabetic and Antihyperlipidemic effect of Flavonoid Rich Fraction of Helicteres Isora Linn Fruit On Streptozotocin Induced Diabetic Rats. Administration of flavonoid rich fraction of H. isora fruit orally at the dose of (100, 200, 400 mg/kg), but the 400 mg/kg of H. isora dose showed significant decrease in lipid profile especially triacylglycerol, low density lipoprotein, cholesterol also affected serum glucose level, serum high density lipoprotein, serum albumine, serum triacylglycerol, serum creatinine, serum alkaline phosphatase, serum total protein.

S. Venkatesh et al. [9] studied the Antidiabetic Activity Of Helicteresisora Linn Root. Administration of Aqueous ethanol and butanol extract had shown significant protection and lowered the blood glucose level to normal in glucose tolerance test at the dose of 250 mg/kg of body weight. The percentage protection by aqueous ethanol and butanol extract was found to be 30 and 48% respectively.

3.2.2 Antihyperlipidemic activity

A. Raja et al. [17] estimated the Antihyperlipidemic Activity of Helicteres isora Fruit Extract on Streptozotocin Induced Diabetic Male Wistar Rats. Administration of the fruit extract of Helicteresisora (300 mg/kg of BW) for the period of 45 days resulted in significant reduction in lipid level, total cholesterol, triacylglycerol, phospholipids in diabetic rats.

R. Sahane et al. investigated the Antidiabetic and Antihyperlipidemic Effect of Flavonoid Rich Fraction of Helicteres isora L Fruit On Streptozotocin Induced Diabetic Rats. Administration of flavonoid rich fraction of H. isora fruit orally at the dose of (100, 200, 400 mg/kg), but the 400 mg/kg of Helicteres.isora dose showed significant decrease in lipid profile especially triacylglycerol, low density lipoprotein, cholesterol also affected serum glucose level, serum high density lipoprotein, serum albumine, serum triacylglycerol, serum creatinine, serum alkaline phosphatase, serum total protein.

3.2.3 Antioxidant activity

S. Sharma et al. [18] have shown in-vitro antioxidant activity of pet. ether, methanolic and ethyl acetate extract of helicteres. isora L and there was significant free radicals inhibition.

P.K. Basniwal et al. [19] studied The In-Vitro Antioxidant Activity Of Hot Aqueous Extract Of Helicteresisora. L. Fruits. The Aqueous (hot) extract of Helicteres. isora L exhibit strong antioxidant activity by inhibiting nitric oxide and scavenging superoxide anion and hydrogen peroxide radicle.

3.2.4 Antihelmintic activity

D. Shah et al. [20] investigated the Antihelmintic Activity Of Helicteres Isora L Fruits Extract at various concentration (50 and 100 mg/ml) of aqueous extract, resulting in and shortest time required for paralysis and death of worms.

M. Manke et al. [21] studied the Antihelmintic Potential of Helicteres isora L Bark Extract Against Pheterima Posthuma (Indian adult earthworm). Administration of various extract at concentration of 10, 20, 50 mg/ml, but 50 mg/ml concentration of extract showed better activity with paralysis and death of earthworms.

### Table 2. Phytochemical screening of the Helicteres isora linn. Fruit

| Sr.no | Phytochemicals | Observation | Inference |
|-------|----------------|-------------|-----------|
| 1.    | Carbohydrate   | Red to violet ring at the junction of two liquids was obtained in Molisch’s test | + |
| 2.    | Proteins       | White precipitate obtained in xanthoprotein test | + |
| 3.    | Alkaloids      | Cream coloured precipitate was obtained in Mayer’s reagent | + |
| 4.    | Cardiac glycosides | Yellow, orange to deep red colour was obtained in Baljet reagent | + |
| 5.    | Flavonoid      | Deep blue colour | + |
| 6.    | Tannins        | Blue-green colour was obtained with ferric chloride | + |
| 7.    | Essential oil  | Red colour was obtained in sudan red III test | + |
4. CONCLUSION

In Conclusion as per research of scientist, the pharmacognostic study of parts of plant must for authentication of drug which constituted by number of chemical constituents which shows application on human body, different parts of Helicteres isora Linn showed different pharmacological activities too on different parts of plant. In evaluation of Antioxidant and anticancer by various solvent extracts (hexane, IPA and acetone) and crude protein. Antihyperlipidemic Activity is investigated on fruite, Antidiabetic and Antihyperlipidemic activities also on flavonoids present in fruits, roots also showed antidiabetic activities, cytotoxic activities showed as per research of scientist, antioxidant which present in plant shows anticancer activities was found by estimated research activities overall To conclude, whole plant parts is effectively used medicinally so further investigations are necessary to find out the active bio active molecules responsible to cure different disorders.

CONSENT

It is not applicable.

ETHICAL APPROVAL

It is not applicable.

COMPETING INTERESTS

Authors have declared that no competing interests exist.

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