



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

Swapnali S. Mankar^{1*}, Muh. Younas², Awadhut Pimpale³ and Devyani Awari⁴

¹Department of Pharmaceutical Chemistry, Datta Meghe College of Pharmacy, DMIMSU, Salod, Wardha 442004. India.

²Department of Doctor of Pharmacy, Balkh university, Mazar-e-Sharif 1702. Afghanistan.

³Department of Pharmaceutical Chemistry, Datta Meghe College of Pharmacy, DMIMSU, Salod, Wardha 442004. India.

⁴Department of Pharmacology, Datta Meghe College of Pharmacy, DMIMSU, Salod, Wardha 442004. India.

Authors' contributions

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

Article Information

DOI: 10.9734/JPRI/2021/v33i49A33322

Editor(s):

(1) Dr. Sawadogo Wamtinga Richard, Ministry of Higher Education, Scientific Research and Innovation, Burkina Faso.

Reviewers:

(1) Farah Saeed, Dow University of Health Sciences, Pakistan.

(2) Mustehasan, Central Council for Research in Unani Medicine, India.

(3) Benjamaporn Seephim, Kosumphisai Hospital, Thailand.

Complete Peer review History: <https://www.sdiarticle4.com/review-history/76535>

Review Article

Received 28 August 2021

Accepted 04 November 2021

Published 11 November 2021

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 Sterculiaceae, 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 September 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

Results: During the study all investigators investigate, different region shows minute change in organoleptic characteristics as well as phytochemical constituents and pharmacological study exhibits activities like Fruit showed Antioxidant, Antidiabetic and Antihyperlipidemic activity, Bark extract showed Antihelmintic 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: Sterculiaceae

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 ethnic 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 otorrhoea, ulcers in the ear [4,5].

2.1 Ayurvedic Description

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

• Cultivation and Harvesting

Helicteresisora 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), Yamunagar (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, bifarioussubsessile, 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 mrigashringa 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 characteristics, 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

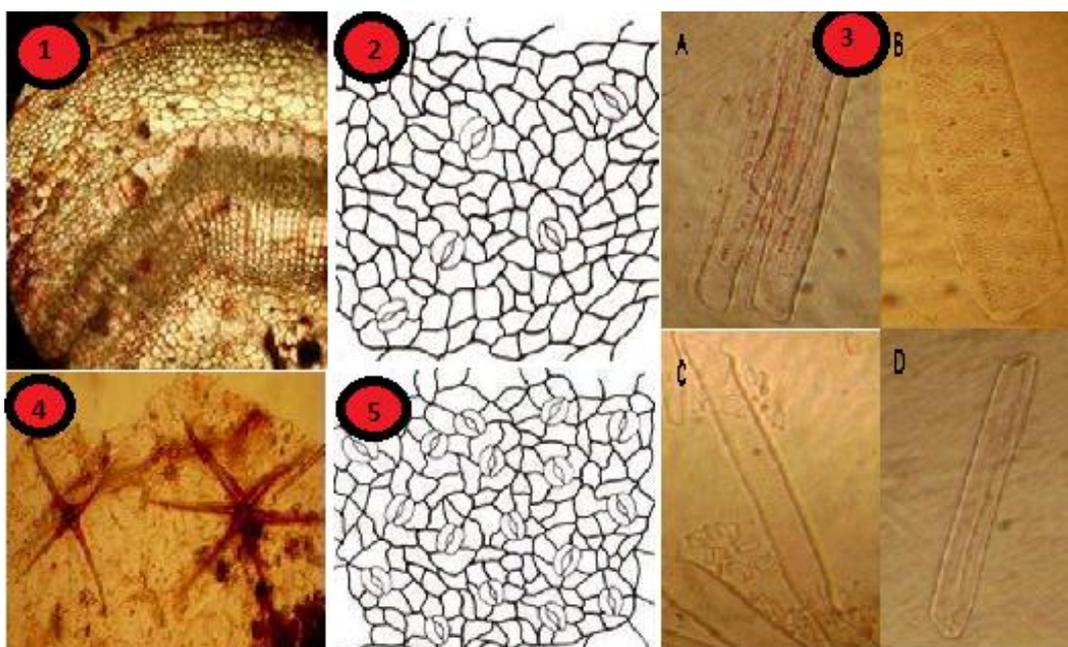


Fig. 2. 1) T. S. of Stem 2) Stomata upper epidermis 3) Stem vessels 4) Trichome 5) Lower epidermis of *Helicteres isora* Linn

P. Harde *et al* investigated by doing HPTLC on Oleanolic 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
<i>H.isora</i> (root)	Gujarat	0.895	0.075
	Punjab	0.944	0.076
	Maharashtra	0.753	0.020

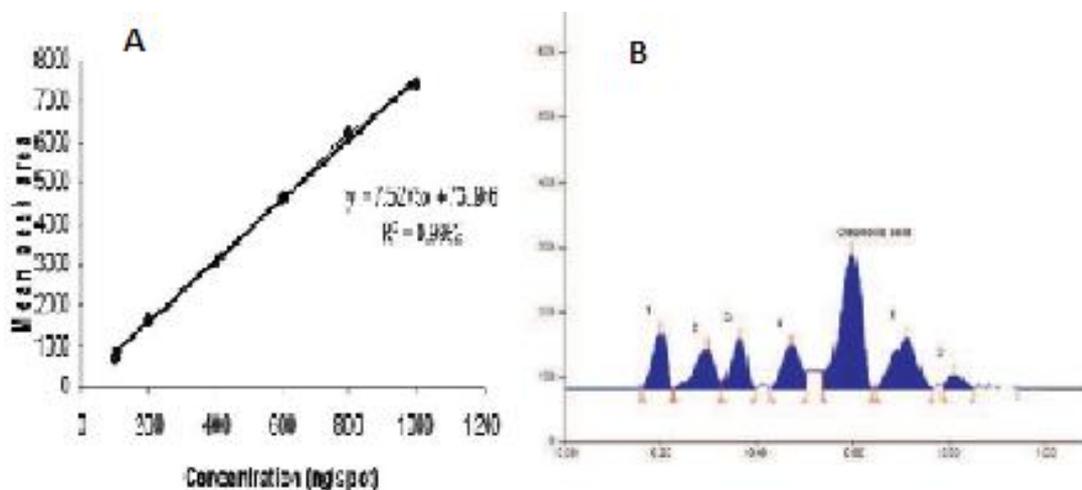


Fig. 3. A- Calibration graph of Oleanolic acid, B-Densitometric chromatogram of sapogenin extract of roots of *H. isora*

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 *Helicteres/Isora* 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 *Helicteres isora* (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 *Helicteres/Isora*. 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* Linn .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 *Pheretima 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	+



Fig. 3C. Plant *Helicteres isora*. Linn

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 Antihyperli pedemic activities also on flavonids 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.

REFERENCES

1. Kanthale PR, Biradar S. Pharmacognostic Study Of *Helicteres isora* L. 2017;103.
2. Muthukumar T, Mary A, Christy V, Ramya RC, Malaisamy M, Sivaraj C, Arjun P, Raaman N and Balasubramanian K, Antioxidant and anticancer activity of *Helicteres isora* dried fruit solvent extracts, J. Acad. Indus. Res.2012;1(3):148-152.
3. Chitra M. Study on pharmacognostical properties of leaf of *Helicteres isora* L. Annals Of Pharmacy And Pharmaceutical Sciences. 2015;6(1&2):8-13
4. Evans WC. Trease And Evans Pharmacognosy. Fifteenth Edition. Published By Harcourt. 2002;480.
5. Agrawal SS, Paridhavi M, Herbal Drug Technology, Published By Universities Press (India) Private Limited, Hyderabad. 2007;98.
6. Trivedi PC. Medicinal plants : Ethrobotanical approach, Publiashed By Agrobios (India) Edited In. 2006;156,282, 941.
7. Pandey S, Patel D, Mishra P, Tiwari R. Morphological, phytochemical and pharmacological study of *Helicteres isora* (Marorphali), International Journal of Research in Pharmacy and Pharmaceutical Sciences 2021;6(3):13-17.
8. Sahane R, Donthula S, Kanade P. Antidiabetic and antihyperlipidemic effect of flavonoid rich fraction of *Helicteres isora* Linn. Fruits On Streptozotocin Induced Diabetic Rats InventiJournal. 2016;268-269.

9. Venkatesh S, Reddy G, Reddy B, Lakshman M. Anti-Diabetic Activity Of *Helicteres isora* Root, Researchgate. 2007;2(4):269.
10. Kapoor LD. Handbook of ayurvedic medicinal plants : Herbal reference library. 202-203.
11. AliShah S, Khan U, Pharmacological activity of *Helicteres isora* L. A Review Article. Journal Of Pharmacy And Pharmaceutical Sciences. 2014;(2):47-49.
12. Sabale P, Grampurohit N, Banerjee K, Gaikwad D, Gadhave M. Recent advances on the phytochemical and pharmacological profile of plant *Helicters isora* Linn. A Review Article International Research Journal Of Pharmacy. 2012;3(4): 14-16 .
13. Gokhale SB, Dr. Kulkarni Y, Dr. Gokhale A, Yele S. Book of experimental pharmacognosy, published By Nirali Prakashan ,First Edition. 2011;2:1.
14. Tambekar DH, Khante BS, Panzade BK, Dahikar S, Banginwar Y. Evaluation of phytochemical and antibacterial potential of *Helicteres isora* L. Fruits against enteric bacterial pathogens, Afr. J. Tradit. Complement Altern. Med. 2008;10,5(3): 290-3.
15. Mahire SP, Patel S N. Extraction of phytochemicals and study of its antimicrobial and antioxidant activity of *Helicteres isora* L., Clin Phytosci. 2020;6:40.
16. Bean M, Ntoun M, Bramsonc D, Hing-Jerc Hang, Jerryl. Mclaughlina, Nd John M. Cassady, cucurbitacin b and isocucurbitacin B: Cytotoxic components of *Helicteres isora*. Journal Of Natural Products. 2018;48(3):500.
17. Raja A, Elanchezhiyan C, Sethupathy S. Antihyperlipidemic activity of helicteresisora fruit extract on streptozotocin induced diabetic male wistar rats. European Review For Medical And Pharmacological Sciences. 2010;14:191-196.
18. Sharma S, et al. Studied the total phenolic and flavonoid content of *Helicteres isora* L in different solvents may be used as a Potential Antioxidant Agent, World journal of pharmacy and pharmaceutical sciences 2017;6(8):1471-1476 .
19. Basniwal PK, Suthar M, Rathore GS, Gupta R, Kumar V, PareekAnd A, Jain D, In-Vitro Antioxidant Activity Of Hot Aqueous Extract Of *Helicteres. Isora* Linn Fruits, Natural Product Radiance. 2009;8(5):483-487
20. Shah D, Somshekhar S, Soloman S. Anthelmintic activity of *Helicteres isora* Linn. fruits extract. World Journal Of Pharmacy And Pharmaceutical Sciences 2013;4(11):788-793.
21. Manke M, Dhawale S, Jamkhande P, Anthelmintic Potential Of *Helicteres isora* bark extract against *Pheretima Posthuma*. Asian Pacific Journal Of Tropical Disease, 2015;5(4):313-315.

© 2021 Mankar et al; This is an Open Access article distributed under the terms of the Creative Commons Attribution License (<http://creativecommons.org/licenses/by/4.0>), which permits unrestricted use, distribution, and reproduction in any medium, provided the original work is properly cited.

Peer-review history:

The peer review history for this paper can be accessed here:
<https://www.sdiarticle4.com/review-history/76535>