

Review Article

HUGONIA MYSTAX: A REVIEW

DEVENDRA S. SHIRODE*, CHITRALEKHA SONAWANE, PYRITAMA POWAR

Dr. D. Y. Patil College of Pharmacy, Akurdi, Pune - 411 044, Maharashtra, India

Email: dssdypcop@gmail.com

ABSTRACT

Medicinal plants have contributed significantly to the ethnotherapeutics and drug development all over the globe, which provides budding leads to discover therapeutically active compounds. From ancient times plants have been used as a renewable source of medicine. Use of medicinal plants or bioactive compounds for the diverse disease is now becoming the solution to numerous health problems in the present world. The genus *Hugonia* L., of family Linaceae, comprises about 40 species in the world. The plant *Hugonia mystax* is a woody evergreen liana distributed throughout India in the dry tropical forest it is also known as Modirakanni and Kamsamaraha. Mostly found in south Indian forest i.e. Kerala and Tamilnadu. The present study brings details of pharmacognostic profile and phytochemical details of *Hugonia mystax*. It is an unexplored medicinal plant in the Indian medicinal system. According to ethnobotanical information, the root powder of *H. mystax* is used as the best antidote for snake or viper bite, anthelmintic, febrifuge, astringent and for the treatment of fever, verminosis, peptic ulcers, intestinal worms. *H. mystax* consists of different phytochemical constituents like steroids, terpenoids, flavonoids, alkaloids, glycosides, phenols, tannins, saponins and carbohydrates.

Keywords: *Hugonia mystax*, extract, dry evergreen forests, root, inflammatory swellings, astringent

INTRODUCTION



Hugonia mystax is a climbing shrub belongs to the family linaceae. It is distributed in dry evergreen forests of India and Srilanka [1]. The plant has different name in different language in India, which are as follows

English- Climbing flax

Malayalam- Modirakkanni, Kaarthotti

Tamil-Mothirakanni, Agori

Telugu- Aravigoranta

Sanskrit- Kamsamaraha

History

Hugonia mystax was first reported by Dalzell & Gibson in Bombay Flora in 1861 based on a collection of the species between Vengurla and Malvan. However, no specific locality has been given by Dalzell. He reported the flowering period of the plant as August, in the rainy season. In the flora of Sindhudurg district (1988), Mr. B.G. Kulkarni reported this species, on the authority of Dalzell[2].

M.R. Almeida has reported this plant on the authority of Dalzell, as well as in the flora of Maharashtra [3].

B.G. Gavade located this species while doing the plant survey of Vengurla taluka for his Ph.D. Degree (2009). He has seen the plant flowering and fruiting during December, in winter season [4].

Plant description

Climbing flax is a rambling, climbing scrub with yellow velvet-hairy twigs. *Hugonia mystax* is an unarmed and evergreen climber with spreading branches. It is sometimes described as a climbing shrub. Branchlets are horizontal, provided with a pair of strong circinate hooks.

Leaves: Leaves are simple, alternate, elliptic-ovate hairless penninerved, glossy, curvaceous and glabrous on both sides is 5-10 cm long and 2-3 cm wide [5].

Flowers: Flowers are yellow, about 2.5 cm across, borne at the ends of the branchlets, on short stalks, clothed with soft yellow hairs. Petals are many times longer than the sepals. The calyx has of 5 sepals which ovate with an acute apex, 7 mm long and 4 mm wide. The corolla contains 5 bright yellow and glabrous, obovate, 2 cm long and 1 cm wide petals. The androecium has 10 stamens. The filaments are 7 or 10 mm long and connate into a 3 mm long tube with ovoid anthers on the free tips of the filaments. The pistil is composed of 5 styles which are slender, 4 mm long with lobed-stigma at the tip. The ovary is globose and glabrous. The buds are covered with short and white-brownish hairs. The flowers are fragrant[5].

Fruit and seed: Fruits are globose fleshy drupes, seeds 2 or 3 compressed. The fruits are green turning red when ripe, 1-1.5 cm across with one seed [5].

Bark: Bark is corky, light brown and transversally cracked. The branchlet has a pair of woody and circinate hooks[5].

Microscopy

Different part of the plant *Hugonia mystax* shows different microscopic structure when transverse sections of these parts examine under the microscope. This microscopic data is helpful for identification and authentication of the plant.

Root: T.S of the root (fig.1) when observed under a microscope it shows the presence of outer layer which has many layer cork and narrow secondary cortex below that it contain parenchymatous cell with starch grain, patches of stone cells and prism shape calcium oxalate crystal. Phloem fiber and secondary xylem are also observed [6].

Stem: section of stem (fig 2) under a microscope shows cork with thick periderm and six layered narrow phelloderm. Secondary phloem consists of outer collapsed phloem and inner non-collapsed phloem. Secondary xylem consists of a solitary diffuse vessel, thick walled fiber, and wide straight rays. Calcium oxalate crystals present in cortex and starch grain present in pith[7].

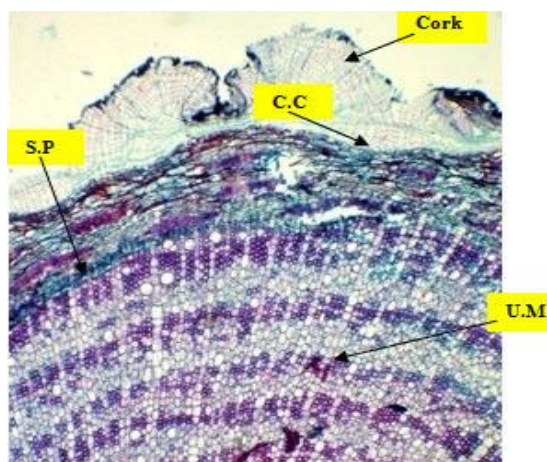


Fig. 1: T.S. of the root- One Sector U.M: Uniseriate medullary ray; C.C: Cork cambium; S.P: Secondary phloem

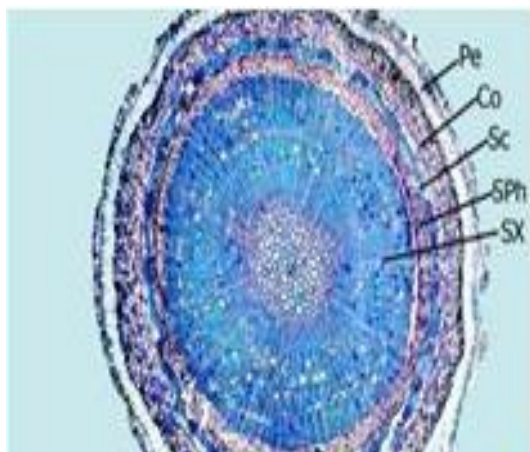


Fig. 2: T.S. of steam. Pe-periderm, Co-cortex, Sc-sclerenchyma, SPh-secondary phloem, SX-secondary xylem

Physico-chemical Property

In Case of root extract total ash is greater than acid insoluble and water soluble ash. Extractive value is higher in water than alcohol [6]. Similarly, the steam extract also shows a higher value for total ash and higher extractive value in ethanol [7].

Phytochemical profile

Two types of the phytochemical present in plants i. e. primary and secondary. Secondary metabolites like alkaloids, tannins etc. are responsible for the pharmacological action. Each part of the plant contains various phytoconstituents in a various amount which are responsible for its effect.

Aerial parts

T. Rajananda Swamy claimed the presence of steroids, terpenoids, flavonoids, alkaloids, glycosides, phenols, tannins, saponins, and carbohydrates and absence of amino acids and oils in aerial parts of *Hugonia mystax* [8].

Leaves

Ethanollic extract of leaves shows the presence of carbohydrates, flavonoids, steroids, saponins and terpenoids. Alkaloid, protein and amino acids are absent in leaf extract [9].

Stem

Three different extracts of steam i.e. petroleum ether, chloroform and ethanol extract were prepared by maceration process and analyzed by gas chromatography- mass spectroscopic method. Total 62 compounds were identified from three extracts out of which some major constituents show activities like antimicrobial, antifungal and antioxidant. These chemicals are di-n-octyl phthalate, 2-methyl-7-nonadecene, and α -D-Glucopyranoside methyl [10].

Bark

G. Rajeshwari et al claimed GC-MS analysis of ethanolic extract of bark shows presence of following bioactive compounds -2- Furan carboxaldehyde, 5- (hydroxyl methyl), β -D-Glucopyranoside, methyl,n-Hexadecanoic acid, 9,12-Octadecadienoic acid (Z,Z), Oleic Acid, Benzaldehyde, 2-hydroxy-6-methyl- [Synonyms: 2,6-Cresotaldehyde], Benzofuran, 2,3-dihydro- [Synonyms: Coumaran], Octadecanoic acid, 1-Docosene and Stigmastan-6, 22- dien, 3,5-dihydro- (1.49) [11].

Root

Petroleum ether, chloroform, ethanol and aqueous extracts of root extracts showed the presence of flavonoids, phenols, saponins, steroids, tannins and terpenoids [12].

Stem, bark, and root

Quantitative determination of total phenolic content, total flavonoid content by RP-HPLC analysis from an ethanolic and methanolic extract of stem root and bark. The result showed that the highest phenolic content was found in ethanol extract of root, the highest amount of flavonoids content was found in the aqueous extract of the root. The highest amount of phenolic acid present was p-cumaric acid [13].

Pharmacological effect

Different parts of the plant show different pharmacological effect due to the presence of different phytochemical. Kirtikar and Basu claimed *Hugonia mystax* is used as anti-inflammatory, febrifuge, astringent and antidote on poisoning. Some other actions are also evaluated from different parts of the plant which are as follows.

Anti-inflammatory action

Ethanolic extract of leaf and bark of *Hugonia mystax* showed strong anti-inflammatory action against carrageenan induced rat paw edema in rats. Maximum inhibition was obtained in dose 500mg/kg after 3 hours [14] while ethanolic extract of leaves showed a maximum response in the dose 200 mg/kg in 4 hours [15].

Anthelmintic action

Ethanolic extract of *Hugonia mystax* leaves used in the range 20 mg/ml, 25 mg/ml, 50 mg/ml, 100 mg/ml to check the anthelmintic activity in Indian adult earthworm. It produced anthelmintic activity in a dose-dependent manner, 100 mg/ml concentration giving the shortest time of paralysis (P) and death (D). It may be due to the presence of tannins [16].

Antioxidant

Ethanolic extract of *Hugonia mystax* leaves at dose 400 mg/kg increases glutathione, SOD, catalase and peroxidase levels significantly in Streptozotocin - nicotinamide induced diabetic rats. This is responsible for protecting the cell from oxidative stress. This effect may be due to the presence of carbonyl group [17]. Petroleum ether, chloroform and ethanol extract of fruits of *Hugonia mystax* were screened for in vitro antioxidant activity by using various models like DPPH radical scavenging activity and total phenolic content. All extract showed an antioxidant effect in dose-dependent manner. Ethanolic extract of fruit has most significant antioxidant activity [18].

Antimicrobial action

Various Endophytic fungal isolates from the leaf *Hugonia mystax* (*Aspergillus* sp., *Chaetomium*

sp., *Curvularia* sp., *Dreschelara* sp., *Fusarium* sp., *Penicillium* sp., *Colletotrichum* sp., *Nigrospora* sp., *Pestalotiopsis* sp. and *Phyllosticta* sp.). Each of this is tested for antimicrobial activity against various pathogens. *Penicillium* sp. and *Colletotri chumsp.* showed highest antimicrobial activity against the tested pathogens [19]. Different solvent extracts of *Hugonia mystax* leaf (hexane, diethyl ether, dichloromethane, ethyl acetate and methanol) were tested for antibacterial activity against different gram positive and gram negative bacteria by disc diffusion method. All extracts showed significant activity against the gram-positive bacteria (*Streptococcus mutans*, *Bacillus subtilis*, *Staphylococcus aureus* and *Micrococcus luteus*) and gram negative bacteria (*Escherichia coli*, *Klebsiella pneumoniae*, *Proteus vulgaris* and *Schigella flexneri*.) [20].

Hepatoprotective action

70% ethanol extract of leaves of *H. mystax* tested for hepatoprotective effect and in vivo antioxidant (GSH and LPO) activity at the dose 200 and 400 mg/kg p.o. in paracetamol and carbon tetrachloride induced hepatotoxicity in rats. Leaf extract significantly reduced the elevated biochemical parameters (SGOT, SGPT, ALP, and bilirubin levels) which are responsible for the hepatoprotective action. [21, 22] Hydro-alcoholic extract of *Hugonia mystax* showed hepatoprotective action in thioacetamide-induced liver toxicity by reducing various biochemical parameters and also showed in vitro antioxidant effect have more activity on hydroxyl free radical than superoxide and DPPH radicals [23].

Antihyperglycemic action

Streptozotocin-nicotinamide induced diabetic rats when pre-treated with ethanolic extract of *Hugonia mystax* leaves Showed reduced level of blood sugar, serum cholesterol, triglycerides, and low-density lipoprotein and increase HDL. It also decreases the elevated level of alkaline phosphatase, SGOT, and SGPT in diabetic rat [24]. Ethanolic leaves extract also reduces the serum glucose and have insulin release effect when administered in diabetic rabbit [25].

Cytotoxic action

Methanolic extract of leaves and steam bark showed cytotoxic effect on three types of cell lines i.e. HeLa cervical cell line, MCF-7 human breast adenocarcinoma cell line and A-549 human lungs adenocarcinoma epithelial cell line [26]. Methanolic extract of leaves and steam bark also increased the mean survival time of DLA tumor bearing mice. The decrease in tumor volume, packed cell volume, and viable cell count in Dalton's Lymphoma Ascites (DLA) bearing female Swiss albino mice [27].

Stock preventive action

Aqueous extract of *Hugonia mystax* has stock preventive activity in a dose-dependent manner in common carotid artery occlusion along with ferric chloride-induced thrombosis model [28].

CONCLUSION

The present study indicates that the plant *Hugonia mystax* is useful for the treatment of various diseases. This plant shows the presence of essential phytochemicals i.e. flavonoids, alkaloids, glycosides, phenols, tannins, saponins and which may responsible for the various therapeutic action. Literature survey also revealed that chemical constituents exhibited pharmacological action. Further study is required to screening others pharmacological effect of plant and identify the phytoconstituent responsible for it.

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