Manuscript Type: Review Article

# An Overview of the Chemistry and Pharmacological Profile of *Heterophragma quadriloculare*.

Hadiya Pathan[1], Dr. Harshavardhan. Mishal[2]*, Mrs. Rashmi Mishal[3]

[1,2]. MET's Institute of D. Pharmacy.

[3]. GES's Sir Dr. M. S. Gosavi College of Pharmaceutical Education and Research, Nashik.

An Overview of the Chemistry and Pharmacological Profile of *Heterophragma quadriloculare*.

**Abstract:**

In this study we have documented the medicinal plant *Heterophragma quadriloculare (Roxb)* used for the treatment of various ailments and especially snake bite victims by the tribals of Khandesh region of Maharashtra state. Snake bite poisoning is a more acute in northern hilly parts of this area. The chemical ingredients reported from this plant belong to the different classes such as alkaloids, tannins, phenols and flavonoids. Commonly known as Waras this plant has number of medicinal uses elaborated in folk medicine literature. Very few pharmacological activities have been verified and demonstrated by different workers till date. This review article is informative and emphasizes pharmacological assessment of its anti snake venom activities.

**Keywords:** *Heterophragma quadriloculare,* Waras, Antimicrobial, Anti diabetic.

**Introduction:**

*Heterophragma quadriloculare* (Roxb) is a medium sized tree of Bignoniaceae family which has been widely used by the tribals of northern hilly regions of Maharashtra state. This region comprises three districts namely, Jalgaon, Dhule and Nandurbar, previously known as Khandesh . Northern part of this Khandesh is occupied with Satpura upland while southern part is occupied by Ajanta satmala ranges, a spur of Western Ghats. *Heterophragma quadriloculare* (Roxb) **(1)**, locally known as 'Waras" is found throughout these ranges. Ethnomedical investigation has revealed that decocation of the bark of this plant is often used by the tribals of Khandesh region viz. Pawara , Bhill, Vasave, Paradhi for treating snake bite

victims. It is also observed that witch doctors and bhagats prescribe this drug for the treatment of various ailments. Patil [2] has reported the use of fresh bark paste by the farmers to treat accidental injuries caused by an axe. Reports are also available about different ethnomedicinal uses of this plant by the tribals of various states. Further pharmacological studies of *H. quadriloculare* (Roxb) in the treatment of various disorders and other activities have been undertaken by many workers.

**Description:** *Heterophragma quadrilocularis* [3] [4] also known as *Bignonia quadrilocularis* is large tree with fragrant rose coloured flowers with big imparipinnate leaves with 7 to 11 leaflets and narrowly oblong woody capsules of about one feet length. Wood is yellowish white and hard. Leaflets and flowers are quite big with rose white or yellow corolla. Fruits are cylindrical with compressed seeds having membranous wings at each end. It is often found in the hilly regions of North Maharashtra state along with the banks of Godawari River and hills of Western Ghats in Maharashtra. Tribals and aborigines of this region mostly use the timber for making furniture and wooden toys. April to May is the flowering and fruiting season of the plant.

**Chemistry:** Various chemical constituents from the different chemical classes have been reported from *Heterophragma quadriloculare* till date. Satani *et al* [5] has reported the presence of carbohydrates proteins, amino acids, fats, alkaloids, steroidal compounds, tannins, falvonoids, terpenoids including Lupeol and Ursolic acid in the leaves of *Heterophragma quadriloculare* leves. Transformation of Lapachol [6] isolated from the heartwood of *H. quadriloculare* to a novel napthaquinone and related compounds is demonstrated by Jassbi *et al.*

**Classical uses and other Pharmacological Studies:** According to many published ethnobotanical and Ayurveda reports it is observed that *H. quadriloculare* is frequently used in folk medicine to treat various ailments nationwide. Decoction of bark is reported to be used in treating snakebite [7] victims. Some workers have also reported topical use of leaf paste for the treatment of snake bite in Morigaon district [8] of Assam, India. Reports are also available about the use of leaf paste in the treatment of *Tinea pedis* [9] infection by tribals of Shahapur and Jawhar forest areas of Maharashtra state. Pandya [10] *et al* have discussed the significance of *Heterophragma quadriloculare* root as an antidote in the tropical woods of Western Ghats of Southern Gujrat state, India. A Thick tar extracted from the wood of *H. quadriloculare* is also reported to be used in the treatment of cutaneous diseases by the tribals of Gujrat forests. [11]

**Antimicrobial Activity:** Acetone extracts of *H. quadriloculare* bark have been reported to possess significant in vitro anti-microbial activity against Klebsiella *pneumoniae* and *Candia albicans.* [12]

**Antidiabetic Activity:** Satani *et al* [13] have studied the anti-diabetic the efficacy of various extracts and specific isolated fractions of *H. quadriloculare* leaves in Streptozotocin induced Type II diabetic rat models successfully. The study has revealed the prominent anti-diabetic activity and the efficacy of leaf extracts of *H qudriloculare* in a dose dependent manner.

**Conclusion:** The extensive ethnobotanical and literature survey has revealed that *Heterophragma quadriloculare* (Roxb) is an important plant with variety of active medicinal constituents. It is used in the form of crude dosage forms in folk medicine by tribals of various states of India since ancient times. The main pharmacological properties indicated its anti-microbial, anti-diabetic and anti-fungal activity. As such this plant is specifically reported to be used by the tribals and farmers for its anti-snake venom activity. Much phytochemical work has already been already been done by the research workers all over the country. Still the research is insufficient and many aspects are unexplored such as different chemical constituents of seeds and bark of the plant and their isolation with reference to its anti-venom activity. This needs due separate attention. Further studies should be carried out to explore the hidden areas and their practical clinical application which can be utilized for the human welfare.

**Fig 1:** ***Heterophragma quadriloculare***

**Fig 2:** ***Heterophragma quadriloculare*** **Pods**

**References:**

1) Cooke T, The Flora of the Presidency of Bombay, 1958, V0l. I & II, Sri Saraswaty Press Ltd. Calcutta – 9.

2) Patil MV, Patil DA, Folk medicine of Nashik district (Maharashtra) India, *Ancient Science of Life* 2001, Vol. XX, 26-30.
3) Gamble JS, Flora of the Presidency of Madras 1957, Sri Saraswaty Press Ltd Calcutta - 9, II$^{nd}$ Ed. 700-701.
4) Mahabale TS, Botany and Flora of Maharashtra- Part IV in Maharashtra State Gazetteers 1987, 323-324.
5) Satani B, Surana V, Shah S, Mishra H, Qualitative and quantitative phytochemical analysis of *Heterophragma quadriloculare* (Roxb) K. Schum leaves *J Pharm Appli Sci* 2016, 3(1), 18-25.
6) Jassbi AR, Singh P, Lamba J, Jain S, Baldwin IT, Tahara S Transformation of Lapachol to a novel Naphthaquinone and Related Compounds, *Z Naturforsch* 2006 61b, 73-77.
7) Bhamre PB, Some anti-venom medicinal plants from tribals of Dhule district Maharashtra, *New Sci J Tech* 1995, 1(1) 35-38.
8) Kalita D, Saikia J, Mukherjee AK, Doley An Ethnomedical survey of traditionally used medicinal plants for the treatment of snakebite in Morigaon district of Assam, India. *Int J Med Arom Plants* 2014, 4(2), 97-106.
9) Kolhe R , Gurav A, Goli P, Rath Chinmay, Mangal AK, Shrikanth N, Influence of Ayurveda in traditional health practice of tribe of Shahapur and Jawhar forest area of Maharashtra *Ethnobotany Research and Applications* 2021 http://dx.doi.org/10.32859/era.22.19.1-36.
10) Pandya IY, Yadav RS, Significance of Tropical woods of Western Ghats of Southern Gujrat, India, *Int J Life Sci Res* 2014, (2)1, 30-42.
11) Kushwaha SPS, Bhatt GD, Tadvi DM, Nandy S, Ecological and Ethnobotanical Characterisation of Gujrat Forests, *Int J Plants Env* 2020, 6(1), 1-19.
12) Gokak IB, Goundi RM, Kurdekar R, Hegde GR, Antimicrobial screening of tree barks of *Heterophragma quadriloculare* (Roxb) K. Schum and *Hymenodictyon obovatum* Wall. from Kumta and Dharwad, Karnataka, India, Int J Med Arom Plants 2012, 2(1), 167-171.
13) Satani BS, Surana VS, Shah SA, Mishra SH, Evaluation of anti-diabetic activity of *Heterophragma quadriloculare* (Roxb) K Schum leaves *IJP* 2017 4(11), 378-383.