

CHAPTER 7

Taxonomy, Traditional Uses, and Bioactive Compounds of *Vallaris solanacea* (Roth ex Roem. & Schult.) Kuntze

Kavita¹, Jyoti Chauhan¹, Balkar Singh², Sweta Mishra³ and Ranjeet Singh^{4*}

¹Department of Botany, Kurukshetra University Kurukshetra, Haryana, India

²Department of Botany, Arya PG College, Panipat, Haryana, India

³Ambika Prasad Research Foundation, Odisha, India

⁴Department of Botany, Pt Chiranji Lal Sharma Government College, Karnal, Haryana, India

*Email ID: ranjeet.s71@gmail.com

DOI:



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ABSTRACT

Vallaris solanacea (Roth ex Roem. & Schult.) Kuntze, a member of the Apocynaceae family, is a medicinally significant plant widely distributed across India, Burma, Thailand, and other parts of South and Southeast Asia. Traditionally, it has been used for treating gastrointestinal ailments, fever, malaria, pain, diabetes, and various skin diseases. Phytochemical investigations reveal the presence of β -sitosterol, flavonoids, tannins, terpenoids, phenolic compounds, saponins, and alkaloids, which contribute to its antioxidant, antimicrobial, anti-inflammatory, antidiabetic, and anticancer properties. Furthermore, its antifungal activity against *Aspergillus flavus* suggests potential applications in food safety and preservation. This review explores the taxonomy, traditional medicinal uses, and bioactive compounds of *Vallaris solanacea*, emphasizing its pharmacological potential and future prospects in drug development.

Keywords: Apocynaceae, morphology, medicinal uses, bioactive compounds

INTRODUCTION

The family Apocynaceae, also known as the dogbane family, includes a diverse range of flowering plants well-recognized for their production of chemical compounds that offer protection against herbivores and pathogens (Boxi 2024). This family comprises approximately 250 genera and 2,000 species, mainly consisting of tropical trees, shrubs, and vines (Greeshma et al. 2020). A distinctive feature of this family is the production of milky sap, along with simple, opposite, or whorled leaves. The significance of Apocynaceae is apparent in its influence on both traditional medicine and modern pharmacy (Wong and Chan 2013).

Vallaris solanacea (Roth ex Roem. & Schult.) Kuntze, belonging to Apocynaceae, is a climbing ornamental shrub that can grow up to 10 meters tall. This plant is native to several Asian countries, including China, India, Pakistan, Sri Lanka, Cambodia, Myanmar, Thailand, Vietnam, and Indonesia. In India, it is primarily found in the Malnad region of Karnataka (Wong and Chan 2013). *V. solanacea* holds significant medicinal value, particularly for treating skin diseases and wound healing. Ethnobotanical studies highlight the traditional uses of *V. solanacea*. The bark is known for its bitter and astringent properties and is chewed by the Kols to fix loose teeth. It is a key ingredient in many Ayurvedic formulations (Greeshma et al. 2020). The milky sap or latex of the plant acts as a mild irritant and is applied to wounds and old sores, promoting faster healing. The stem contains β -sitosterol and exhibits antiulcer and antioxidant activities. The oils extracted from the bark possess anticancer, antimicrobial, analgesic, anti-inflammatory, anti-diarrheal, and cardiotonic properties (Vagdevi et al. 2011; Rout and Bhatnagar 2022).

TAXONOMY

V. solanacea, commonly known as Bread Flower or Hapormali. It is characterized by its climbing habit, often twining, and can grow up to 10 meters tall. The stems are covered with grey, spotted bark that emits a milky latex when wounded. The leaves of *V. solanacea* are large, measuring 12-15 cm in length and 4-6 cm in width. They are ovate-lanceolate with pointed apices, oppositely arranged, and petioled. The leaf surfaces are densely pubescent. The plant produces highly fragrant, white, bowl-shaped flowers, approximately 3 cm wide, with five circular petals and five narrow, pointed sepals that are about 2.5 mm long. These flowers bloom in clusters of 3-6 in the leaf axils, predominantly during the spring, from December to April (Saxena and Bramham 1995; Kumar et al. 2022; Figure 1).



Figure 1: Vegetative parts of *V. solanacea*

TRADITIONAL USES

V. solanacea has been traditionally used in Ayurvedic and folk medicine for treating various ailments. The bark and latex are applied to wounds, sores, and skin infections to promote healing (Wong et al. 2011a). It is Applied externally to treat eczema, ringworm, and skin infections while the plant's extracts are used to relieve gastrointestinal disorders such as indigestion, dysentery, and diarrhea (Urs et al. 2019). The latex is applied externally for intestinal worm infections. It is traditionally used for treating fever and malaria, especially in rural and tribal medicine. The leaf and bark extracts are used to reduce body temperature during febrile conditions (DeFilipps and Krupnick 2018). The oils from the bark have analgesic and anti-inflammatory properties, making them useful in treating joint pain, headaches, and muscle aches. The milky sap is applied topically for pain relief in arthritis and rheumatism. The plant is valued for its antimicrobial and wound-healing properties (Wong et al. 2011b). The bark is chewed by the Kols to fix loose teeth. It is also a popular remedy for inflamed gums and oral ulcers (Wong et al. 2011a). Additionally, *V. solanacea* has been used to manage diabetes, improve heart health, and regulate blood circulation. The leaf extracts have shown antifungal activity against soil-borne pathogens, traditionally used to treat microbial infections. With its rich medicinal potential, this plant continues to be an integral part of traditional healing practices across South and Southeast Asia (Greeshma et al. 2020).

BIOACTIVE COMPOUNDS

V. solanacea is rich in bioactive compounds that contribute to its diverse medicinal properties. The stem and bark contain β -sitosterol, a phytosterol known for its anticancer, anti-inflammatory, and cardioprotective effects (Ahmed et al. 2010). The plant is also abundant in alkaloids, flavonoids, tannins, terpenoids, phenolic compounds, saponins, and steroids, which exhibit antioxidant, antimicrobial, analgesic, and antidiabetic activities (Wong et al. 2013). The milky latex of the plant possesses antifungal and wound-healing properties, making it effective in treating skin infections and sores (DeFilipps and Krupnick 2018). The presence of essential oils and secondary metabolites in the bark provides antimicrobial and antiulcer benefits, while the plant's extracts have shown potential in reducing oxidative stress and modulating immune responses. These bioactive compounds make *V. solanacea* a valuable plant in traditional medicine and pharmacological research (Greeshma et al. 2020).

PHARMACOLOGICAL IMPORTANCE

V. solanacea possesses a wide range of pharmacological properties, making it an important medicinal plant in traditional and modern therapeutic applications. Its anti-inflammatory and analgesic effects have been utilized for treating pain, fever, and inflammatory conditions such as arthritis and muscle soreness (Greeshma et al. 2020; Rout and Bhatnagar 2022). The plant's antioxidant activity, attributed to its rich content of flavonoids, phenolic compounds, and tannins, helps neutralize free radicals, thereby reducing oxidative stress and preventing cellular damage (Das et al. 2014). This property is particularly beneficial in managing chronic diseases such as cardiovascular disorders and neurodegenerative conditions. The antiulcer and gastroprotective potential of *V. solanacea* is well-documented, as its extracts help in reducing gastric acidity, enhancing mucosal protection, and promoting ulcer healing. Its antimicrobial and antifungal properties, especially against *Aspergillus flavus*, make it useful in preventing food contamination and related infections (Rout and Bhatnagar 2022). The plant's milky latex and essential oils possess strong antibacterial properties, aiding in wound healing and skin disease treatment (Greeshma et al. 2020). Furthermore, β -sitosterol and other bioactive compounds present in the plant contribute to its anticancer activity, with studies showing inhibitory effects on various cancer cell lines. The plant also demonstrates antidiabetic properties, as its extracts help regulate blood glucose levels and improve insulin sensitivity (Das et al. 2014). Additionally, its cardioprotective effects support heart health by improving circulation and reducing the risk of hypertension and related disorders (Rout and Bhatnagar 2022). With its diverse medicinal properties, *V. solanacea* holds immense potential in herbal medicine, pharmaceuticals, and nutraceuticals, paving the way for further research and drug development.

CONCLUSION

V. solanacea is a medicinally valuable plant with a long history of traditional use in Ayurvedic and folk medicine. Its diverse therapeutic applications, including the treatment of digestive disorders, inflammatory diseases, skin infections, and metabolic conditions, highlight its pharmacological significance. The plant's bioactive compounds, particularly β -sitosterol and flavonoids, contribute to its antioxidant, anticancer, and antimicrobial properties, making it an important species for herbal drug formulations. Despite its extensive ethnomedicinal use, further pharmacological and clinical studies are required to validate its medicinal claims and explore its

mechanisms of action. *V. solanacea* holds potential for pharmaceutical development, nutraceutical applications, and integrative medicine, making it an important subject for future research.

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