Review article

A review of *Barleria Prionitis* L. A rarely known plant with potential of Phytochemical and Pharmacological assets

➢ ABSTRACT:

Barleria Prionitis Linn., commonly referred to as "*Vajradanti*," is a thorny shrub native to Southern Asia and certain African regions. This herb has a long history of use in traditional medicine systems, particularly Ayurveda, where it has been employed to address a wide array of health concerns including respiratory ailments, fever, liver disorders, and dermatological issues. A comprehensive review of scientific literature underscores the plant's rich phytochemical composition. It is a veritable treasure trove of bioactive compounds, such as tannins, saponins, flavonoids, glycosides, alkaloids, phenols, and specific compounds like β-sitosterol, lupeol, syringic acid, and vanillic acid. This chemical diversity is believed to underpin the herb's broad spectrum of pharmacological activities. Research has unveiled the potential of Barleria Prionitis in addressing a variety of health challenges. Studies have demonstrated its antimicrobial, antiparasitic, anti-inflammatory, antioxidant, and hepatoprotective properties. Furthermore, the herb has shown promise in managing metabolic disorders like diabetes, as well as gastrointestinal issues. Its analgesic and antiarthritic effects have also garnered attention. Despite the compelling evidence supporting the therapeutic efficacy of Barleria Prionitis, its full potential remains largely untapped. Further research is imperative to elucidate the underlying mechanisms of action, optimize extraction processes, and develop standardized formulations. Moreover, clinical trials are necessary to validate the traditional claims and establish the herb's safety and efficacy in modern healthcare. By unlocking the secrets of Barleria Prionitis, researchers and healthcare providers can potentially develop innovative and sustainable therapeutic solutions for a range of diseases

Keywords: Barleria prionitis, Acanthaceae, Antidiabetic, Anthelmintic, Antifertility, Antiviral.

➢ INTRODUCTION:

Plants have served as both sustenance and medicine for millennia, with a vast array of species offering potential therapeutic benefits. India, a global biodiversity hotspot, is home to an

abundance of medicinal plants. The contemporary resurgence of traditional medicine, driven by concerns over synthetic drug adverse effects, has ignited renewed interest in natural products. Barleria Prionitis L., a widely distributed Asian and African plant, holds a significant place in traditional medicine systems for treating various ailments. (*Vasoya, Usha. et,al 2012*) Despite its historical use, comprehensive scientific research into its pharmacological and phytochemical properties remains relatively scarce. (*Portal, India Biodiversity, 2020*). This study aims to comprehensively elucidate the therapeutic potential of Barleria Prionitis L. by conducting a thorough investigation of its phytochemical constituents and pharmacological activities. (*Banerjee, D., et al. 2012*) Specific objectives of this research encompass a detailed phytochemical profiling of the plant, evaluation of its pharmacological properties across multiple biological assays, and establishment of correlations between its phytochemical composition and observed biological effects. (*Shukla, S., et al.2018)* By bridging this knowledge gap, this study contributes to the scientific validation of Barleria Prionitis' traditional medicinal applications and its potential as a promising source of novel therapeutic agents. (*Dheer, R. et al. 2019*) This comprehensive approach will not only enhance our understanding of the plant's pharmacological profile but also lay the groundwork for future studies focused on isolating and characterizing bioactive compounds, optimizing extraction processes, and developing standardized formulations for clinical applications. Ultimately, this research aspires to contribute to the development of safe, effective, and sustainable herbal-based therapies.

- **AIMS AND OBJECTIVES**

To carried out the medicinal, pharmacological, and phytochemical properties of Barleria plant much possible. To explain the traditional uses of Barleria. *prionitis* in different medicinal systems. To provide a detailed botanic description of *Barleria. prionitis*. To discover the phytochemical constituents in *Barleria. prionitis*. To give more information about literature of this plant.

Fig 1: *Barleria Prionitis*

Synonyms: (Singh, Mahesh et al.2005**)**

Table no. 01 Synonyms

Bengali	Kantajinti, Peetjhanti
English	Yellow nail, dye plant, Porcupine flower
Gujarati	Kantashila
Kannada	Karunta, Mullugorante
Malayalam	Chemmulli, Varelmutti
Marathi	Kate koranti, Kholeta, Koranta, Pivala koranta
Telugu	Mullugorintachettu

Barleria Prionitis L. is a shrub typically reaching a height of approximately 1.5 meters. The plant's stems are cylindrical, exhibiting a rigid structure and a smooth texture. Their coloration varies from green to light tan. The leaves are elliptical to ovate in shape, with dimensions ranging from 3 to 10 centimetres in length and 1.5 to 4 centimetres in width. (*Khare, C. P. et al.2007*) A notable feature is the presence of 5 to 20 millimetre long, pale

spines located in the axils of the leaves. The inflorescence is a terminal cluster of tubular flowers, each measuring around 3 to 4 centimetres in length. (*Kapoor, A., et al. 2014*) These flowers are typically vibrant yellow or white, pink in colour. Following pollination, the plant develops ovoid capsules, approximately 8 millimetres long and 5 millimetres wide. These capsules are characterized by a covering of matted hairs and culminate in a sharp, pointed tip. (*Sharma, P., et al.2013*).

The Macroscopic Characters of *Barleria Prionitis* L:

Table No.2 The Macroscopic characters of *Barleria prionitis* Linn. Leaf

Sr.No.	**Macroscopic Parameter**	**Observation**
1	Colour	Dark green on upper surface and pale green on inferior surface
2	Odor	Characteristic
3	Taste	Tasteless
4	Habit	Erect; Perennial shrub
5	Shape	Ovate elliptical
6	Dimensions	3-14 × 1-3.5 cm
7	Apex	Acute or acuminate
8	Margin	Entire
9	Venation	Reticulate
10	Leaf base	Cuneate or Attenuate
11	Petiole	Petiolate

Taxonomical Classification: (*Bhogaonkar, P. Y et, al. 2012***)**

Table no.3: Taxonomical classification

01.	Kingdom	Plantae
02.	Subkingdom	Tracheobionta
03.	Division	Magnoliophyta

04.	Class	Magnoliopsida
05.	Subclass	Asteridae
06.	Order	Scrophulariale
07.	Family	*Acanthaceae*
08.	Genus	*Barleria Species - Prionitis.*
09.	Botanical name	*Barleria prionitisLinn*
10.	Family	*Acanthaceae* (Acanthus family)
11.	Synonyms	Barleria appressa, Barleria coriacea,

- **MATERIALS AND METHODS**

Phytochemical Profile of Barleria Prionitis L.:

Barleria Prionitis L. has emerged as a promising phytotherapeutic agent due to its rich reservoir of secondary metabolites. The aerial parts of the plant, particularly the flowering tops and leaves, have been the primary focus of phytochemical investigations. *(Ghatapanadi, S. R., et, al. 2011).* Potassium salts constitute a significant component of the plant's elemental composition, contributing to its overall therapeutic profile. Beyond these primary metabolites, a diverse array of secondary metabolites has been identified through a combination of traditional phytochemical screening methods and advanced analytical techniques. Flavonoids, alkaloids, tannins, saponins, terpenoids, steroids, essential oils, and phenolic compounds are the major classes of secondary metabolites reported in Barleria Prionitis L. (*Atif, Mohammed et al. 2015*) These compounds have been qualitatively detected using a repertoire of colorimetric and precipitation reactions.

Test for the detection of phytochemical:

Test for Alkaloids:

- Wagner's Reagent: This reagent is a solution of iodine in potassium iodide. A reddish-brown precipitate indicates a positive test for alkaloids.
- Mayer's Reagent: This is a solution of potassium tetraiodomercurate (II). A cream-colored precipitate indicates a positive test for alkaloids.
- Dragendorff's Reagent: This reagent is a solution of bismuth subnitrate in potassium iodide and nitric acid. A reddish-orange precipitate indicates a positive test for alkaloids. Flavonoids by testing with alkaline reagent and Shinoda test.

- Saponins by Foam Test. A persistent foam that lasts for at least 10 minutes indicates the presence of saponins.
- di-nitro phenyhyldrazine test for Terpenoids
- Phytosterol by Liebermann's test and Liebermann–Burchard test.
- Phenolic compounds and tannins by lead-acetate test, FeCl3, and bromine water test.
- Essential oil by Sudan III test.
- Amino acids and proteins by Millon's test, Biuret test, and Ninhydrin test.
- Carbohydrates by Benedict's test, Fehling's test and Molisch test.
- Glycosides by Borntrager's test and legal's test.

➢ OBSERVATION AND RESULT

➢ Activities of Phytoconstituents Isolated from *Barleria Prionitis* L*:*

Plant Part	Phytoconstituent	Class	Possible Activity	Ref.
Aerial part	Barlerinoside	Phenylethanoid Glycoside	Glutathione S-Transferas inhibitory activity	*(Chen, Jian Lu, et al.1998)*
	Lupulinoside	Iridoid Diglucoside	Antioxidant activity	
	7-methoxydiderroside	Secoiridoids	Antioxidant activity, antiviral activity	
	Balarenone	Terpenoid	Glutathione S-transferase and acetylcholinesterase inhibitory activity, antibacterial activity	*(Aneja, Kamal et al 2010)*
	Lupeol	Triterpene	Anti-inflammatory and anti-cancer, glutathione s-transferase and acetylcholinesterase inhibitory activity, antibacterial activity	
	Apigenin7-O-β-D-glucoside	Glycosyloxy Flavone	Antibacterial activity, anti-Inflammatory activity, ant-Oxidant activity	*(Aneja, Kamal et al 2010)*
	Luteolin-7-O-glucoside	Flavone	Antibacterial activity,	*(Chen,*

			antioxidative activity, antimicrobial activity, hepatoprotective activity, anti-inflammatory activity	*Jian Lu, et al.1998)*
	Pipataline	Terpenoid	Enzyme inhibitory activity, antioxidant activity	*(Aneja, Kamal et al 2010)*
	Barlerin	Iridoid Glycosides	Antioxidant activity, antiviral activity, anti-cancer activity, enzyme inhibitory activity, anti-inflammatory activity	*(Chen, Jian Lu, et al.1998)*
	Acetyl Barlerin		Antioxidant activity, antiviral activity, anticancer activity, enzyme inhibitory activity, anti-inflammatory activity	*(Ata, Athar et al. 2011)*
	Shanzhiside methyl ester		Glutathione S-Transferas inhibitory activity, antioxidant activity	

- **Medicinal uses:**

The flowers of this plant have garnered particular attention for their therapeutic properties. They are traditionally employed as a potent remedy for fever, a condition characterized by elevated body temperature. Additionally, the flowers have been used to manage respiratory ailments, which encompass a range of conditions affecting the airways, such as asthma, bronchitis, and the common cold. (Kumari, *Purnima et al. 2013*) Furthermore, the anti-inflammatory properties of the flowers are believed to provide relief from joint pains, a common symptom associated with conditions like arthritis. The root of Barleria Prionitis Linn. has found specific application in oral health care. A mouthwash concocted from the root extract has been traditionally used to mitigate toothache and combat gum diseases, conditions characterized by inflammation and bleeding of the gum tissues. (*Jaiswal, S. K., et al. 2010*).

Beyond the flowers and roots, the entire plant, including the leaves, has been incorporated into traditional Indian medicine. (*Ata, Athar et al. 2011*)

Chemical constituent:

The *Barleria Prionitis* leaves and flowering tops are rich source of potassium salt (*Maji, A. K., et al. 2011*). Preliminary phytochemical analysis of hydro methanolic extract of B. prionotis whole plant indicated presence of flavonoids, glycosides, saponins, tannin and steroids (*Sharma, P., et al. 2013*). Delving deeper into the plant's chemical composition, researchers have successfully isolated specific compounds, including barlarenone, pipataline, lupeol, prioniside A, and prioniside B. These molecules represent promising targets for further investigation and potential drug development. Additionally, chromatographic studies have unveiled the presence of iridinoid glycosides, such as acetyl barlerin, expanding the repertoire of bioactive compounds within this species. Chromatography study of alcohol extract of Barleria prionitis revealed the presence of iridinoid glycosides such as acetyl barlerin (*Jaiswal, S. K., et al. 2010*).

Traditional Uses:

Several traditional uses of this plant are as follows:

- **Disorders of respiratory system**: ***(****Jaiswal, Sunil k., et al. 2010,)*

Dried bark as well as roots are used as expectorant to treat whooping cough, Ash of the whole plant is used for asthma.

- **Pain fever and inflammation**: *(Aneja, Kamal et al 2010)*

Paste of the seeds is used to treat oedema, entire plant is used to treat tonsillitis, joice of the leaves is used to treat fever.

Pharmacological activities of *Barleria prionitis* Linn.:

1. **Anti- inflammatory and anti-nociceptive activity: *(****Jaiswal, Sunil k., et al. 2010)***

50% ethanolic extract of the flower of B. prionitis in experimental animals shows anti-inflammatory as well as anti-nociceptive activity.

2. **Mast Cell Stabilization and Membrane Protection Activity: *(****Maji, A. K., et al. 2011*)**

Whole plant hydro-alcoholic extract of *Barleria prionitis* L. shows mast cell stabilization and membrane protection activity.

3. **Anti-bacterial Activity: *(****Kumari, Purnima., et al. 2013*)**

The methanolic extract from fresh callus cultures of *Barleria prionitis* which was cultured on MS medium fortified with IAA (2.0 mg/l) and BAP (1.5 mg/l) for 2 - 12 weeks was observed

and examined for the potency of their phytochemicals against dental caries pathogens. It kills dental caries producing pathogens and shows anti-bacterial activity.

4. **Anticataract Activity: *(Atif, Mohammed., et al. 2015)***

Oral administration of *Barleria prionitis* significantly delayed the onset and progression of cataract in selenite as well as galactose induced cataract in pups.

5. **Antifertility Studies: *(R.S. Gupta, et, al. 2000)***

Oral administration of root extract of *Barleria prionitis* L. to male rats (100 mg/rat per day) for the period of 60 days did not cause body weight loss. The root extract brought about an interference with spermatogenesis. The round spermatids were decreased by 73.6% (P50.001). No significant change was found in the population of secondary spermatocytes.

6. **Antifungal Activity: *(Pal, Anita, et al. 2018)***

Natural dye extracted from aerial parts of *Barleria prionitis* and different kinds of textile fabrics dyed with the natural dye were investigated for their antifungal activity.

7. **Antimicrobial Activity: *(Panchal, Priyanka et al. 2015)***

Whole plant of *Barleria prionitis* l. whole plant shows anti-bacterial property in ethanolic extract.

8. **Antioxidant Activity: *(Sharma, Piush, et al. 2014)***

Different extract of *Barleria prionitis* L. leaves and stem shows anti-oxidant activity.

9. **Central Nervous System Activity: *(Gangopadhyay, Amites, et al. 2012)***

The 70% ethanol extract of leaves of *Barleria prionitis* Linn (Acanthaceae) in Swiss albino mice. General behaviour was studied using actophotometer. According to the study, it was observed that the test drug has the stimulant activity.

➢ DISCUSSION

The present review underscores the historical and traditional significance of *Barleria prionitis* in addressing a diverse array of health concerns, notably in the Indian medicinal repertoire. The plant's efficacy in managing ailments such as toothache, wounds, and joint pain provides a compelling rationale for contemporary scientific investigation. The phytochemical profile of *B. prionitis*, characterized by the presence of glycosides, saponins, flavonoids, steroids, and tannins, offers a promising foundation for elucidating the plant's pharmacological properties. These bioactive compounds are well-documented for their therapeutic potential in various pharmacological activities, including anti-inflammatory, antioxidant, and antimicrobial effects. Future research should focus on isolating and characterizing the bioactive compounds, conducting pharmacological evaluations, and exploring potential therapeutic applications. By

bridging the gap between traditional knowledge and modern scientific inquiry, the full potential of *B. prionitis* can be realized.

➢ CONCLUSION

The review of *Barleria prionitis* offers valuable insights into the plant's potential as a therapeutic agent. While further research is needed to fully understand its medicinal potential, the conclusions presented in the review provide a strong foundation for future investigations. A multidisciplinary approach involving ethnobotany, phytochemistry, pharmacology, and clinical research is essential to reveal the full therapeutic promise of this underutilized plant. The article is informative and resourceful. It will definitely help the practitioners and researchers to do more works in the field. This study is important in terms of scientific research because of the side effects of modern synthetic drugs.

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