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Review Article

PHYTOCHEMICAL AND ETHENOMEDICINAL VALUES OF *Barleria prionitis* L.: AN OVERVIEW

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ABSTRACT:
In recent years, a no. of plants has been investigated and reported possessing medicinal values. Large body of evidence has accumulated to demonstrate promising potential of plants used in various traditional, complementary and alternative systems. The present review aimed to compile data on phytochemicals and promising ethnomedicinal valuse of *Barleria prionitis* L**.** *(Acanthaceae*) which have been established against various disease models using modern scientific methodologies and tools.

KEY WORDS: *Barleria prionitis*, Phytochemicals, Ethenomedicinal Uses

INTRODUCTION

Barleria prionitis is a branched annual shrub of about 1–3 feet height with flowering and spiny invader. The Shrub is armed with 5-20 mm long spines in leaf axils. Most often found on road sides. Due to presence of spines it is ignored by cattles and it is considered as weed. The *Barleria prionitis* is native to tropical areas of east Africa and Asia, but may be found throughout tropical Asia (India and Sri Lanka) and in South Africa also. The month of August to November is favorable for the flowering and fruiting within the plant. Flowers are yellow or whitish in color, tubular, 3-4 cm long and broad, sessile in leaf axils or in terminal branched spikes. The white flower variety of *Barleria prionitis* is bitter in taste. The roots are tap like and with lateral system. The stem part is generally single, but may have multiple stems or branches near ground. The stem branches are stiff, round, light tan or light gray colored and glabrous. The leaves are elliptic to oblong, upto 3-10 cm long and 1.5-4 cm broad. The base of leaves remain tapering into the petiole. The seeds of *Barleria prionitis* are compressed, with about 8 mm length and 5 mm width. The seeds are flattened and remain covered with matted hairs. The weight of air

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dried seed is about 0.03g/seed. The fruits are ovoid and capsule shaped [1, 2].

Taxonomical Description:

Kingdom	: Plantae
Order	: Lamiales
Family	: Acanthaceae
Genus	: Barleria
Species	: prionitis

Figure 1: *Barleria prionitis*

Regionally Barleria prionitis is also known as Katsareya or Vajradanti (Hindi), Karunta or Koranta (Sanskrit), Ang-karb-Nuu (Thai), Common Yellow Nail Dye Plant (English), Kantajati (Bengali), Kantaasherio (Gujrati), Multi goranta (Telagu) and Shemuli (Tamil & Malayalam).

Traditional Uses:

In medico-botanical survey of villages of Bulandashar, Uttarpradesh, India, rural population uses this plant in cases of asthma and whooping cough; and call *Kala-bansa/Piya-bansa*. They chop green shoots and even roots, burn in an airtight earthen pot, heated until fine powder is obtained, and afterward garlic juice is added to make thick paste. Small tablets are prepared and two tablets with honey are given a day for 4 days or till cure. For infants half the dose twice a day is to be given [3].

The plant juice has been reported to use for treatment of woophing cough in Uttarpradesh and Madhya Pradesh and leaves are used against toothache [4] and rheumatism [5]. The leaves have also been reported to use against Cough ailment [6, 7], and root powder to cure fever [8].

In folk medicine system the *Barleria prionitis* leaves also have been used to treat infection-related ailments [9], against fever and neuralgia[10]. Local Tribal and non-tribal healers of Andhra Pradesh, India prescribe leaves and roots of plant (locally called *Mullagorinta*) with milk or hot water to treat asthma[11]. In Tamil Nadu, root decoction is being used against snakebite [12], and leaves to treat toothache [13]. In Rajasthan the root extract of plant is applied locally on skin to expel out spine from skin. Beside these *Barleria prionitis* leaves have been reported to use in, liver ailments, piles treatment, ulcers and irritation control. The root part is also used to disperse boils and glandular swellings [14].

In Maharashtra, crushed leaves of *Barleria prionitis* are applied on the wound [15]. It was revealed in an ethno-medicinal survey that pills prepared from *Barleria prionitis* are used for massage in combination with coconut oil. These pills give purity, rubefacient and blotch to body[16]. The folk medicinal healers of Bangaladesh use this plant for anti-inflammatory activity, and for treatment of cancer and tumor [17]. In Rajasthan paste of *Barleria prionitis* roots with goat milk is given to treat rheumatic fever. Root, stem or leaves powder with cow milk is taken as remedy for dropsy and liver congestion [18].

Traditional users of medicinal plants of Tamil Nadu, India uses this plant in various forms. Cataract and fever is treated by juice of leaves. Leaves are chewed to relive toothache, dried bark used in treatment of cough. Paste of root is applied to disperse boils and glandular swellings. Some tribal communities use leaves for treatment of piles and to control irritation and stiffness of limbs, sciatica and enlargement of scrotum [19].

Ethanomedicinal survey in, Andhra Pradesh, India, reveals that local residents use this plant to increase vigour by using seed extract daily once for fortnight. The *Barleria prionitis* also

being used in gout, mouth ulcer and oedema **[20]**.

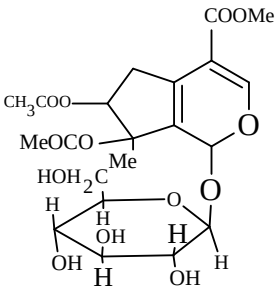
In Orissa the *Barleria prionitis* have been used in cuts, wounds and Malaria[21], and In Gujarat, leaf ash is being used for the treatment of leucoderma by applying with butter[22]. At the same time the use of *Barleria prionitis* fresh leaf paste have also been reported against Scabies in Karnataka **[23]**.

Including all, a number of other ethnomedicinal values of *Barleria prionitis* like spermatogenesis[24], antidiabetic activity[25], anti cataract, as tonic and diuretic [26,27,28,29], against gynecological disorder[30] anti arthritis, antigout and skin diseases, hepatoprotective, antistress, and immunorestorative properties have also been reported.

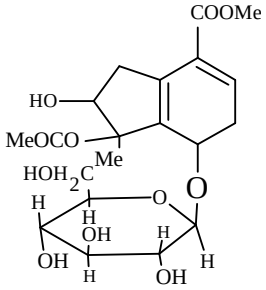
Phytochemical Profile:

Phytochemical screening of leaves and stem of the plant collected from Gujarat, (india) region have revealed the presence of alkaloids, and absence of saponins and tannins **[31]**. Beside this the 6-hydroxyflavones have also been reported in Barleria, which was first reported in the family *Acanthaceae* **[32]**.

The chromatographic separation of the alcoholic extract of the leaves and stems of plant revealed the presence of five Iridoids. Two irridoids were isolated and purified over silica gel. Their structures have been assigned and they were named as acetyl barlerin and barlerin [33]. The presnce of these constituents i.e. barlerin and acetylbarlerin was again confirmed by **Soren**[34].

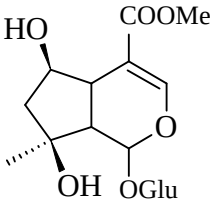


Acetyl Barlerin



Barlerin

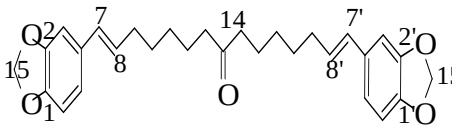
(Chen 1998) identified two iridoid glycosides within the Barleria prionitis; 6-O-Trans-p-coumaroyl-8-O-acetylshanzhiside methyl ester and its Cis isomer in 3:1 mixture, and shown their potent in vitro activity against respiratory syncytial virus (EC50 2.46 microgram/mL, IC50 42.2 microgram/mL). Beside these, iridoid glucoside namely shanshiside methyl ester have also been reported in Hydroalcoholic exrtract of Barleria prionitis.[35]



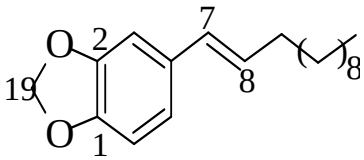
Shanshiside methyl ester

(Bharat 2006) identified and isolated several chemical constituents of *Barleria prionitis* such as acbarlerin, barlerin, β-sitosterol, flavanol glycoside, iridoids and scutellarein-7-neohesperidoside and reported to posses anti-inflammatory potential [36].

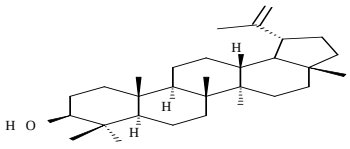
(Athar 2007,) isolated Balarenone, Pipataline, Lupeol, Prioniside A, Prioniside B, and Prioniside C from ethanolic extract of *Barleria prionitis.* The structure activity relationships (SARs) were also studied for AChE inhibitory activity, by preparing its different analogs [37]



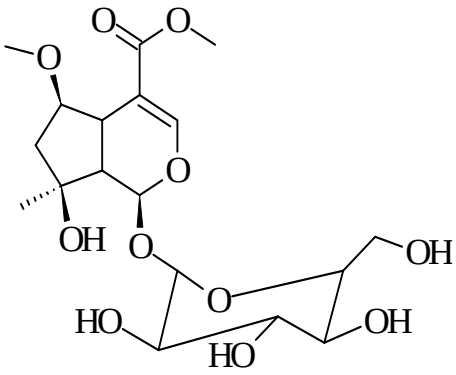
Balarenone



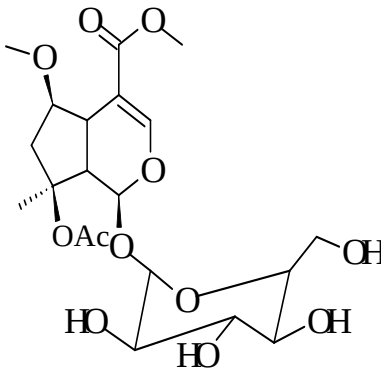
Pipataline



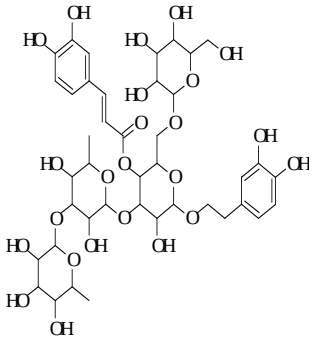
Lupeol



Prioniside A

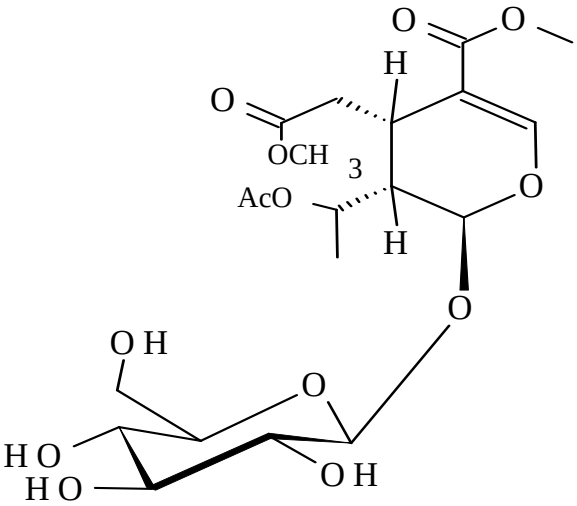


Prioniside B

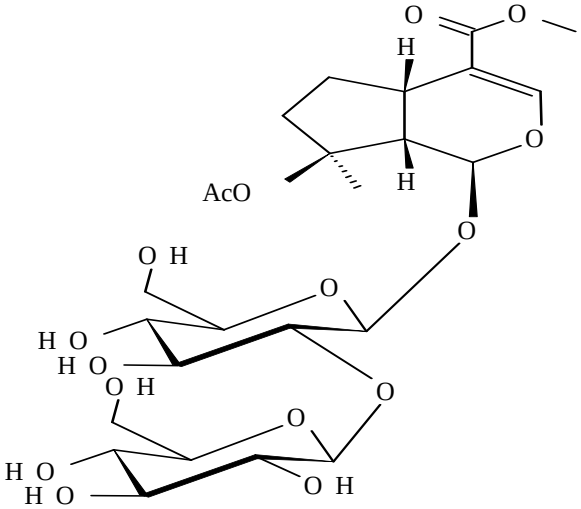


Prioniside C

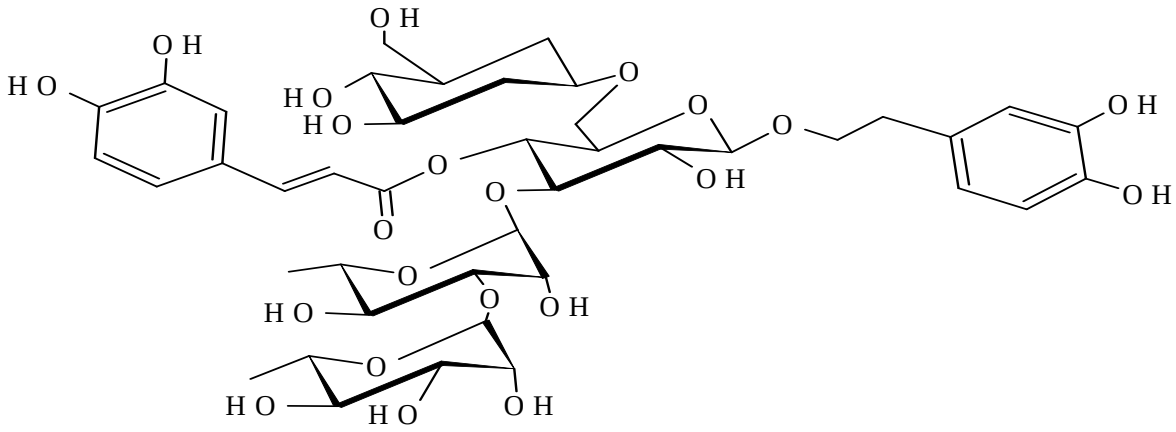
Later on; the air dried aerial parts of *Barleria prionitis* were extracted with 95% ethanol at room temperature and fractionated to yield phenylethanoid glycoside, barlerinoside along with other iridoid glycosides, namely: 7-methoxydiderroside and lupulinoside [38].



7-Methoxydiderroside



Lupulinoside



Barlerinoside

Moreover the presence of alkaloids, glycosides and flavonoids was confirmed in flowers of *Barleria prionitis* with preliminary phytochemicals analysis [39]**.** Later on **Chetan,** evaluated different extracts of *Barleria prionitis* and reported that the petroleum ether extract contain alkaloids, chloroform extract contain flavonoids, ethanol extract contain alkaloids, flavonoids, steroids, saponins, tanin and phenolic compounds. The Aqueous extract was also found abundant in term of flavonoids, saponins, tanins and phenolic compounds**[40]**.

Reported Pharmacological Activity:

- **Anti-fertility Activity:** The significantly reduction in weight of testes, epididymides and ventral prostate along with reduction in total number of spermatids on oral administration of *Barleria prionitis* root extract have been found in male rats. The result data implies the absolute Antifertility effects of root extract, which was supposed due to disturbances in testicular somatic cells functions resulting in the physio-morphological activity of spermatogenesis [41]**.** The similar potential was again confirmed by **Pramod [42].**
- **Antioxidant Activity: Thabrew (2001),** investigated effect of marketed preparation containing *Barleria prionitis* for antioxidant potential on rheumatoid arthritis patients. Study demonstrated that three months treatment of preparation has high antioxidant potential which was shown as initial activities of plasma antioxidant enzymes, superoxide dismutase (SOD), glutathione peroxidase (GPX) and catalase enhanced by 44.6%, 39.8% and 25.2%, respectively [43].
- **Anti-inflammatory Activity:** The Anti-inflammatory activity of *Barleria prionitis* whole plant extract have also been investigated and documented against carrageenan-induced paw edema in rats [44]**.** A recent study showed that anti-inflammatory activity of extracts was clearly related to their inhibition of cyclooxygenase enzymes with subsequent inhibition of prostaglandin synthesis**.** More over; the flower extract was also documented with significant Anti-inflammatory activity against Carrageenan and Cotton pellet induced granuloma in rats [45]**.**
- **Hepatoprotective Activity:** A synergistic pharmaceutical

composition having bioactive fraction of iridoid glucosides obtained from the *Barleria prionitis* was prepared and evaluated against carbon tetrachloride and acetaminophen induced liver toxicit. The result data indicate significant Hepatoprotective value of *Barleria prionitis* [46]**.** Later on; **Singh (2005)** also demonstrated the similar activity[47].

- **Antimicrobial Activity:** The antimicrobial activity of the different parts of *Barleria prionitis* has been reported. At some extent; antifungal effect was also found. The antimicrobial activity of the plant extracts was dose dependant and varied with the type and concentration of the extract as well as type of microbial species[48]**.** Later on; the activity was again confirmed on isolated compound balarenone.
- **Anthelmintic Activity:** The *Barleria prionitis* have been investigated and reported for anthelmintic potential against *Pheretima posthuma* worms. The activity was found in dose dependant manner, giving very short time of paralysis and death with 100 mg/ml concentration [49]**.**
- **Anti Dental Decay Activity:** Crude extract of *Barleria prionitis* have showen good activity against dental caries causing due to oral pathogens where modern antibiotic therapy has failed, so crude extracts may be used to treat the bacterial oral infections caused by *Bacillus sp.* which was shown comparable inhibition zone with standard antibiotic drugs used to treat oral infections and the fungal pathogens especially *Candida albicans* and *Saccharomyces cerevisiae* **[50]**
- **Antidiabetic Activity:** A significant reduction in blood glucose level and glycosylated hemoglobin has been found in animals treated with *Barleria prionitis* leaves extract. Beside this, significant increase in serum insulin level and liver glycogen level, and decrease in the body weight was also observed. All thses result indicate antidiabetic activity of *Barleria prionitis* [51]**.**
- **Antidiarrhoeal activity:** Iridoid rich fraction of *Barleria prionitis* leaf extract showed dose dependent antidiarrhoeal activity at the dose of 25 to 100mg/kg in rats against castor oil induced diarrhoea. PGE2-induced enteropooling was also inhibited by fraction. All the results showed excellent anti-diarrhoeal activity of the plant[52]**.**
- **Diuretic Activity:** Aqueous extract of *Barleria prionitis* was evaluated for potential diuretic and natriuretic activities on different experimental animals. Extract showed significant increase in urine output. The amount of sodium excreted was increased in extract and *Furosemide* treated group, while potassium content excreted in the urine was insignificant in all the groups. It was also found that the extract treated groups possess favorable natriuretic effect[53]**.**
- **Others:** Beside these; AChE inhibitory activity, Anxiolytics [54]**,** and effect on erythrocyte membrane haemolysis have also been reported[55]**.**

Conclusion:

From the above review we can say that the *Barleria prionitis* is abundant in terms of presence of phytoconstituents and their active secondary metabolite. The whole plant or its parts have also been used successfully for treatment of various human ailments, traditionally. The therapeutic potential of the plant against various disorders have also been demonstrated using various animal models. Still, so much work is required with the *Barleria prionitis* to investigate the mechanism of actions with other therapeutic activities.

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