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PHYTOCHEMICALS EXPLORATION: PHARMACOLOGICAL ACTIVITY AND EVALUATION OF BARLERIA PRIONITIS

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Abstract:

A common ingredient in Indian traditional medicine is Barleria prionitis Lin. (Acanthaceae), sometimes referred to as Vajradanti or Porcupine flower. It is extensively dispersed in tropical Asia, Africa, India, and Sri Lanka. Examining the phytochemical and pharmacognocal characteristics of B. prionitis L. (Acantheceae) leaves and roots was the study's main goal. The leaf has antibacterial qualities; its decoction is used to treat feverish catarrh, the paste is put on boils and swollen glands to help them get better, and it is used as a mouthwash to relieve toothaches. Because of its antiseptic qualities, the plant's extract is used in herbal cosmetics and hair products to support the health of the skin and scalp. It has been discovered that the extract of the root has 100% antifertility action. The current investigation employed many techniques for standardization, including fluorescence analysis, physiochemical, phytochemical, macroscopical, microscopical, and HPTLC approaches, as guided by WHO guidelines. We collected roots that had been shade-dried and fresh leaves for morphological analysis. For microscopic research, free-hand slices were made from recently picked leaves and preserved root components. The extractive values for total ash, acid insoluble ash, water-soluble ash, water soluble, ethanol soluble, and ether soluble were calculated along with the loss and drying process. This review also includes research on various pharmacological actions and traditional uses.

Keywords: Barleria prionitis Lin., herbal medicine, formulation, extraction, pharmacognostic.

Introduction:

The genus Barleria and family Acanthaceae include Barleria prionitis, commonly referred to as the porcupine flower. Originally from India, it is also widely dispersed in other Asian countries such as Malaysia, Pakistan, the Philippines, Sri Lanka, Bangladesh, Yemen, and tropical Africa. East Coast Southern and Central Africa, Sri Lanka [1,2]. It is a perennial shrub that grows upright and is thorny. It typically has a single stem and can reach a height of approximately 1.5 meters. Lateral roots extending outward in every direction. The leaves are up to 40 mm broad and 100 mm long. They have an oval form that is narrow at both ends (ellipsoid). Three-to-five-pointed, pale-colored, sharp spines, measuring 10 to 20 mm in length, guard the base of the leaves. The tubular yellow-orange flowers have multiple long filaments that stick out. Flowers appear singly at the base of leaves as well as tightly clustered at the apex of the plant. A sharply pointed beak with tangled hairs protects two fairly big, flat seeds inside an oval-shaped seed capsule. Light brown to light gray in hue, stiff and smooth, are characteristics of the stems and branches [3,4]. Numerous colloquial names exist in India, such as the following: in English: Yellow nail-dye plant, Porcupine flower; in Sanskrit: Vajradanti, Kurantaka,

Koranta; in Hindi: Kala bans, Katsareya, Piabansa; in Bengali: Kantajinti, Peetjhanti; in Gujarati: Kantashila; in Kannada: Karunta, Mullugorante; in Malayalam: Chemmulli, Varelmutti; in Marathi: Kalsunda, Kate koranti, Kholeta, Koranta, Pivalakoranta; in Odia: Daskeranta; in Tamil: Kaattu kanagaambaram, Semmulli; and in Telugu: Mullugorintachettu (4,5,6).
Scientific name - Barleria prionitis
Common name - Porcupine flower

Fig.1:barleria prionitis

Photo Credit: https://images.app.goo.gl/7wSJPJxw5tcy1D7e9

Taxonomical classification of B. prionitis:

Kingdom:	Plantae
Sub Kingdom:	Tracheobionta
Division:	Magnoliophyta
Class:	Magnoliopsida
Subclass:	Asteridae
Order:	Scrophulariales
Family:	Acanthaceae
Genus:	Barleria
Species:	Prionitis

Table 1. phytoconstituents of *barleria prionitis* present in different plant parts:

Plant part	Phytoconstituent/Nutrient	Test(Extract Details)	References
Leaves	Alkaloid	TLC	[8,9]
	Flavonoids	TLC	
	Saponins	TLC	
	Tannins	TLC	
	Phytosteroids	TLC	
	Phenolic	TLC	
	Terpenoids	Not specified	[9]
	Sterol (stigmasterol)	HPLC	

	Essential oil	Not specified	[10]
Aerial part	Glycosides	NMR	[11,12]
	Terpenoids (lupeol)	NMR	[13]
	Pipataline, Balarenone, 13,14-Secostigmasta-5,14-diene-3-ol	NMR	
Whole plant	Glycosides	Borntrager's test, Legal's test	[14,15,16]
	Saponins	Frothing test	
	Flavonoids	Ammonia test, Alkaline reagent test, Shinoda test	
	Phenolic compounds and Tannins	FeCl3 test, Lead acetate test, Bromine water test	
	Steroids	Salkowski test	[14]
	Alkaloids	Mayer's reagent, Hager's reagent, Wagner's reagent, Dragendorff's reagent	[15,16]
	Carbohydrate	Molisch test, Fehling's solution, Benedict's test	
	Phytosterols	Liebermann's test, Libermann Burchard test	
	Protien and Amino Acids	Biuret test, Ninhydrin test	
	Polyphenol	Folin-ciocalteu test	[17]
	7-rhamnosylglucoside	Not specified	[18]
	Anthraquinones	Chemical tests	[19]
Flowers	Flavonoid	Not specified	[20]
	Glycoside	Not specified	
	Neohespridoside	Not specified	

HABITAT

From plains to 500 m, wayside thickets and shrub jungles are typical habitats for B. prionitis. Typical. Sri Lanka, Pakistan, India, Malaysia, and Tropical Africa and Asia. The following Indian states are usually home to it: Andaman and Nicobar Islands; Andhra Pradesh; Assam; Bihar; Chhattisgarh; Goa; Gujarat; Jharkhand; Karnataka; Kerala; Madhya Pradesh; Maharashtra; Orissa; Rajasthan; Tamil Nadu; Uttarakhand; UP; and West Bengal [21].

TRDITIONAL USE OF *Barleria prionitis*

Since ancient times, thanomedicinal practitiners have utilizes Barleria prionitis to treat a wide range of dangerous or intolerable illnesses. Its leaf is highly beneficial in treating sciatica, enlargement of the scrotum, cold, cough, irritation, and stiffness of the limbs [22, 23]. Leaf juice works effectively to treat boils, glandular swellings, whooping cough, dropsy, gastrointestinal issues, and catarrhal affections [24, 25]. Crushed leaves are applied to the skin to treat wounds and skin diseases [26,27,28]. A leaf extract and honey infusion is administered for seven days when a patient has a fever [29]. the whole plant is used as a remedy to treat different kinds of sicknesses, as well as pyorrhea, whooping cough, asthma, gout, respiratory issues, and toothaches [30,31,32, 33]. Green sprouts and roots combined with honey are blended to create tablets given

daily to treat whooping cough. [34]. The tablets are placed in a sealed clay pot, heated until a fine powder is formed, and then combined with garlic juice. Table 1 provides a concise synopsis of the conventional application of BP.

Table 2. traditional use of *barleria prionitis*

Plants part	**Disorder**	**Application mode**	Reference
Leaves	Skin diseases	The crushed leaves are applied to the skin	[35]
	Itching	Fresh leaves paste	[36]
	Cough and Cold	Not Specified	[37]
	Glandular Swelling and Boils	Given as juice directly	[24]
	Gastric Problem	Juice obtained from macerated	[26]
	Toothache	The affected area is coated with either the paste or juice	[24,31]

Pharmacological activities

1. Antifungal activities: B. prionitis bark extracts in ACE, EtOH, and MeOH shown antifungal activity against S. cerevisiae and C. albicans, with MeOH extract demonstrating greater activity against all fugal strains [38, 39]. Using chloroform, acetonitrate, and alcohol or ethanol extract of the stem, leaves, and roots, antifungal activity of B. prionitis was observed against C. neoformans, C. vaginitis, and B. dermatidis [40]. Additionally, it was discovered that B. prionitis stem and root extracts in EtOH, dichloromethane, and PET demonstrated fungistatic and fungicidal effects against C. albicans [41, 42].

2.Antidental activity : Antimicrobial efficacy against tooth decay pathogens: B. prionitis Linn. crude extract showed strong antimicrobial action. According to reports, bark extract prepared with MeOH shown much stronger antimicrobial action against oral infections such as S. aureus, S. mutans, Pseudomonas sp., Bacillus sp., C. albicans, and S. cerevisiae[39].

3.Antiviral activities: Chen et al. (1998)[43] reported two iridoid glycosides (i.e., 6-O-trans-p-coumaroyl-8-Oacetlshanzhiside methyl ester and its cis isomer from B. prionitis). With EC50 and IC50 values of 2.46 and 42.2 µg mL-1, respectively, these bioactive phytochemicals demonstrated strong effectiveness against the respiratory syncytial virus (RSV)[41, 43].

4.Antioxidant activity: Root leaves and stems extracted with MeOH exhibited strong antioxidant activity. The entire B. prionitis plant's ethOH extract exhibited strong antioxidant properties. According to a report, the leaf and stem MeOH extracts demonstrated antioxidant activity with IC50 values of 63.41±0.32 and 81.69±0.40, respectively. The MeOH extract of B. prionitis exhibited the highest reducing power [44, 45, 46]. The whole plant's EtOH and H2O extracts have significant antioxidant activity, according to in vitro research[46].

5.Anti-diabetic properties: An extract of B. prionitis's alcoholic leaves showed promise in preventing diabetes. An oral alcoholic extract dose of 200 mg kg-1 body weight was found to significantly lower blood sugar levels while raising serum insulin and liver glycogen levels in diabetic test organisms (rats). Investigational animals displayed a mild but negligible antidiabetic effect from the alcoholic extract of B. prionitis root [47].

6.Antihypertensive action: The MeOH extracts of B. prionitis leaves containing DOCA salt exhibit an antihypertensive effect. B. prionitis at 200 and 400 mg/b.w. had a substantial anti-hypertensive action in rats treated with DOCA salt to induce hypertension[48]. The process by which DOCA salt reabsorbs salt and water results in a rise in blood volume, which raises blood pressure. Compared to normal Rat's B. prionitis extracts, DOCA salt-treated nephrectomized rats showed a prolonged rise in SBP and DBP[48].

7. Analgesic activity: Using writhing models caused by acetic acid and an artificial pain meter, the analgesic activity of B. prionitis flower extract was reported[49]. An in viv**o** test revealed that the floral extract significantly decrease mice's discomfort and caused a dose-dependent rise in the analgesiometer-induced force. Flower extract reduced writhing by 5.24% in a statistically significant way at a dose concentration of 50 mg/kg body weight[49].

8. Enzyme inhibitory effects: It has been reported that extracts from various parts of B. prionitis and isolated phytochemicals inhibit the clinically significant enzymes, glutathione S-transferase (GST) and acetylcholinesterase (AChE)[42, 50, 51]. The extracts from the leaf, stem, and root of B. prionitis showed AChE inhibitory performance in MeOH extracts, with the stem and leaves extracts showing greater effectiveness of inhibition when compared to the extract root. The degree to which various glycoside chemicals inhibited AChE varied. Additionally, prionisides B and C demonstrated GST inhibitory action, with prionisides B and C having a higher capacity for GST inhibition[50,51].

Formulation:

1.Vajradanti Gel Formulation-

The Barleria prionitis L. plant material underwent shade drying, followed by grinding into a 60 g powder that was then sifted through a 40-mesh sieve. Subsequently, it underwent four ethanol extraction cycles (1000 mL each time) using a 36-hour maceration process. The resulting extract was filtered through Whatman filter paper and evaporated to dryness using a rotary evaporator (Buchi Rotavapor-R2, Flawil, Switzerland) under reduced pressure at 45°C. The dried residues were stored in vials at 4°C in the refrigerator for later use.

2.Vajradanti Paste Formulation-

Collect top-quality herbs, ensuring they are free from impurities. Thoroughly cleanse the herbs to remove any contaminants. Allow the cleaned herbs to naturally air dry or use a controlled drying process. Grind the dried herbs into a fine powder using traditional methods or grinding equipment. Mix Vajradanti, black pepper, clove, neem, and camphor powders in the desired ratios. Gradually incorporate base ingredients (like water, glycerin, etc.) into the herbal powder mixture to create a paste. Blend the ingredients thoroughly to achieve a uniform paste texture. Conduct quality assessments to verify that the final paste adheres to safety and efficacy standards. Transfer the prepared Vajradanti paste into suitable containers, ensuring proper storage conditions for maintaining its quality.

3. Barleria prionitis powder-

Generally, for making Vajradanti powder, people often use the roots of the Barleria prionitis plant. Collect the roots of the Barleria prionitis plant. Thoroughly clean the roots to remove dirt and impurities. Allow the cleaned roots to dry naturally in a shaded area. This step is crucial to reduce moisture content. Once the roots are completely dry, grind them into a fine powder using a mortar and pestle or a grinder. Optionally, you can sift the powder to ensure a smoother consistency and to remove any coarse particles. Store the Vajradanti powder in an airtight container away from moisture and sunlight to maintain its potency.

Evaluation Method:

Determining the values of ash

Determining the amount of ash helps identify low-quality goods, used-up medications, and an overabundance of earthy or sandy materials. It applies particularly better to medications in powder form. Ash values have the ability to identify the adulteration of various materials such as soil, sand, silica, limestone, etc. [52, 53].The Indian Pharmacopoeia 1996, Vol-II, approach was used in determining the various ash values.

b) Calculating the Total Ash Value

2 grams of precisely weighed air-dried powder mixture were placed in a clean, dry platinum crucible that had been previously weighed. The mixture was burned at 450 degrees Celsius until the ash was carbon-free, as shown by the ash's white color. After being placed in a desiccator, the container with the ash was allowed to cool until a consistent weight was reached. It was estimated to find the proportion of total ash in the air-dried sample [54].

c) Calculating the Water Soluble Ash Value

After boiling the ash for five minutes with 25 milliliters of water, it was filtered through ashless filter paper. Hot distilled water was used to cleanse the residue that had accumulated on the filter paper. After letting the filter paper dry, it was fired for 15 minutes at 4500 C. The water soluble ash was derived by deducting the weight of the insoluble ash from the total amount of ash sampled. The air-dried sample (I.P.1996 Vol-II) was used to compute the percentage of water-soluble ash [55, 56].

d)Acid Insoluble Ash Value Calculation

After boiling the ash for five minutes with 20 milliliters of hydrochloric acid (2M), it was filtered through ashless filter paper and cleaned with hot, distilled water. The filter paper was let to dry, burned for fifteen minutes until it turned a dull red color, cooled in a desiccator, and then weighed. Calculating the proportion of acid-insoluble ash required consulting an air-dried sample (I.P.1996 Vol-II).

e) Values extracted from solvents

Using a solvent to extract any drug ingredient results in a solution containing several components. The medicine and solvent employed will determine the makeup of this solution. One way to obtain initial data regarding the caliber of a given drug sample is through the use of a solvent[57,58].

Coclusion:

In Ayurvedic medicine, B. prionitis Linn. is used extensively in India, Sri Lanka, tropical Asia, and Africa. The evidence that it can be utilized to treat a wide range of illnesses was illustrated by B. prionitis Linn. The discovery that pure phytochemicals and crude extracts of B. prionitis Linn. leaves have been screened for various pharmacological activities and found to have analgesic, anti-inflammatory, and hepatoprotective activity, as well as antidiabetic activity in the plant's stem bark and antioxidant and hypocholesterolemic activity in the juices, is intriguing. This article offers a thorough analysis of the many sections of B. prionitis, including their toxicity, phytochemistry, pharmacology, and traditional uses. A comprehensive review of the literature revealed the extract and isolated bioactive compounds from B. prinitis that have promising pharmacological properties, such as antioxidant, antidiabetic, anti-dental, anti-viral, anti-inflammatory, enzyme inhibitory, anti-hypertensive, analgesic effects without being toxic. As a result of the aforementioned research, it is possible to identify this species and distinguish it from others using a variety of characteristics, including pharmacognostical, phytochemical, qualitative, and semi-quantitative (limit tests) methods. In the etanolic extract of leaves and roots, phytochemical screening revealed the presence of saponins, flavanoids, alkaloids, glycosides, and tannins, indicating its potential use in treating children's fever, whooping, cough, toothache, glandular swelling, anascara, rheumatic pain, stomach issues, and catarrh.

Refference:

[1] Banerjee D, Maji A, Banerji P. Barleria prionitis Linn: 2012. A review of its traditional uses, phytochemistry, pharmacology and toxicity. Res J Phytochem, 6: 31-41.

[2] Vasoya U. 2012. Pharmacognostical and physicochemical studies on the leaves of Barleria prionitis (L). Int J Pharm Sci Res., 3(7): 2291.

[3] Sharma P, Shrivastava B, Sharma GN, Jadhav HR. 2013. Phytochemical and ethenomedicinal values of Barleria prionitis L: An overview. J Harmonized Res Pharm, 2(3): 190-9.

[4] Jain S, Jain R, Singh R. 2009. Ethnobotanical survey of Sariska and Siliserh regions from Alwar district of Rajasthan, India. Ethnobot Leafl, 1: 21.

[5] Maji, A.; Banerjee, D.; 2012. Banerji, P. *Barleria prionitis* Linn: A review of its Traditional uses, Phytochemistry, Pharmacology and Toxicity. *Res. J. Phytochem.*, *6*(2): 31-41. http://dx.doi.org/10.3923/rjphyto.2012.31.41

[6] Singh, M.P.; Panda, H. 2006. *Medicinal Herbs with their Formulations*; Daya Publishing House: New Delhi, 1: 155-156.

[7] https://images.app.goo.gl/7wSJPJxw5tcy1D7e9

[8] Choudhary, M.; Kumar, V.; Gupta, P.K.; Singh, S. 2014. Anti-arthritic activity of *Barleria prionitis* Linn. leaves in acute and chronic models in Sprague Dawley rats. *Bull. Fac. Pharm. Cairo Univ.*, *52*(2): 199-209.

[9] Jeyasankar, A.; Premalatha, S.; Krishnappa, K.; Elumalai, K. 2013. Larvicidal activity of *Barleria prionitis* L (Acanthaceae) against Japanese encephalitis vector, Culex tritaeniorhynchus Giles (Diptera, Culicidae*). Int. J. Curr. Res. Rev, 1*(2): 116-120.

[10] Talele, B.D.; Mahajan, R.T.; Chopda, M.Z.; Nemade, N.V. 2012. Nephroprotective Plants, A Review. *Int. J. Pharm. Pharm. Sci., 4*(1): 8-16.

[11] Chen, J.L.; Blanc, P.; Stoddart, C.A.; Bogan, M.; Rozhon, E.J.;
Parkinson, N.; Ye, Z.; Cooper, R.; Balick, M.; Nanakorn, W.; Kernan, M.R. 1998. New iridoids from the medicinal plant *Barleria prionitis* with potent activity against respiratory syncytial virus. *J. Nat. Prod., 61*(10): 1295-1297.
http://dx.doi.org/10.1021/np980086y PMID: 9784173

[12] Ata, A.; Kalhari, K.S.; Samarasekera, R. 2009. Chemical constituents of *Barleria prionitis* and their Enzyme inhibitory and Free Radical Scavenging activities. *Phytochem. Lett., 2*(1): 37-40.
http://dx.doi.org/10.1016/j.phytol.2008.11.005

[13] Kosmulalage, K.S.; Zahid, S.; Udenigwe, C.C.; Akhtar, S.; Ata, A.; Samarasekera, R. Glutathione. 2007. S-transferase, acetylcholinesterase inhibitory and antibacterial activities of chemical constituents of *Barleria prionitis. Z. Naturforsch. B, 62*(4): 580-586.
http://dx.doi.org/10.1515/znb-2007-0417

[14] Maji, A.; Bhadra, S.; Mahapatra, S.; Banerji, P.; Banerjee, D. 2011. Mast cell stabilization and membrane protection activity of *Barleria prionitis* L. *Pharmacogn. J., 3*(24): 67-71.
http://dx.doi.org/10.5530/pj.2011.24.13

[15] Kapoor, A.; Shukla, S.; Kaur, R.; Kumar, R.; Lehra, K.S.; Kapoor, S. 2014. Preliminary Phytochemical Screening and Antioxidant activity of Whole plant of *Barleria prionitis* Linn. *Int. J. Adv. Pharm. Biol. Chem, 3*(2): 410-419.

[16] Kapoor, A.; Shukla, S.; Kumar, R.; Kaur, R.; Lehra, K.S.; Kapoor, S. 2014. Pharmacognostical, Preliminary Phytochemical Screening and Antimicrobial Studies of Leaves of *Barleria prionitis* Linn. *Int. J. Pharmacogn. Phytochem. Res, 6*(2): 369-378.

[17] Chetan, C.; Suraj, M.; Maheshwari, C.; Rahul, A. 2011. Screening of Antioxidant activity and Phenolic content of whole plant of *Barleria prionitis* Linn. *Int. J. Res. Ayurveda Pharm., 2*(4): 131-139.

[18] Gangaraju, S.; Naidu, K.; Chakradhar, V.; Prasad, R. 2002. Anthraquinones
from *Barleria prionitis. Indian Drugs, 39*(7): 400-401.

[19] Harborne, J.; Subramanian, S.S.; Nair, A. 1971. Scutellarein 7-
rhamnosylglucoside from *Barleria prionitis. Phytochemistry, 10*(11): 2822-2823.
http://dx.doi.org/10.1016/S0031-9422(00)97291-1

[20] Khare, C.P. 2008. *Indian Medicinal Plants, An Illustrated Dictionary*;
Springer Science & Business Media.

[21] Shendage SM, Yadav SR. 2010. Revision of the genus Barleria (Acanthaceae) in India. Rheedea, 20(2): 81-130.

[22] Kala CP. 2005. Ethnomedicinal botany of the Apatani in the Eastern Himalayan region of India. Journal of Ethnobiology and Ethnomedicine, 1(11): 1-8.

[23] Singh B, Kumar D, Singh R. 2012. Phytotherapeutics for management and
prevention of cataract generation. Phytopharmacology, 3(1): 93-110.

[24] Mohammed S, Kasera PK, Shukla JK. 2004. Unexploited plants of potential medicinal value from the Indian Thar desert. Natural Product Radiance, 3(2): 69-74.

[25] Meena K, Yadav B. 2010. Some traditional ethnomedicinal plants of southern Rajasthan. Indian Journal of Traditional Knowledge, 9(3): 471-4.

[26] Rahmatullah M, Azam MNK, Rahman MM, Seraj S, Mahal M, Mou S, et al. 2011. A survey of medicinal plants used by Garo and non- Garo traditional medicinal practitioners in two villages of Tangail district, Bangladesh. American Eurasian Journal of Sustainable Agriculture, 5: 350-7.

[27] Patil SB, Naikwade NS, Kondawar MS, C.S.Magdum, Awale VB. 2009. Traditional uses of plants for wound healing in the Sangli district, Maharashtra. International Journal of PharmTech Research, 1(3): 876-8.

[28] Alam G, Singh MP, Singh A. 2011. Wound healing potential of some medicinal plants. International Journal of Pharmaceutical Sciences Review and Research, 9(1): 136-45.

[29] Panda S, Rout S, Mishra N, Panda T. Phytotherapy and traditional knowledge of tribal communities of Mayurbhanj district, Orissa, India. J Pharmacogn Phytother, 3(7): 101-13.

[30] Katewa S, Galav P. 2005. Traditional herbal medicines from Shekhawati region of Rajasthan. Indian Journal of Traditional Knowledge, 4(3): 237-45.

[31] Reddy K, Trimurthulu G, Reddy CS. 2010. Medicinal plants used by ethnic people of Medak district, Andhra Pradesh. IndianJournal of Traditional Knowledge, 9(1): 184-90.

[32] Ata A, Van Den Bosch SA, Harwanik DJ, Pidwinski GE. 2007. Glutathione S-transferaseand acetylcholinesterase-inhibiting natural products from medicinally important plants. Pure and Applied Chemistry, 79(12): 2269-76.

[33] Krishnaraju AV, Rao TV, Sundararaju D, Vanisree M, Tsay H-S, Subbaraju GV. 2005. Assessment of bioactivity of Indian medicinal plants using brine shrimp (Artemia salina) lethality assay. Int J Appl Sci Eng., 3(2): 125-34.

[34] Patel D, Mansoori A. 2012. Cancer–an ayurvedic perspective. IJARPB, 2(2): 179-95.

[35] Rahmatullah M, Azam MNK, Rahman MM, Seraj S, Mahal M, Mou S, et al. 2011. A survey of medicinal plants used by Garo and non- Garo traditional medicinal practitioners in two villages of Tangail district, Bangladesh. American Eurasian Journal of Sustainable Agriculture, 5: 350-7.

[36] Kala CP. 2005. Ethnomedicinal botany of the Apatani in the Eastern Himalayan region of India. Journal of Ethnobiology and Ethnomedicine, 1(11): 1-8.

[37] Kumar M, Sheikh MA, Bussmann RW. 2011. Ethnomedicinal and ecological status of plants in Garhwal Himalaya, India. Journal of Ethnobiology and Ethnomedicine, 7(1): 1-13.

[38] Shukla P, Singh A, Gawri S, Alexander A, Sonwane S. 2011. Invitro propagation of Barleria prionitis Linn and its Antibacterial Activity. Int. J.Pharma Professional's Res., 2(1): 198-200.

[39] Aneja KR, Joshi R, Sharma C. Potency of Barleria prionitis L. 2011. Bark Extracts against Oral Diseases causing strains of Bacteria and Fungi of Clinical Origin. New York Sci. J., 3: 5-12.

[40] Panchal P, Singh K. 2015. Antimicrobial activity of Barleria prionitis on Pathogenic Strains, 7(4): 73-75.

[41] Banerjee AK, Maji S, Mahapatra S, Banjeri P.Barleria prionitisLinn. 2012. A Review of its Ttraditional uses, Phytochemistry, Pharmacology and Toxicity, Res. J.Phytochem, 6: 31-41.

[42] Amoo SO, Nalala AR, Finnie JF, Van Staden J. 2011. Antifungal, acetyl cholinesterase inhibition, antioxidant and phytochemical properties of three Barleria species. Sou. Afri. J. Bot., 77: 435-445.

[43] Chen JL, Blanc P, Stoddart CA, Bogan M,RozhonEJ. 1998. New iridoids from the medicinal plant Barleria prionitis with potent activity against respiratory syncytial virus. J. Nat. Prod., 61: 1295-1297.

[44] KapoorA, Shukla S, Kaur R, Kumar R. 2014. Preliminary phytochemical screening and antioxidant activity of whole plant of Barleria prionitis Linn. Int. J. Adv. Pharma, Biol. & Chem., 3(2):410-419.

[45] Sharma P, Sharma GN, Srivastava B, Jadhav HR. 2014. Evaluation of Antioxidant Potential of Barleria prionits leaf and stem. Ame J. PhytomedClin.Thera., 2(11): 1177-1186.

[46] Chetan C, Suraj M, Maheshwari C, Rahul A, Priyanka P. 2011. "Screening of antioxidant activity and total phenolic content of whole plant of Barleria prionitis." Linn. Int. J.Res. Ayurveda Pharma, 2: 1313- 1319.

[47] Dheer, R, Bhatnagar P. 2011. A study of the antidiabetic activity of Barleria prionitis Linn. IndianJ. Pharmacol, 42(2): 70-73.

[48] Marya BH,Bothara SB. 2013. Investigation of antihypertensive activity of leaves of Barleria prionitis in Doca salt induced hypertensive rats. Int. J. Pharm. Sci. Res., 18(2): 17-19.

[49] Jaiswal SK, Dubey MK, Das S, Verma AR, Vijyakumar M and Rao CV. 2010. Evaluation of flower of Barleria prionitis for anti-inflammatory and anti-nociceptive activity. Int. J. Pharm. Biol. Sci., 1: 1-10.

[50] Kosmulalage KS, Zahid CS, Udenigwe S, Ahktar A, Ata R, Samarasekera. 2007. Glutathione S-transferase, acetyl cholineseterase inhibitory and antibacterial activities of chemical constituents of Barleria prionitis. Z. Naurforsch, 62b: 580-586.

[51] Ata A, Bosch VDSA, Harwanik, DJ, Pidwinski, GE. 2007. Glutathione Stransferase and acetylcholinesterase-inhibiting natural products from medicinally important plants, Pure Appl. Chem., 79: 2269-2276.

[52] Asano, N., Kato, A. and Watson, A.A. 2001. Therapeutic applications of suger-miniking glycosidase inhibitors. Mirurevews in medicinal chemistry, 1: 145-154.

[53] Aslam, M. 2002. Aspects of Asian Medicine and its practice in the west. Trease and Evans Pharmacognosy 15th edition, Edinburgh London, 467-481.

[54] Atta-Ur-Rahman, Zaman, K. 1989. Medicinal plants with hypoglycemic activity. J Ethnopharmacol, 26: 1-55.

[55] August K.T., Sheela, C.G. 1996. Antiperoxide effects of s-allyl. Cysteine sulfoxide, an insulin secretagogue, in diabetes rats. Experientia, 52: 115-20.

[56] Baldwa, V.S., Goyal, R.K., Bhandari, C.M., and Panagariya, A. A. 1976. clinical trial of isulin obtained from vegetable source (plant insulin) in patients with diabetes mellitus. Rajasthan med. J., 15(1): 54.

[57] Bailey, C.J., and Day, C. 1989. Traditional Plant medicines as treatment for diabetes. Diabetes care, 12: 553-564.

[58] Barbara, M, Murphy., Lawrence, C. Frigo. 1993. Development, Implementation and Results of a successful multidisciplinary adverse drug reaction reporting programme is a university teaching hospital. Hosp Pharma, 28: 1199-1204, 1240.