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## Evaluation of minerals and phytochemicals present in aerial parts of *Barleria buxifolia* L. (Acanthaceae)

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#### Abstract

The family *Acanthaceae* consists of a significant number of medicinal plants with broad array of biological activities and gorgeous number of phytoconstituents. Most of *Barleria* species are potent in anti-inflammatory, analgesic, antileukemic, antitumor, antihyperglycemic, anti-amoebic, virudal, antidiabetic, antifertility, hepatoprotective, nephroprotective and antibiotic activities. The objective of this study is to carry out the preliminary phytochemical screening aerial parts of *Barleria buxifolia* L. Fresh plant sample collected from various parts of Uthangarai. Plant extract prepared by using soxhlet apparatus, Quantitative mineral analysis and Phytochemical analysis carried out by standardized procedure. Selected plant extracts indicates the presence of glycosides, alkaloids, carbohydrates, tannin, phenolics, flavonoids, proteins and amino acids. Medicinal assessment of plants lies in some chemical substances like alkaloids, flavonoids, tannins and phenolic compounds which serve as defend against many microorganisms. The results obtained from preliminary pharmacognostic standardization of aerial parts of *Barleria buxifolia* L. are helpful in resolve of quality and purity of the crude drug and its marketed formulation.

**Keywords:** phytochemical, *Barleria buxifolia*, acanthaceae, herbal, pharmacognostic

#### Introduction

India represents one of the great emporia of ethanobotanical wealth. Even today tribal communities in India still collect and preserve locally available wild and cultivated plant species and practice herbal medicine to treat a variety of diseases and disorders (Mahishi, 2005) <sup>[10]</sup>. Plants have been, a rich source of many natural products in major parts of India and other countries, most of which have been extensively used for traditional human health care systems. The vast majority of people in the world takes care of themselves and uses healing plants that have been used for hundreds of generations (Cordell, 1995; Farnsworth and Soejarto, 1991; Shengji, 2002; Taylor *et al.*, 2001; Krishna *et al.*, 2009) <sup>[4, 5, 16, 8, 17]</sup>. The Acanthaceae is a large dicotyledonous flowering plant family in the order Lamiales, which comprises approximately 220 genera and 4,000 species (Scotland and Vollesen, K, 2000) <sup>[15]</sup>. It is composed of mainly annual and perennial herbs, shrubs climbers, and some large trees (Fongod *et al*, 2013) <sup>[6]</sup>. A number of plant species in Acanthaceae has significant medicinal values (Manisha *et al*, 2012) <sup>[11]</sup>. Several Acanthaceae members are widely used by many ethnic communities as traditional medicine throughout the world (Mahbubur Rahman *et al*, 2014) <sup>[9]</sup>. Acanthaceae family possess antifungal, cytotoxic, anti-inflammatory, anti-pyretic, antioxidant, insecticidal, hepatoprotective, immunomodulatory, anti-platelet aggregation and anti-viral potential (Awan *et al*, 2014) <sup>[2]</sup>. Various species of *Barleria*, reported as folk medicine. *Barleria longiflora* displays nephroprotective activity (Manjula and Saravana Ganthi, 2018) <sup>[13]</sup>, *Barleria noctiflora* having antiinflammatory (Manjula and Saravana Ganthi, 2018) <sup>[12]</sup> and antidiabetic potential (Manjula and Saravana Ganthi, 2018) <sup>[14]</sup>.

#### Systematic Position

Kingdom: Plantae  
Division: Tracheophyta  
Class: Magnoliopsida  
Order: Lamiales  
Family: Acanthaceae  
Genus: *Barleria*  
Species: *buxifolia*

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**Methodology**

**Morphological study**

Fresh plants material was collected from in and around Uthangarai. Plant material is identified by using Flora of the presidency of Madras by J.S. Gamble.

**Preliminary Phytochemical screening**

The air-dried and powdered plant materials were taken in different amber coloured bottles, extracted (by Soxhelt method) with petroleum ether, chloroform, benzene, ethanol and water, and then the solvent were filtered off. The extracts thus obtained from each plant were then subjected to qualitative tests for the identification of various plant constituents by the methods described by Trease and Evans (1989)<sup>[18]</sup>, Harborne, (1998)<sup>[7]</sup> and Brindha *et al.* (1981)<sup>[3]</sup>. The preliminary phytochemical screening is a qualitative chemical evaluation which indicates spectrum of chemical constituents in the chosen plant.

**Quantitative estimations of minerals**

**Estimation of elements**

The percentage of major elements like carbon, nitrogen, phosphorus, potassium, sodium, calcium, magnesium and sulphur was determined by the standard method of AOAC (1984). The trace elements like zinc, copper, iron, manganese, boron and molybdenum were determined by the method of Williams and Twine (1960)<sup>[19]</sup>.

**Estimation of major elements**

2 g of the dried powder of the sample was taken in 250 ml conical flask and 12 ml triple acid mixture (Nitric, sulphuric and perchloric acid in the ratio of 1:2:1) was added. The mouth of the conical flask was covered with a funnel. The contents were digested in the flask over a sand bath till a clear solution was obtained. The solution was filtered through Whatman No.40 filter paper and the filtrate was collected in a 250 ml volumetric flask. The conical flask was washed with small increments of hot water and the washing was added to

the filter paper. The residue on the filter paper was also washed with hot water till the filtrate runs free of chloride. The volumetric flask was cooled under tap water and made up to 250 ml with cold distilled water. This triple extract was used for the analysis of major constituents. The minerals (N, P, K, Na and Ca) were estimated using Flame Photometer (Spectronics Flame Photometer, India).

**Estimation of trace elements**

The ground plant samples were sieved with a 2 mm rubber sieve and 2 g of the plant samples were weighed and subjected to dry ashing in a well-cleaned porcelain crucible at 550°C in a muffle furnace. The resultant ash was dissolved in 5 ml of HNO<sub>3</sub>: HCl: H<sub>2</sub>O (1:2:3) mixture and heated gently on a hot plate until brown fumes disappeared. To the remaining material in each crucible, 5 ml of deionized water was added and heated until a colour less solution was obtained. The mineral solution in each crucible was transferred into a 100 ml volumetric flask by filtration through Whatman No. 42 filter paper and the volume was made to the mark with deionized water. This solution was used for elemental analysis. Potassium, sodium, calcium, magnesium, sulphur, zinc, copper, iron, manganese, boron and molybdenum were estimated using Atomic Absorption Spectrophotometer.

**Result**

**Morphological study**

Box-Leaved *Barleria* is a shrub 5-6 feet tall, with strong spines under the leaves. Flowers are purple-blue, produced in whorls towards the upper part of the stem. The species name *buxifolia* means leaves like Boxwood tree. Leaves are 8-16mm long, ovate or obovate, tip blunt with a sharp point. Leaves are nearly stalk less, with hairs on both sides scattered, white, short. Spines below the leaves are 6-6mm long, simple and straight. Flowers arise mostly solitary, purple blue. Bracts are 6-8mm long, reduced to simple spines. Corolla-tube is 1.8-2.5cm long, slightly widened upwards.

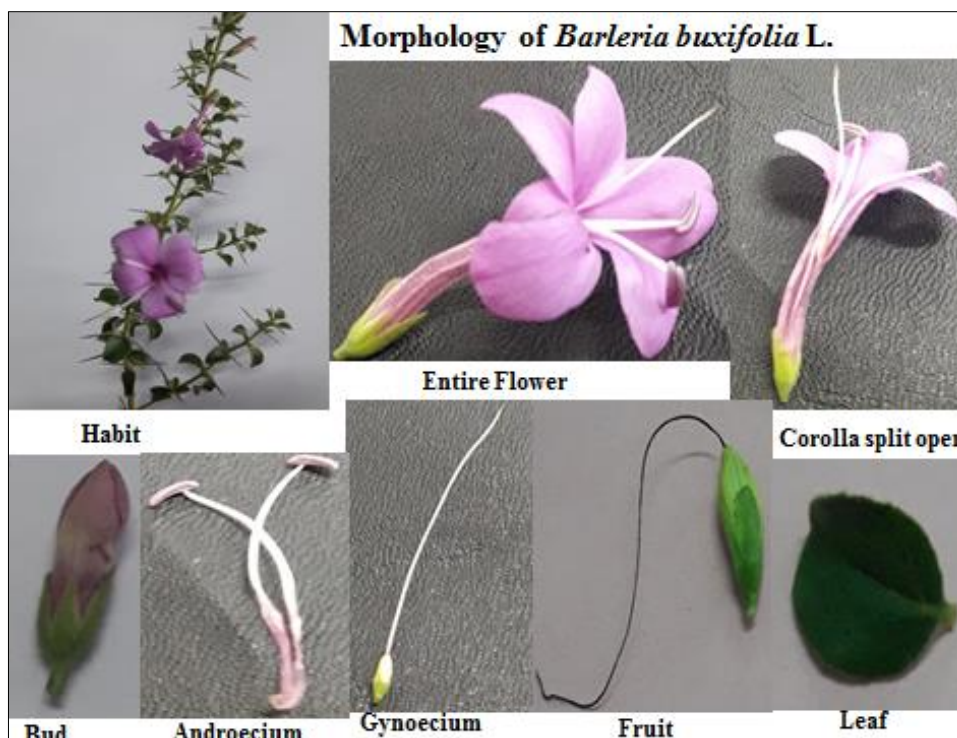


Plate 1: Morphology of *Barleria buxifolia* L.

## Preliminary phytochemical screening

**Table 1:** Preliminary Phytochemical analysis of *Barleria buxifolia* L.

S. No	Extract	Triterpenoids	Reducing sugars	Sugars	Alkaloids	Phenolic compounds	Catechins	Saponins	Tannins	Anthroquinones	Amino acids
1	Petroleum ether	+	-	+	-	-	-	-	+	-	-
2	Benzene	-	+	+	+	-	-	+	+	-	+
3	Ethanol extract	+	+	+	-	+	-	-	+	+	+
4	Distilled water	+	+	+	+	+	+	+	-	-	-

Results of preliminary phytochemical analysis shows (Table 1) the presence of various constituents. The ethanol and distilled water extracts indicates the presence of more phytochemicals comparably the other extracts.

**Table 2:** Quantitative Minerals analysis of *Barleria buxifolia* L.

S.No	Estimation	Aerial parts
1.	Organic Carbon (%)	2.02
2.	Total Nitrogen (%)	1.50
3.	Total Phosphorus (%)	0.21
4.	Total Potassium (%)	2.26
5.	Total Sodium (%)	0.13
6.	Total Calcium (%)	2.41
7.	Total Magnesium (%)	1.02
8.	Total Sulphur (%)	0.24
9.	Total Zinc (ppm)	0.52
10.	Total Copper (ppm)	0.09
11.	Total Iron (ppm)	66.06
12.	Total Manganese (ppm)	1.36
13.	Total Boron (ppm)	Nil
14.	Total Molybdenum (ppm)	Nil

Mineral analysis also shows (Table 2) the presence of most of the studied minerals except Boron and Molybdenum. Potassium, Calcium and Iron are the richest source of minerals.

## Discussion

Ethanol extract of selected plant samples shows the presence of glycosides, alkaloids, carbohydrates, tannin, phenolics, flavonoids, proteins and amino acids. Medicinal value of plants lies in some chemical substances like alkaloids, flavonoids, tannin and phenolic compounds which serve as defend against many microorganisms. Presents of all essential minerals especially calcium, potassium, iron, and magnesium denotes it may be used as a source of food. The results obtained from preliminary pharmacognostic standardization of aerial parts of *Barleria buxifolia* L. are helpful in determination of quality and purity of the crude drug and its marketed formulation.

## References

- Awan AJ, Ahmed CB, Uzair M, Aslam MS, Farooq U, Ishfaq K. Family Acanthaceae and genus *Aphelandra*: ethno pharmacological and phytochemical review. *Int J Pharm Pharm.* 2014; 6(10):44-55.
- Awan, AJ, Aslam MS. Family Acanthaceae and genus *Aphelandra*: ethanopharmacological and phytochemical review. *Inter. J. Pharmacy and Pharm. Sci.* 2014; 6 (10):44-55.
- Brindha P, Sasikala P, Purushothaman, KK. Pharmacognostic studies on Merugan Kizhangu. *Bull. Medico. Ethno. Bot. Res.* 1981; 2(3):84-96.
- Cordel GA. Changing strategies in natural products chemistry. *Phytochemistry.* 1995; 40:1585-1612.
- Farnsworth NR. Screening plants for new medicines. In: Wilson EO (ed.), *Biodiversity*. National Academic Press, Washington DC. 1988; 83-97.
- Fongod AGN, Modjenpa NB, Veranso MC. Ethnobotany of Acanthaceae in the Mount Cameroon region. *J Med. Plants Res.* 2013; 7(36):2707-2713.
- Harborne JB. *Phytochemical methods*; 3<sup>rd</sup> edition, London: Chapman and Hall Ltd; 1998; 10.
- Krishna CM, Gupta V, Bansal P, Kumar S, Kumar SP, Kumar TP, Sharma S. Folk Medicinal Value of Some Weeds around Hyderabad. *Inter. J Pharm. and Clinical Research.* 2009; 1(3):92-94.
- Mahbubur Rahman AHM, Wahida Afsana M, Rafiul Islam AKM. Medicinal Uses on Acanthaceae Family of Rajshahi, Bangladesh. *J. appl. sci. res.* 2014; 2 (1):82-93.
- Mahishi P, Srinivasa BH, Shivanna MS. Medicinal plant wealth of local communities in some villages in Shimoga district of Karnataka. India. *J. Ethnopharmacol.* 2005; 98:307-312.
- Manisha N, Madhuri M, Vipin SA. Comprehensive Floristic Study of Bhopal District with Special Reference to Family Acanthaceae. *IJRM.* 2012; 2(1):8-10.
- Manjula MS, Saravana Ganthi A. *In-vitro* antioxidant and anti-inflammatory potential of ethanol extracts (root and aerial parts) of *Barleria noctiflora*. *Annals of Plant Sciences.* 2018; 7(2):1997-2001.
- Manjula MS, Saravana Ganthi A. Nephroprotective activity of *Barleria longiflora* L. (Acanthaceae) against gentamicin induced nephrotoxicity in male albino wistar rats. *Journal of Pharmacognosy and Phytochemistry,* 2018; 7(2):2835-2837.
- Manjula MS, Saravana Ganthi, A. *In-vitro* anti-diabetic activity of root and aerial parts of *Barleria noctiflora* L. f. (Acanthaceae) *The Pharma Innovation Journal.* 2018; 7(4):1073-1075.
- Scotland RW, Vollesen K. Classification of Acanthaceae. *Kew Bull.* 2000; 55:513-589.
- Shengji P. Ethnobotany and modernisation of Traditional Chinese Medicine, In: *Proc. Wise Practices and Experiential Learning in the Conservation and Management of Himalayan Medicinal Plants*, Kathmandu, Nepal, 2002.
- Taylor JLS, Rabe T, McGaw LJ, Jager AK, Van Staden J. Towards the scientific validation of traditional medicinal plants. *Plant Growth Regul.* 2001; 34:23-37.
- Trease GE, Evans WC. *Text book of Pharmacognosy.* 12<sup>th</sup> Ed., Balliere, Tindall, London, 1983, 57-383.
- Williams A, Twine J. *Modern methods of plant analysis*, Peach, K, Tracey, M. V, (Edu.), Springer Verlag, Berlin, 1960.