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SHORT COMMUNICATION

Preliminary phytochemical analysis of *Barleria longiflora* L.f. using different solvent

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ABSTRACT

Present investigation deals with the preliminary phytochemical analysis of *Barleria longiflora*. The leaf, stem and root of this plant were subjected to successive soxhlet extraction using petroleum ether, chloroform and ethanol. The various part of extracts, were subjected to preliminary phytochemical screening for different classes of phytoconstituents. Phytochemical analysis, ethanol extracts showed presence of all compounds.

Keywords: *Barleria longiflora*, soxhlet, petroleum ether, chloroform and ethanol

1. INTRODUCTION

For thousands of years mankind is using plant resource to improve or cure sicknesses. Plants constitute a source of different chemical compounds which are possible to use in medicine and other applications. The plant parts such as leaves, flowers, bark, seeds, fruits, stem and root contain the following bioactive compound like alkaloids, steroids, tannins,

glycosides, volatile oils, fixed oils, resins, phenols and flavonoids [1]. Owing to the significance in the above context, such preliminary phytochemical screening of plants is the need of the hour in order to discover and develop novel therapeutic agents with improved efficacy. Numerous research groups have also reported such studies throughout the world [2].

There is a growing awareness in connecting the phytochemical constituents of a medicinal plant with its pharmacological activity. Screening of active compounds from plants has led to the invention of new medicinal drugs which has efficient protection and used for the treatment of various diseases [3]. Nowadays natural products derived from plants are being tested for presence of novel drugs with new modes of pharmacological action. A special feature of higher plants is the capacity to produce a large number of secondary metabolites [3]. Phytochemicals are the natural bioactive compounds. That are naturally present in plants and the most considerable bioactive components of plants are alkaloids, tannins, flavonoids, steroids, terpenoids, carbohydrates and phenolic compounds [4].

Plants have been used as an substitute medicine to promote human health and endurance in many regions of the world since prehistoric times [5]. Plants are the great sources of medicines, especially in traditional system of medicine, which are useful in the treatment of various diseases. [6]. Plants are made up of secondary metabolites which are formed as products of primary metabolism and produced for defense against predators. Examples of such metabolites are tannins, flavonoids and alkaloids; they are known to be the brain behind the healing potentials of plants [7].

Secondary metabolites are generally not important for the growth and reproduction of organisms, but they play an important role in pharmaceutical field [8]. Phytochemical tests were carried out to know about the qualitative existence of secondary metabolites in them [9]. Preliminary screening of phytochemicals is a valuable step, in the detection of the bioactive principles present in medicinal plants and subsequently may lead to drug discovery and development [2].

Most of the research reports, acanthaceae family members has a novel and medicinal important phytochemical compounds in its [10-12]. Not only this, there was no previous work done in this plant moreover the *Barleria longiflora* L.f. is an Endemic in status [13, 14]. Present study reveals the evaluation of phytochemical analysis in different solvents like petroleum ether, chloroform and ethanol extract of *Barleria longiflora* L.f.

2. MATERIALS AND METHODS

2. 1. Preparation and selection of plant extract

To remove the soil particles and adhered debris the leaf, stem and root were detached and washed clearly in running tap water. The plant part like leaf, stem and root were shade dried separately and ground well into powder and extracted by using hot continuous extraction technique in a soxhlet extractor using solvent like petroleum ether, chloroform and ethanol until the extracts were colorless in the siphon tube.

The extracts were concentrated and dried under vacuum. The three different solvents (Petroleum ether, chloroform and ethanol) were taken and preliminary phytochemical analysis was done by using the standard procedure [15]. To identify the presence of some secondary metabolites using the following tests.

2. 2. Test for Alkaloids

Dragendorff's test: 1 ml of plant extract were taken, 1 ml of Dragendorff's reagent was added and mixed well. A dark orange or orange red precipitates indicate the presences of alkaloids.

2. 3. Test for Flavonoids

Shinoda test: To 1ml of the extract, add 8 - 10 drops of concentrate HCl and a pinch of magnesium powder or filing. Boil for 10 to 15 minutes and cool. A red coloration indicates the presence of flavonoids.

2. 4. Test for Steroids

Libermann Burchard test: To 0.5 ml of the extract, add 2 ml of acetic anhydride and 2ml of concentrate H_2SO_4 along the sides of the tube. The formation of green colour indicates the presence of steroids.

2. 5. Test for Terpenoids

Salkowski test: To 5 ml of the extract, add 2 ml of chloroform and 3ml of concentrated H_2SO_4 . At the interface of the two liquids a yellow ring formed and turned reddish brown colour after two minutes.

2. 6. Test for Tannins

Modified Prussian blue test: To 1ml of the extract, add 1ml of 0.008 M potassium ferricyanide and 1 ml of 0.02 M $FeCl_3$ in 0.1 M HCl. Appearance of blue colour indicates the presence of tannins.

2. 7. Test for Saponins

Forth test: About 2g of the powdered sample is boiled with 20ml of distilled water in a water bath and filter. 10 ml of the filtrate is mixed with 5 ml of distilled water and shake vigorously for a stable persistent.

3. RESULT AND DISCUSSION

The phytochemical screening of petroleum ether, chloroform and ethanol extracts of *B. longiflora* are presented in Table1. Medicinally active metabolites were present in *B. longiflora*. The leaf, stem and root were extracted with different solvent and the results showed the presence and absence of alkaloids, flavonoids, steroids, terpenoids, tannins and saponins in all the extracts. Plants are the nature's gift used to prevent and control the diseases in all over the world [16]. The natural products (like alkaloids, flavonoids, steroids, terpenoids, tannins and saponins) still play a very important role in medicine. Plant extract has a potential application as natural medicine and to treat diseases as well as the microbiological safety of the human health [17]. Medicinal plants and the parts of medical plants denote a rich source of antibacterial agents. Plants are the source of many powerful and potent drugs and are used medicinally in different countries. Different traditional medicinal plants extracts have been tested. Several

reports have shown the efficiency of traditional herbs against microorganisms [15]. Medicinal plants contain some natural products which perform definite physiological action on the human body and these bioactive substances include alkaloids, flavonoids, steroids, terpenoids, tannins and saponins [9].

Towards the biological activities of medicinal plants these secondary metabolites contribute significantly towards the biological activities of medicinal plants. For example hypoglycemic, anti-diabetic, antioxidant, antimicrobial, anti-inflammatory, anti-carcinogenic, antimalarial, anticholinergic activities etc. [2]. Hence, phytochemical screening serves as the first early step in predicting the kinds of potential active compounds from plants [4]. Alkaloids, as reported by Elekwa *et al.* in 2008, have been seen to interfere with cell division which makes them an important plant part to possibly be used as remedy in the treatment of cancer. Noble (1990) corroborated that alkaloids are widely used as cancer chemotherapeutic agent. Cardiac glycosides have been reported to be effective in congestive heart failure [18]. From the phytochemical screening it is observed that the petroleum ether and chloroform extracts gave a negative result with Dragendorff's which indicate the absence of alkaloids in both extracts but it is present in ethanolic extract of leaf of *Barleria longiflora*. Whereas in stem petroleum ether showed negative result but chloroform and ethanolic extract showed the positive result. And also when the same test was done for the root of the *Barleria longiflora* L.f. petroleum ether and chloroform gave negative result and ethanolic extract gave a positive result.

Flavonoids are hydroxylated phenolic substances which are known to be manufactured by plants in response to microbial infection. And they have been found to be antimicrobial components against wide array of microorganisms [9]. Flavonoids are referred to as bioflavonoid, are polyphenol antioxidants found naturally in plants. Flavonoids are also known as vitamin P or natural biological modifiers. [1].

In the test of flavonoids petroleum ether showed the negative result which indicates the absence of flavonoids but chloroform and ethanolic extract showed the positive result which indicates the presence of flavonoids in the leaf sample of *Barleria longiflora*. Whereas in the stem sample petroleum ether and ethanolic extract showed positive result and chloroform showed negative result. For the root the result was obtained as we got for the leaf sample. Steroids have been reported to have antibacterial properties and they are very important compounds especially due to their relationship with compounds such as sex hormones [19]. When it comes for the test of steroids petroleum ether and ethanolic extract of leaf showed positive result with libermann burchard test by indicating the presence of steroids. But chloroform extract of leaf showed the absence of steroids. In the same test in the stem samples petroleum ether and chloroform showed the absence of the steroids whereas ethanolic extract showed positive result.

It is well known that terpenoids possess antimicrobial, antifungal, antiparasitic, antiviral, anti-allergenic, antispasmodic, antihyperglycemic, antiinflammatory and immunomodulatory properties. In storing agriculture products terpenoids can be used as protective substances [2]. The growth of many fungi, yeasts, bacteria and viruses was inhibited by tannins. tannins are attributed for analgesic and anti-inflammatory activities [20].

In the salkowski test, petroleum ether gave negative result indicating the absence of terpenoids. Chloroform and ethanolic extract of leaf sample showed the presence of terpenoids. In the stem of *Barleria longiflora* showed the previous mentioned results. But in the case of root sample petroleum ether and chloroform showed the negative result but ethanolic extract of root sample showed the positive result.

Tannins are polyphenolic compounds found in most plants and are generally thought to function as chemical defenses against pathogens and herbivores. In recent work points to a number of beneficial effects of tannins at moderate concentrations, including being a natural detergent to reduce bloat and a suitable substitute for synthetic anthelmintics and having antimicrobial activity and antioxidant activity [21]. When the attempt was done to find the tannins presence petroleum ether and chloroform showed the absence of tannins with modified prussian blue test in leaf sample. But ethanolic extract showed the presence of tannins. In the case of stem petroleum ether showed the negative result whereas the chloroform and ethanolic extract showed the positive results.

Saponins are extremely poisonous, as they cause hemolysis of blood and are known to cause cattle poisoning. However, they are also having beneficial pharmacological effects including anti-inflammatory, anti-parasitic and anti-viral properties [22]. As a detergents, piscicides and molluscicides saponins have been extensively used. In addition to their industrial applications as foaming and surface active agents and also have beneficial health effects [20]. Saponins are helpful in lowering cholesterol, as antioxidant and anti-inflammatory agents [19]. The leaf extract of petroleum ether, chloroform and ethanolic extract showed the negative result with forth test which indicates the absence of saponins. The stem extract of petroleum ether and chloroform gave negative result of saponins but the ethanolic extract showed the positive result. And the saponins were found to be absent in petroleum ether and ethanolic extract of root sample and present in chloroform extract of root sample of *Barleria longiflora* L.f.

Table 1. Preliminary phytochemical analysis of different part of *B. longiflora* L.f. using different solvent

S. No	Compounds	Test	LEAF			STEM			ROOT		
			P.E	C	E	P.E	C	E	P.E	C	E
1	Alkaloids	Dragendorff's	-	-	+	-	+	+	-	-	+
2	Flavonoids	Shinoda	-	+	+	+	-	+	-	+	+
3	Steroids	Liebermann Burchard	+	-	+	-	-	+	-	-	+
4	Terpenoids	Salkowski	-	+	+	-	+	+	-	-	+
5	Tannins	Modified Prussian blue	-	-	+	-	+	+	-	+	+
6	Saponins	Forth test	-	-	-	-	-	+	-	+	-

P.E - Petroleum Ether, C - Chloroform, E - Ethanol, + Denotes Presence of compound, - Denotes Absence of compound

References

- [1] Joseph B, Ph K, Mc K. Preliminary phytochemical screening of selected Medicinal Plants. *Int Res J Sci Eng.* 2013; 1(2): 55-62

- [2] Watal G, Yadav M, Chatterji S, Gupta SK. Preliminary phytochemical screening of six medicinal plants used in traditional medicine. *Int J Pharm Pharm Sci.* 2014; 6(5): 2-14
- [3] Vidhya R, Udayakumar R. Gas Chromatography-Mass Spectrometry (GC-MS) Analysis of Ethanolic Extracts of *Aerva lanata* (L.). *Int J Biochem Res Rev.* 2015; 7(4): 192-203. doi:10.9734/IJBCRR/2015/17241
- [4] Santhiya N, Priyanga S, Hemmalakshmi S, Devaki K. Phytochemical analysis, anti inflammatory activity, in vitro antidiabetic activity and GC-MS profile of *Erythrina variegata* L. bark. *J Appl Pharm Sci.* 2016; 6(7): 147-155. doi:10.7324/JAPS.2016.60722
- [5] Palanichamy P, Krishnamoorthy G, Kannan S, Marudhamuthu M. Bioactive potential of secondary metabolites derived from medicinal plant endophytes. *Egypt J Basic Appl Sci.* 2018; (August). doi:10.1016/j.ejbas.2018.07.002
- [6] Pattar P V, Jayaraj M, Arunkumar BS, Ananth B. Pharmacognostical and Preliminary Phytochemical Investigation of *Blepharis molluginifolia* , Pers. – A Threatened Medicinal Herb. *Pharmacogn J.* 2011; 3(19): 29-33. doi:10.5530/pj.2011.19.6
- [7] Jeremiah Oshiomame Unuofin, Gloria Aderonke Otunola AJA. Phytochemical screening and in vitro evaluation of antioxidant and antimicrobial activities of *Kedrostis africana* (L.) Cogn. *Asian Pac J Trop Biomed.* 2017; 7(10): 901-908. doi:10.1016/j.apjtb.2017.09.008
- [8] Susanto DF, Aparamarta HW, Widjaja A, Gunawan S. Identification of phytochemical compounds in *Calophyllum inophyllum* leaves. *Asian Pac J Trop Biomed.* 2017; 7(9): 773-781. doi:10.1016/j.apjtb.2017.08.001
- [9] Thite S, YR C, VT A, BA K. Preliminary phytochemical screening of some Medicinal Plants. *Int J Pharm Chem Biol Sci.* 2013; 3(1): 87-90
- [10] Nidhi UK, Kumar S. Identification and screening of bioactive compounds in *Barleria prionitis* linn rhizome exhibiting antibacterial activity. *Int J Res Biotechnol Biochem.* 2013; 3(1): 1-6
- [11] Yadav SA, Raj AJ, Sathishkumar R. In vitro antioxidant activity of *Barleria noctiflora* L. f. *Asian Pac J Trop Biomed.* 2012; 2 (2 SUPPL.). doi:10.1016/S2221-1691(12)60302-5
- [12] Sharma P, Sharma GN, Shrivastava B, Jadhav HR. Evaluation of Antioxidant Potential of *Barleria prionitis* Leaf and Stem. *Am J Phytomedicine Clin Ther.* 2014; 2(11): 1177-1186
- [13] Karthikeyan, Baskaran A, Rajasekaran CS. Gas Chromatography-Mass Spectrometry (GC-MS) Analysis of Ethanolic Extracts of *Barleria acuminata* Nees. *Int J Pharmacol Res.* 2016; 6(02). doi:10.7439/ijpr
- [14] Baskaran A, Karthikeyan V, Rajasekaran CS. Gas chromatography-mass spectrometry (gc-ms) analysis of ethanolic extracts of *Barleria longiflora* L. f. *World J Pharm Pharm Sci.* 2016; 5(4): 1233-1246. doi:10.20959/wjpps20164-6360

- [15] Velmurugan G, Anand. SP. Preliminary phytochemical screening and antibacterial activity of *phylloidium pulchellum* l. Desv. An important medicinal plant. *Int J Adv Res.* 2016; 4(2): 785-791
- [16] Baskaran A, Karthikeyan V, Rajasekaran CS. Anti-Microbial Activity of *Barleria longiflora* L . F Against Human Pathogenic Microbes. *Int J Life Sci Res.* 2019; 7(1): 225-229.
- [17] Kaminidevi S, Thangavelu T, Lakshmanan A, et al. Preliminary Phytochemical screening and Antimicrobial activity of fresh plant extract of Indian folk medicinal plant, *Gnaphalium polycaulon*. *Int J Phytomedicine.* 2014; 6(1): 82-86.
- [18] Itoandon EE, Olatope SOA, Shobowale OO. Preliminary Phytochemical Analysis and Antimicrobial Properties of Crude Extract of *Combretodendron macrocarpum* Stem Bark. *Niger Food J.* 2012; 30(2): 51-56. doi:10.1016/S0189-7241(15)30035-7
- [19] Samejo MQ, Sumbul A, Shah S, Bano S. Phytochemical screening of *Tamarix dioica* Roxb. ex Roch. *J Pharm Res.* 2013; 7(2): 181-183. doi:10.1016/j.jopr.2013.02.017
- [20] Savithramma N, Rao ML, Suhrulatha D. Screening of Medicinal Plants for Secondary Metabolites. *Middle-East J Sci Res.* 2011; 8(3): 579-584
- [21] Sung SH, Kim KH, Jeon BT, et al. Antibacterial and antioxidant activities of tannins extracted from agricultural by-products. *J Med Plants Res.* 2012; 6(15): 3072-3079. doi:10.5897/JMPR11.1575
- [22] Qadir U, Paul VI, Ganesh P. Preliminary phytochemical screening and in vitro antibacterial activity of *Anamirta cocculus* (Linn.) seeds. *J King Saud Univ - Sci.* 2015;2 7(2): 97-104. doi:10.1016/j.jksus.2014.04.004