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PHYTOCHEMICAL AND PHYSICO-CHEMICAL SCREENING ON LEAF OF *Lavandula bipinnata*

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ABSTRACT

The *Lavandula bipinnata* (Roth) Kuntz (Lamiaceae) used for centuries as an herbal remedy. The essential oil yield from it is highly effective and can be used in balms, perfumes, cosmetics and topical application. It is believed to be of benefit for a problem includes anxiety, headaches, depression, cold and as a breath freshener and mouthwash. The five solvent namely Petroleum ether, Acetone, Methanol, Ethanol and Distilled water extracts obtained by soxhlet extraction. The different qualitative phytochemical tests were performed to detect the presence of active phytoconstituents. A detailed histochemical investigation of leaf of drugs was carried out. The physico-chemical standards of the powder in the present study can be used to identify the crude drug. The phytochemical screening shows the presence of Alkaloid, Carbohydrate and Glycosides in all extracts. Saponin, Phenol, Tannin, Gum and mucilage present except than Petroleum ether. Maximum presence shown by Saponin and phenols.

Key words: *Lavandula bipinnata*, phytochemical, physico-chemical.

INTRODUCTION

Higher plants used in traditional medicine provided some of the first prototype drugs used clinically in the treatment of a wide variety of diseases. Most important bioactive constituents of these plants are steroids, terpenoids, carotenoids, flavonoid, alkaloids, tannins and glycosides. Plants in all facets of life have served a valuable starting material for drug development[1]. Plants have been associated with the human health from time immemorial and they are the important source of medicines since human civilization[2]. The history of plants being used for medicinal purpose is probably as old as the history of mankind. The use of medicinal plants in the industrialized societies has been traced to the extraction and

development of several drugs from this plant as well as from traditionally used folk medicine[3].

The *Lavandula bipinnata* (Roth) Kuntz (Lamiaceae) includes annual or short lived herbaceous and herb or small shrubs. A stout or slender erect, leaf shape is diverse across the genus. They are simple in some commonly cultivated species, in others they are pinnately toothed or pinnate, sometimes multiple pinnate and dissected. In most species the leaves are covered in fine hairs or indumentums, which normally contain the essential oils[4]. Flowers are borne in whorls, held on spikes rising above the foliage, the spikes being branched in some species. Some species produce colored bracts at the apices. The flowers may be blue, violet or lilac in the wild species, occasionally blackish purple or yellowish. The calyx is tubular. The corolla is also tubular, usually with five lobes (the upper lip often cleft, and the lower lip has two clefts) [4, 5] . The plant Flower in October-November.

Commercially the plant is grown mainly for the production of essential oil of *lavender*. This has antiseptic[6, 7] and anti-inflammatory properties[8]. These extracts are also used as fragrances for bath products. The plant is supposed to act as antidote against –poison. The roots are rubbed with over the sting or the bite of poisonous animals. The powdered leaves are given for inhalation to the person who has been bitten by a serpent in order to prevent him from falling into sleep[9]. The plant extract devoid of tannins[10].

In the present study we focused on the phytochemical, histochemical and physico-chemical study of leaves of *L. bipinnata.*

MATERIAL AND METHODS

Collection and authentication: The fresh plant Leaves of *L.bipinnata* were collected from the Gangapur dam area, Nasik (M.S.) India. The species for the proposed study was identified and authenticated as *L .bipinnata* by Dr. S. R. Kshirsagar a voucher specimen was prepared and deposited in the P.G. Dept. of Botany, S.S.V.P.S. College, Dhule (M.S.). The collected plants were washed repeatedly with tap water and finally with distilled water. Then sliced in root, stem and leaves. They were shade dried and powdered with help of grinding and filtered through sieves and stored for chemical analysis[11, 12].

Extraction: About 50 gm of shade dried leaf of *L.bipinnata* was powdered and was extracted with five different solvents like ethanol, methanol, acetone, petroleum ether and distilled

water in a Soxhlet extractor for 36 hours respectively. It was concentrated to dryness under reduced pressure and controlled temperature (40-50^{o}C) using rotary evaporator.

Phytochemical Analysis: Phytochemical analysis of the test solution was carried out according to standard methods[13, 14].

Histochemical Analysis: Tran sections of leaf were taken by free hand. Histochemical tests were performed on fresh plant materials[15, 16].

Physico-chemical Evaluations: Total ash, water-soluble ash, acid-insoluble ash, alcohol and water-soluble extractive values were determined to find out the amount of water and alcohol soluble components. The Moisture content was also been determined[17, 18]. Powdered leaves were observed in daylight on treating the powdered drug with different chemical reagents.

Table – 1: Preliminary phytochemical analysis of crude extract of *Lavandula bipinnata* Leaf

Sr. No.	Phytochemical test	Petroleum ether	Ethyl alcohol	Distilled Water	Acetone	Methanol
1	**Alkaloids**					
	a) Mayer's reagent	+	+	+	+	+
	b)Wagner's reagent	-	-	-	-	-
2	**Carbohydrate**					
	a)Molish's test	-	+	+	+	+
	b) Barfoed's test	-	-	-	-	-
	c)Benedict's test	-	-	-	-	-
	d)Keller-Kiliani	+	+	+	+	+
	e)Iodine	-	-	-	-	-
3	**Fixed oil and Fat**					
	a) Spot test	+	+	-	++	-
	b)Saponification Test	+	+	-	+	-
4	**Saponin**					
	a) Foam test	-	++	++	++	++
5	**Protein & amino acid**					
	a) Million's test	-	+	+	+	+
	b) Ninhydrin test	-	-	-	-	+
6	**Phenolic comp.**					
	a)Ferric test	-	++	++	++	++
8	**Gum & mucilage**					
	a) 95% alcohol	-	+	+	+	+

9	**Tannin**	-	+	+	+	+
10	**Flavonoid**	+	-	+	+	+
11	**Glycosides**	+	+	+	+	+

Note: (+) minimum presence, (++) maximum presence, (-) absent

Table 2: Histochemical Tests – *L. bipinnata* leaf

Reagents	**Constituents**	**Colour**	**Degree of intensity**
Weak Iodine solution	Starch	Blue/Violet	++
Sudan IV	Fats	Pink / Red	++
Dragendroffs reagent	Alkaloids	Orange red	+++
$Ba(OH)_2 + K_2Cr_2O_7 + CaCl_2$	Saponins	Yellow	+++
$FeCl_3$	Tannins	Blue green	+
Picric acid (Aq.)	Protein	Yellow	++
KOH+90% Alc.+$FeCl_3$+HCl	Glucoside	Dark blue	+

Note: (+) minimum presence, (++) medium presence, (+++) maximum presence

Table 3a: Physico-chemical characteristic of different extracts of *L. bipinnata* leaf

Solvent	**Initial weight of powder (gm)**	**Final weight of powder (gm)**	**Weight of crude extract (gm)**	**Crude extract (%)**	**Color of extract**
Distilled Water	50	47.79	2.21	4.42	Dark brown
Ethanol	50	42.17	7.83	15.66	Dark Green
Acetone	50	45.67	4.33	8.6	Dark Green
Petroleum ether	50	47.17	2.83	5.66	Green
Methanol	50	40.69	9.31	18.62	Dark Green

Table 3b: Physico-Chemical evaluation of *L. bipinnata* Leaf

Sr.No.	**Physical Character**	**(%W/W)**
1.	**Extractive value**	
	Alcohol	68.52
	Water	56.94
2	**Ash values**	
	Total ash	4.60
	A.S.A	3.38
	A.I.A	1.22
	W.S.A	3.64
	W.I.A	1.19

Note: A.S.A.= Acid Soluble Ash ; A.I.A= Acid Insoluble Ash ;

W.S.A=Water Soluble Ash ; W.I.A= Water Insoluble Ash

Table 3c: Effects of chemicals on powdered drugs of *L. bipinnata* Leaf

Sir No	Reagent	Leaf
1	Powder	Olive green
2	Powder + Iodine	Light brown.
3	Pd +5% ferric chloride	Pale yellow
4	Pd +1N.NaOH	Radish brown
5	Pd +Acetic Acid	Greenish black
6	Extracts +Acetic acid + 50% H_2SO_4	Yellowish green
7	Pd + 50% H_2SO_4	Green
8	Pd + concentrate HCl	Greenish
9	Pd + Ammonia.	yellow
10	Pd +Ammonia + pt.ferrocyanide.	Dark green
11	Extract+ 4% NaOH+ 1% $CuSO_4$	Pale yellowish brown
12	Extract +40% NaOH+1%Lead acetate.	Faint yellowish brown
13	Pd +50% Nitric acid +ammonia.	brownish Red
14	Pd +sat. Picric Acid.	Orange brown

RESULT AND DISCUSSION

Phytochemical tests: Phytochemical studies revealed presence of alkaloids, carbohydrates, Saponin, tannins, phenols, gums and mucilage etc. (Table 1). Alkaloids, glycosides, carbohydrates were examined in all five solvent extracts. Phenolic compounds, gums and mucilage, tannin and saponin were detected in all four extracts except than petroleum ether. Test for saponin and phenols showed best results. Phytochemical constituents such as Saponin, alkaloids, flavonoid, tannins, steroids several other aromatic compounds are secondary metabolites of plant that serve as defense mechanism against predation by many microorganisms, insects and herbivores.

Plant essential oils and extracts have been used for many thousands of years, in food preservation, pharmaceuticals, alternative medicine and natural therapies. It is necessary to investigate those plants scientifically which have been used in traditional medicine to improve the quality of health care. The essential oil from dried leaves of *L. bipinnata* evaluated for In-vitro antimicrobial and anti-oxidant activity[19,20]. The most common components usually found in *lavender* essential oils were present in the oil samples analyzed, out of 43 peaks, 29 components, which constitute 72.38%, were identified in the essential oil[20].

Histochemical: Histochemical results indicates presence of starch, proteins, tannins, saponin, fats, alkaloids and glycosides in different parts like parenchyma, cortex and pith (Table 2)

Physico-chemical characters: The physico-chemical characters like Ash value, extractive value and effect of chemicals on powder drug in daylight summarized in (Table 3a, 3b, 3c)

CONCLUSION

The results revealed the presence of medicinally active constituents in the present plant studied. The physico-chemical compounds identified in this study have earlier been proved to be bioactive. The presence of some of these compounds have been confirmed by previous workers to have medicinal as well as physiological activity and therefore could be said to be responsible for the efficacy of the leaves of the plants studied in treatment of different ailments. The plant extracts could therefore be seen as a potential source for useful drug. The continued traditional medicinal use of this plant is therefore encouraged while it is suggested that further work should be carried out to isolate, purify and possibly characterize the active constituents responsible for the activity of this plant. Also additional work should be embarked upon with a view to elucidate the possible mechanism of action of these extracts. The plant is not known to be toxic because it has been consumed by mankind for centuries without showing any signs of toxicity.

REFERENCES

1. Ajayi I. A., Ajibade O. and Oderinde R. A. Preliminary Phytochemical Analysis of some Plant Seeds. *Res.J.Chem.S,* 1(3): 58-62, (2011).
2. Kajaria D.K., M. Gangwar, A.K. Sharma, G. Nath, .B. Tripathi, J.S. Tripathi and S.K. Tiwari.Comparative evaluation of phenol and flavonoid content of polyherbal drugs. Pharmacology online, 3: 1365-1373. (2011)
3. Shrikumar S. and T.K. Ravi. Approaches towards development and promotion of herbal drugs.Phcog. Rev 1:180-184(2007)
4. Upson T, Andrews S. The Genus *Lavandula*. Royal Botanic Gardens, Kew. Retrieved 2012-03-30.(2004)
5. Bailey L. H. 'Manual of Cultivated Plants'. MacMillan Publishing Company. http://en.wikipedia.org/wiki/lavandula#cite_ref-14 Access date 1st March 2014
6. Moon, T; Wilkinson, JM; Cavanagh, HM. "Antiparasitic activity of two *Lavandula* essential oils against *Giardia duodenalis*, *Trichomonas vaginalis* and *Hexamita inflata*". Parasitology research 99 (6): 722–8. doi:10.1007/s00436-006-02348. PMID 16741725. (2006)

7. Inouye S., Takizawa T., Yamaguchi H. "Antibacterial activity of essential oils and their major constituents against respiratory tract pathogens by gaseous contact". Journal of Antimicrobial Chemotherapy 47 (5): 565–73. doi:10.1093/jac/47.5.565. PMID 11328766. (2001).
8. Hajhashemi V., Ghannadi A., Sharif B., "Anti-inflammatory and analgesic properties of the leaf extracts and essential oil of *Lavandula angustifolia* Mill". Journal of Ethnopharmacology 89 (1):67–71. doi:10.1016/S0378-8741(03)00234-4. PMID 14522434. (2003).
9. Kirtikar K.R. and Basu B.D., Indian Medicinal Plants. Vol. III, Lalid Mohan Basu Publication, 1975.
10. Atal C.K., Shrivastava J. B, Wali B. K., Chakravarty R. B., Dhavan B.N. and Rastogi R.P., Screening of Indian plants for biological activity. Part VIII. Indian J Exp. Bio 16, 330, (1978).
11. Khandelwal K.K. "Practical Pharmacognosy" Nirali Prakashan Pune. (1985)
12. Kokate C.K., A.P. Purohit and S.B. Gokhale, 'Pharmaeognosy, Nirali Prakashan, Pune, (2005).
13. Harbone Jb. Phytochemical Methods. Edn 3. Chapman and Hall, London. Pp 117-119, (1998).
14. Raman N. , Phytochemical techniques .Laboratory of Natural products pp 19-24, (2006)
15. Johansen D.A. "Plant Microtechnique", Tata McGraw Hill Publishing Company Ltd., New Delhi.(1940.)
16.Guerin H.P., Delaveau P.G. and Paris R.R. "*Bullein deLa Societe Botanique de France* " 118: 29, (1971).
17. AOAC "*Official and tentative methods of analysis*", XI Edn., Association of official Analytical chemists,Washington, D. C. (1975)
18. Anonymous. *Indian pharmacopoeia*, Vol. 2, 3rd edition. Govt. of India, Ministry of Health, Controller of Publications, New Delhi, India, pp. A 74-75. (1985)
19. Hanamanthagouda. M. S, Kakkalameli S. B, Naik P.M, Nagella, Praveen, Seetharamareddy H.R, Murthy, Hosakatte N.M . Essential oil of *Lavandulla bipinnata* Kuntz and their antimicrobial activity. Food chemistry, 118 (3),836-839, (2010).
20. Lu Huin, Li he, Lu Huan Li Xia Lan and Zhou Aiguo, 'Chemical composition of *Lavander* essential oil and its antioxidant activity and inhibition against rhinitis related bacteria.' African Journal of Microbiology Research Vol. 4 (4), 309-313, (2010).