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STUDIES ON SCREENING AND HISTOCHEMICAL LOCALISATION OF PHYTOCHEMICALS IN THE MEDICINAL PLANT *BARLERIA LUPULINA* LINDL

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ABSTRACT

The genus *Barleria lupulina* Lindl of the family Acanthaceae belongs to the sub tribe Barlerieae of the tribe Justicieae *sensu* Benth & Hook. The present investigation mainly emphasized on the histochemical localization of phytochemicals like alkaloids, starch, tannins, reducing sugars, proteins, flavonoids, amino acids and lignins. These localization were determined through colouristion using different reagents like Wagner's, Iodine Solutions, 10% Lead Acetate, Benedict's, Lugol's, 10% NaOH, Fehling's(A&B), Millon's, 0.2% Ninhydrin and 1% Phloroglucinol, The active compounds were identified prominently in different locations of the stem, leaf petiole and root of the medicinal plant *B lupulina* under study. It was found that presence of number of phytochemicals in xylem is higher than other tissues.

Keywords: Histochemical localization, Phytochemicals, Reagents, Medicinal plant, *B lupulina*.

INTRODUCTION

Ancient Indian literature incorporates a remarkably broad definition of medicinal plants and considers all plant parts to be potential sources of medicinal substances. *Barleria lupulina* Lindl is a cultivated medicinal plants, an introduced species from Mauritius, now somewhat naturalized besides its cultivation in the garden as ornamental shrub [1]. It is also used for its medicinal importance as the leaf juice is given to stop bleeding when cut and leaf paste is used as poultice to relief pain. It has strong inhibitory effect against acne-inducing bacteria [2]. It is a small shrub, commonly known as Sornomukhi and distributed in South East Asia. The plant is externally used as an anti-inflammatory against insect bites, snake bites, herpes simplex [3]. Compounds found in the leaves of *Barleria lupulina* Lindl. include barlerin, acetylbarlerin, shanzhiside methyl ester, acetylshanzhiside methyl ester, ipolamiidoside and iridoid glucosides [4]. Limited scientific work has been carried out on the histochemical localization of phytochemicals in *B. lupulina*. The objective of the present investigation is therefore, an attempt to evaluate various pharmacognostic standards, characters of phytochemicals and histochemical localization in *B lupulina*.

MATERIAL AND METHODS

Plant material i.e. *Barleria lupulina* Lindl. (family Acanthaceae) for the present study was collected from the medicinal plant garden of Rampurhat College, Rampurhat and Rathindra Krishi Vigyan Kendra, Visva-Bharati, Sriniketan, Birbhum, located in the lateritic belt of West Bengal, India. The plant has been carefully identified with the help of a book on Systematic of Flowering Plants [1]. Localisation of phytochemicals were identified by light microscope with the hand sections (transverse) and observed under 10x X 10x microscopic lens. Histochemical localization and characterization of phytochemicals from the fresh materials were performed using few reagents such as Wagner's, Iodine Solutions, 10% Lead Acetate, Benedict's, Lugol's, 10% NaOH, Fehling's(A&B), Millon's, 0.2% Ninhydrin and 1% Phloroglucinol. Observing the colorations of these materials with reagents the characterization of the phytochemiclas such as alkaloids, starch, tannins, reducing sugars, proteins, flavonoids, amino acids and lignins were made and listed out.

RESULTS AND DISCUSSION

Presence of alkaloids

It is found from the table-1 that alkaloids are present with orange brown coloration by Wagner's reagent in few epidermal and pith cells and in all xylem cells in stem. But alkaloids in root are present in the cells of the

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cork and in xylem region. But in petiole alkaloids present in epidermis, hypodermis and in xylem. Similar type of results were obtained by some workers [5]

Through iodine test (Blue coloration) it was found that starch grains were located in epidermis, xylem and pith in stem, but only in xylem in root and in cortical parenchyma and few cells in xylem in leaf petiole. Many other workers found prototype results [5,6].

Presence of tannins

Yellow colorations was found by using 10% lead acetatae in the epidermis and xylem in stem and in cork and secondary phloem in root and only in xylem in leaf petiole of *B. lupulina*. Other workers [7] found similar type of results in the family Convolvulaceae.

Presence of reducing sugar

It is observed from the table-1 that reducing sugar is present in few primary xylem, hypodermis, epidermis in stem and in few secondary phloem cells, cork cells, hypodermis and epidermis in root. In leaf petiole it is present only in few cortical cells. Two types of tests were performed using Benedict's reagent and Fehling's (A & B) reagent with brick red colorations in both the tests. Other scientists [8] observed similar type of result of chemical analysis of some medicinal plants.

Presence of proteins

Through the tests with Lugol's and Millon's reagent yellow brown coloration was observed in xylem, epidermis, hypodermis and pith in stem and hypodermis, secondary xylem and cork cells in root and only in few cells in hypodermis in petiole of *B. lupulina*. Secondary metabolites were present in some medicinal plants [8,9]

Presence of flavonoids

Magenta coloration (yellowish brown) colorations was found in few hypodermal cells in stem and hypodermis and cork cells in rootand in epidermis and cortex in leaf petiole in *B. lupulina* using 10% NaOH. Similar types of results were also observed by many scientists [6] in *Plumbago zeylanica.*

Presence of amino acids

Amino acids were observed in only epidermis and xylem in stem in, in few xylem and phloem in root and only in xylem core in leaf petiole with purple coloration using 0.2% Ninhydrin reagent in the taxon *B. lupulina*. Similar types of results were observed in Asclepiadaceae by other workers [10].

Presence of lignin

Test by 1% Phloroglucinal revealed that lignin was present only in xylem in stem and in hypodermis, cortex and cork in root and in xylem in leaf petiole of *B. lupulina.* Other workers [5] found similar type of results.

Table 1. Histochemical localization of phytochemicals in stem, root and petiole of *Barleria lupulina*

Reagents	Colouration	Phytochemicals	Tissue location		
			Stem	Root	Petiole
Wagner's	Orange brown	Aalkaloids	Epidermis, xylem, pith cells	Xylem, cork cells	Epidermis, hypodermis, xylem
Iodine solution	Blue	Starch	Epidermis, xylem, pith cells	Xylem	Cortex, few xylem cells
10% Lead acetate	Yellow	Tannin	Epidermis, xylem	Cork, secondary phloem	Xylem
Benedict's	Brick red	Reducing sugar	Few primary xylem, few hypodermis	Few secondary phloem, cork cell, hypodermis, epidermis	Few cortical cells
Fehlings's	Brick red	Reducing sugar	Few primary xylem, few hypodermis	Few secondary phloem, cork cell, hypodermis, epidermis	Few cortical cells
Lugol's	Yellow brown	Protein	Epidermis, hypodermis, xylem, pith cells	Hypodermis, secondary xylem, cork cell	Few hypodermis
Millon's	Yellow brown	Protein	Epidermis, hypodermis, xylem, pith cells	Hypodermis, secondary xylem, cork cell	Few hypodermis
10% NaOH	Yellowish brown/ magenta	Flavonoids	Few hypodermis	Cork, hypodermis	Epidermis
0.2 % Ninhydrin	Purple	Amino acids	Epidermis, few xylem	Xylem, phloem	Cortex, xylem
1 % Phluroglucinol in 50% HCl	Redish brown	Lignin	Xylem	Cork cells, hypodermis, cortex	Xylem

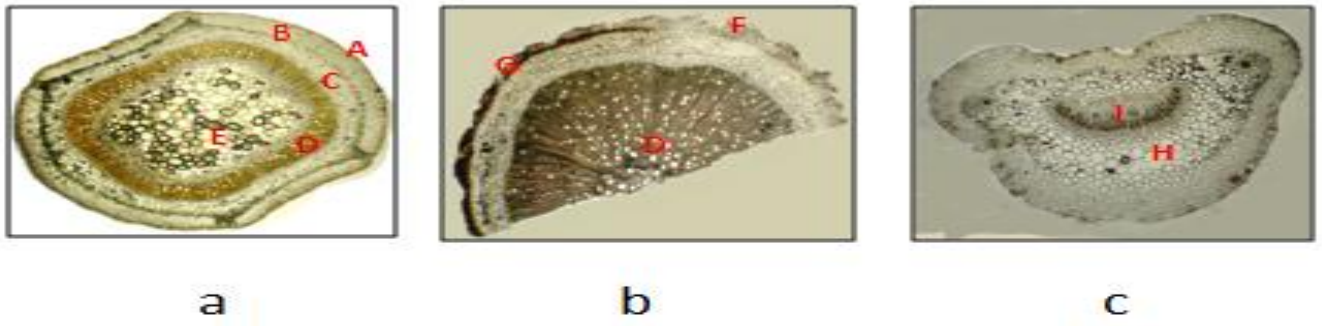

Fig. 1. Transverse section of *Barleria lupulina* Lindl stem (a), root (b) and petiole (c)

A. Epidermis, B. Hypodermis, C. Secondary phloem, D. Secondary xylem, E. Pith, F. Lenticel, G. Cork cells, H. Cortex, I. Vascular bundle

CONCLUSION

Phytochemical screening of the leaf, stem and petiole of *Barleria lupulina* revealed the presence of alkaloids, starch, tannins, reducing sugar, proteins, flavonoids, amino acids and lignin in different tissues. From the results it is found that presence of number of chemical constituents in xylem is higher than other tissues. These compounds have significant application against human pathogens that causes acne and are reported to have curative properties against several pathogens such as *Escherichia coli*, *Pseudomonas aeruginosa*, *Klebsiella pneumonia*, *Staphylococcus aureus* etc. and therefore could suggest their use in the treatment of various diseases [11].

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