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Preliminary Phytochemical and Anatomical Studies on Bark and Leaves of Pimenta dioica (L.) Merr.; (Family-Myrtaceae)

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Abstract: ***A medicinal plant is a plant that possesses therapeutic properties and pharmacological effects on the human body. It naturally synthesizes some secondary metabolites like alkaloids, sterols, terpenes, saponins, tannins, resins, flavonoids, carbohydrates, etc. Phytochemicals are chemical compounds produced by plants and they helps from the diseases and they contains more therapeutic values.The plant anatomy is the branch of botany, which the study of internal structure of plants. Plant anatomy is divided into the following categories. Leaf anatomy shows epidermis and palisade cells and stem structure shows stem anatomy. Pimenta dioica is a medicinal and aromatic plant, used as a flavoring agent. The present study carried out the anatomical study of leaves and stems of Pimenta dioica and the phytochemical analysis of leaves and bark.***
Keywords: Pimenta, Anatomical, Phytochemical, Leaf, Stem, Bark.

I. INTRODUCTION

India is a mega diverse nation, having around 11% of world's biota. India is a home for thousands of medicinally important plant species. Medicinal plants produces and accumulate some secondary metabolites like alkaloids, sterols, terpenes, saponins, tannins, resins, flavonoids, carbohydrates. The medicinal plants are useful for healing and curing human diseases only the presence of phytochemicals present in the plants. India is rich in medicinal and aromatic plants covering an area with different environmental conditions. In India, Medicinal and Aromatic plants play an important role in the agricultural profile. Spices are defined as a strongly flavonoids, medicinal and aromatic substance and are obtained from tropical plants. These spices play a very important role in cooking. Many of the spices are aromatic and it gives flavour. India plays a very important role in the spice market of the world. It contains chemical constituents such as alkaloids, flavonoids, glycosides, phenolics, and terpenoids. Pharmacological evaluation includes the examination of morpho-anatomical characters and pharmacological extractive values.

The medicinal properties of phytochemicals play a vital role in many treatments for diseases. The phytochemicals do not have any side effects like the other pharmaceutical medicines have. So the phytochemicals can cure the human diseases without causing any harm to human.

II. MATERIALS AND METHODS

A. Study area (Plate 1 & 2)

Coimbatore also known as Covai, is a major city of Tamilnadu. It is located on the Western Ghats.The mean maximum temperature ranges from 35.9 °C (97 °F) to 29.2 °C (85 °F). The soil is predominant is black, but some red loamy soil is also formed. The city has a tropical wet and dry climate, with a wet season lasting from September to November due to the northeast monsoon.

Plate: 1-Location Map

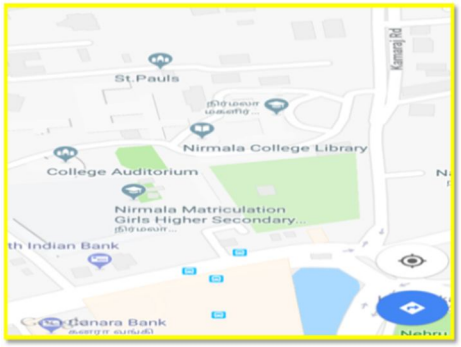


Plate: 2- Study area



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B. Selected Sample (Plate: 3)

For the present study sample is collected from Nirmala College Campus the month of November the leaves, stem, bark were collected. The anatomical and phytochemical analysis of leaves and stems of *Pimenta* and the ethanolic extracts of leaf and bark is analyzed.

Pimenta dioica (L.) Merr.; Plate:3- Habit of selected sample

Systematic Position
Kingdom: Plantae
Division: Angiosperms
Class : Eudicots
Order : Myrtales
Family : Myrtaceae
Genus : Pimenta
Species : P. dioica (L.) Merr.;



C. Plant Description

It is native to central and South America, Mexico, and the West Indies. It is also called Pimenta dioica or myrtle pepper. Allspice is a small, scrubby tree. It is one of the most important ingredients of food and is a good substitute. It is an ingredient in commercial sausage preparations and curry powders. Allspice can also be found in essential oil form.

Uses: The applications of different spices in the medicinal, aromatic, food and beverage industry including healthy foods, cosmetics, perfumery and, flavouring. Allspice resulted in discovery of many aromatic compounds such as Glycosides, Carbohydrates, Saponins, Tannins, etc. Allspice, have resulted in the discovery of many and novel aromatic compounds, mostly glycosides and polyphenols that show antibacterial, hypotensive and analgesic properties.

D. Anatomical Observation

Microscopic studies were done by preparing thin hand sections of stem and leaves. The sections then stained with Safranin and mounted with glycerin in a cover glass. And observed under the microscope. Proper staining is important criteria for the anatomical study.

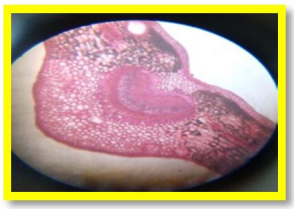
E. Preliminary Phytochemical Analysis

The leaves and barks were washed and for shade drying. After shade drying, they were powdered using an electrical blender. Fine powder was made transferred into air tight containers with proper labeling for further analysis and extraction processes.15 grams of the powdered sample was extracted with 100 ml of ethanol solvents in the shaker system for 48 hours. The phytochemical screening of barks and leaves of ethanolic extract of Pimenta dioica were analyzed by standard methods and it showed various phytochemical constituents. (Harbone, 1984 and Wagner et al, 1984).

III. RESULTS AND DISCUSSION

In the present study the anatomical studies on Pimenta dioica (L.) Merr.; were described to know about the internal features of stem and leaves. The type of tissues and presence or absences of extra characters were identified. The anatomical features of stem and leaves of the Sample is represented and recorded in the Table-1

Table: 1 Comparative anatomical characters of selected Sample

Pimenta dioica	Anatomical characters	
	Transverse section	Description
Leaf		Section shows the presence of upper epidermis, Parenchymatous cortex with oil glands, upper palisade and lower spongy, lignified. Trichomes are present in the epidermis, pericycle schlerenchymatous, Mucilage is present. Lignified mesophylls are present.

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Stem		Circular transection shows thick walled upper epidermis, oil glands present at the parenchymatous cortex, vascular bundles and pith is small as compared to the pith of Murraya koenigii. Epidermis is uniseriate. Epidermis is schlerenchymatous.

A. Phytochemical Screening

In the present study was carried out to find out the phytochemical screening of *Pimenta dioica* (L.) Merr.; leaves and their barks. Phytochemical screening was done to identify the presence of carbohydrates, proteins, amino acids, steroids, glycosides, flavonoids, alkaloids, tannins, saponins and terpenoids. Ethanol extract is taken for both the aromatic plants and compare with the phytochemical constituents. The presence or absence of secondary metabolites are represented in the Table-2.

Table-2 Comparative Phytochemical screening of selected Sample in Ethanolic extract

S. No	Phytochemicals	Ethanolic leaf extract of *Pimenta dioica*	Ethanolic bark extract of *Pimenta dioica*
1	Carbohydrates	-	+
2	Protein	+	+
3	Amino acids	+	-
4	Glycosides	-	+
5	Terpenoids	+	+
6	Steroids	+	+
7	Flavanoids	+	+
8	Alkaloids	+	+
9	Saponins	-	-
10	Tannins	+	+

"+" indicates the presence of Phytochemicals
"-" indicates the absence of phytochemicals

The leaf extract of Pimenta dioica revealed the presence of flavonoids, alkaloids and tannins, protein, amino acids, terpenoids, steroids, saponins, etc. Carbohydrates, glycosides, saponins are absent in the Ethanolic leaf extract of Pimenta dioica. In the case of bark extract presence of carbohydrates, Glycosides, Terpenoids, Proteins, Amino acids, steroids, flavonoids, Alkaloids, Tannins etc. Amino acids, Saponins are absent in the ethanolic extract of Pimenta dioica leaves. More phytochemicals are present in the bark of Pimenta dioica

IV. CONCLUSION

The large numbers of phytoconstituents are present in Pimenta dioica bark. It shows the high activity of medicinal properties. Saponins, amino acids are absent in Pimenta dioica. Some of the phytochemicals are absent in leaf of Pimenta dioica. They are proteins, amino acids, glycosides, steroids, saponins, etc. Comparatively the amount of phytochemicals quantity is large in Pimenta dioica bark. For this study, the bark contains more phytochemicals than the leaves. So, both the plant parts are medicinally and economically important only because of the presence of chemicals. These phytochemicals are useful to cure diseases and used as cosmetics, tastening agent, etc. The main features of both the plant parts are the presence of oil glands in the leaves and stems. There are many multicellular trichomes on the leaf epidermis. The lignified mesophylls cells are present in Pimenta dioica leaf. The stem epidermis is schlerenchymatous. It shows the hardness of the tissues.

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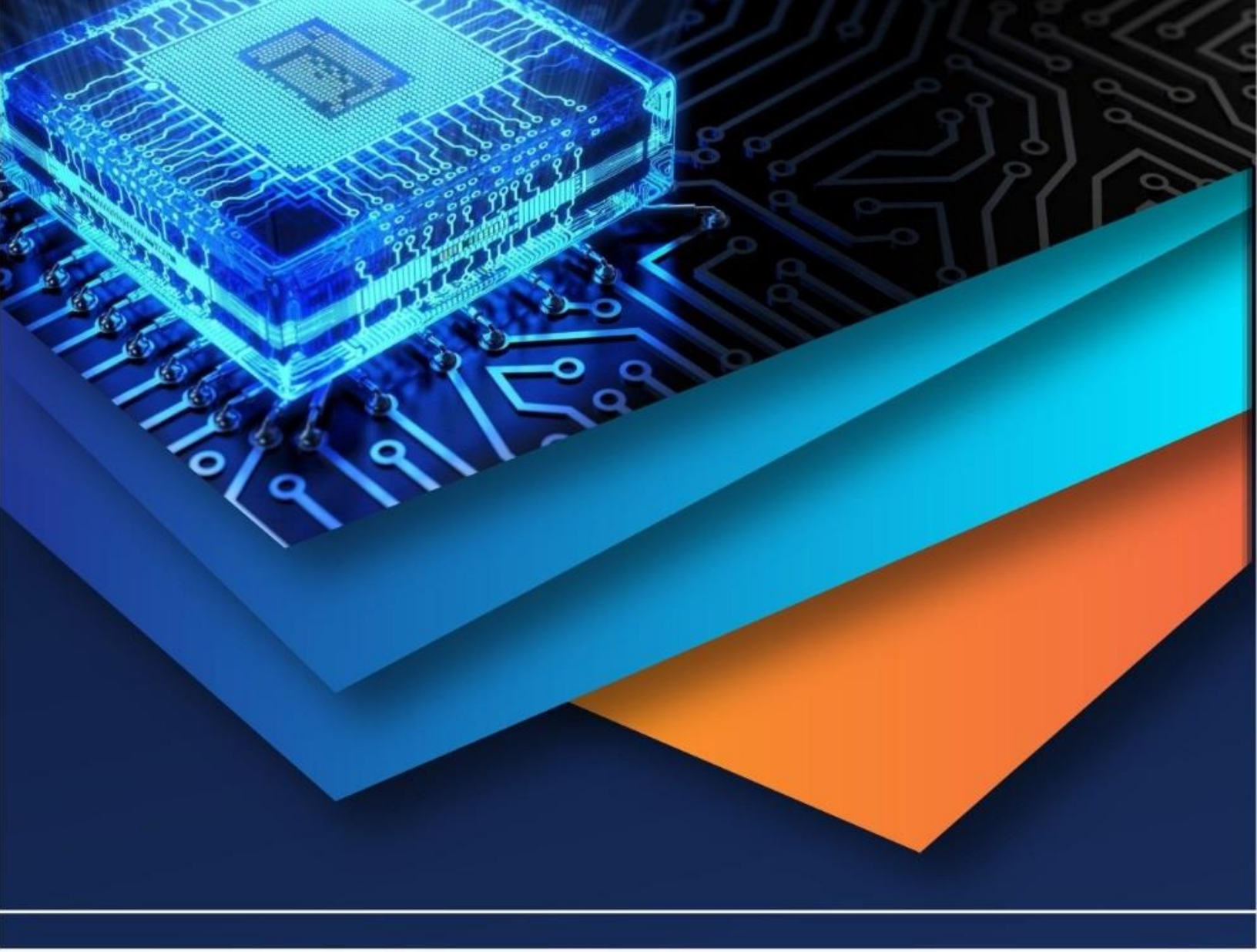
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