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Preliminary Phytochemical and Anatomical Studies on Bark and Leaves of *Murraya koenigii* (L.) Spreng.; (Family-Rutaceae) and *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 help from the diseases and they contain more therapeutic values.

The plant anatomy is the branch of botany, which is 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. *Murraya koenigii* (L.) Spreng.; and *Pimenta dioica* (L.) Merr.; are medicinal and aromatic plants, used as flavoring agent. The present study carried out the anatomy of leaves and stem of *Murraya koenigii* and *Pimenta dioica* and the phytochemical analysis of leaves and bark of *Murraya koenigii* and *Pimenta dioica*.

Keywords: *Murraya koenigii*, *Pimenta dioica*, 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 produce 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. This spice plays 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.

The phytochemical analysis of the *Murraya koenigii* revealed the presence of carbohydrates, proteins, oils, lipids, glycosides, alkaloids, tri terpenoids and steroids and absence of tannins, flavonoids and saponins in the leaf extracts. The leaves, roots and bark can all be used internally in the treatment of digestive problems and relieve nausea and vomiting.

II. MATERIALS AND METHODS

A. Study Area (Plate 1 to 4)

Coimbatore also known as Kovai 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.

Parapram is a small city of Kannur district, Kerala. It experiences a rare humid tropical monsoon climate. In April and May, the average daily maximum temperature is about 35 °C (95 °F). Temperatures are low in December and January. The annual average rainfall is 3438 mm. The soil is mainly laterite.

Plate: 1

Location Map of Nirmala College Campus

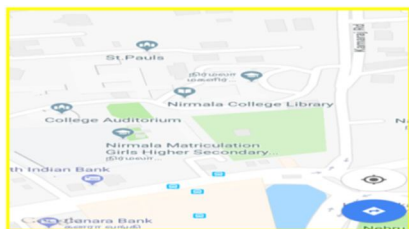


Plate:2

Location Map of Parapram



Plate: 3- Study Area

Sample: 1- *Pimenta dioica* (L.) Merr.; Sample: 2- *Murraya koenigii* (L.) Spreng.;



B. Selected Samples

For the present study samples are collected from Nirmala Campus and Parapram to find out the anatomical and phytochemical analysis of leaves and stems of *Murraya Koenigii* (L.) Spreng.; and *Pimenta dioica* (L.) Merr., and preliminary phytochemical analysis of the ethanolic extracts is analyzed. The leaves, stem, bark were collected during the month of November.

Sample-1 *Pimenta dioica* (L.) Merr.; Plate:5- Habit of selected sample1

Systematic Position

- 1) Kingdom: Plantae
- 2) Division: Angiosperms
- 3) Class : Eudicots
- 4) Order : Myrtales
- 5) Family : Myrtaceae
- 6) Genus : *Pimenta*
- 7) Species : *P. dioica* (L.) Merr.



C. Plant Description

It is native to central and South America, Mexico, and the West Indies. *Pimenta* is a genus of flowering plant in the Myrtaceae family. It is also called *Pimenta dioica* or myrtle pepper. Allspice can be a small, scrubby tree. Allspice is one of the most important ingredients of food and is a good substitute. It is an ingredient in commercial usage preparations and curry powders. Allspice can also be found in essential oil form. The applications of different spices in medicine, aromatic, food and beverage industry including health foods, cosmetics, perfumery and, flavouring. Allspice resulted in discovery of many aromatic compounds such as Glycosides, Carbohydrates, Saponins, Tannins, etc.

Sample-2 *Murraya konigii* (L.) Spreng.;

Systematic Position

- 1) Kingdom: Plantae
- 2) Division : Angiosperms
- 3) Class : Rosids
- 4) Order : Sapindales
- 5) Family : Rutaceae
- 6) Genus : *Murraya*
- 7) Species : *M. koenigii* (L.) Spreng.;



- 1) **Plant Description:** The *Murraya koenigii* (L.) Spreng.; is native to India and Sri Lanka, is a tropical to sub-tropical tree in the family Rutaceae. The leaves are generally called by the name curry leaves. It is a strongly aromatic herb that improves appetite and digestion. The leaves, roots and bark can all be used internally in the treatment of digestive problems. The leaves are used in the treatment of diarrhoea and dysentery. The leaves are harvested as required and used fresh roots and bark are harvested as required and can be used fresh or dried.

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. And observed under the electron microscope.



- 1) **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 with ethanolic extract of *Murraya koenigii* and *Pimenta dioica* were analyzed by standard methods and it showed various phytochemical constituents (Harbone, 1984 and Wagner *et al*, 1984).

Phytochemicals	Reagent	Indications
Carbohydrates	2 drops of Molish reagent, 2 ml conc. H_2SO_4	A brick red precipitate
Proteins	3% NaOH & few drops of 1% $CuSO_4$	Solution turns from blue to purple
Amino acids	Few drops of 40% NaOH & 10% lead acetate	Black precipitate
Steroids	2 ml chloroform & 2 ml conc. sulphuric acid	Red chloroform layer & greenish yellow
Glycosides	Glacial acetic acid, few drops of 5% ferric chloride & conc. sulphuric acid	Reddish brown coloration
Flavonoids	Few drops of 1% ammonia solution	Yellow coloration
Alkaloids	5 ml of 1% aq. HCL & 1ml Mayer's reagent	Yellow colour precipitate
Tannins	1-2 drops of ferric chloride	Blue colour-Gallic tannin
Saponins	2 ml distilled water	Persistent foam
Terpenoids	2 ml chloroform, 3 ml conc. sulphuric acid	Reddish brown precipitate



III. RESULTS AND DISCUSSION

In the present study the anatomical studies of *Murraya koenigii* (L.) Spreng.; and *Pimenta dioica* (L.) Merr.; were described to know about the anatomical feature of stem and leaves. The type of tissues and presence or absences of extra features were identified. Some of the anatomical features of stem and leaves the Samples are represented in Table - 1.

Table- 1 Comparative Anatomical characters of selected Samples

Samples	Anatomical characters	
	Leaves	Description
<i>Murraya koenigii</i>		Trichomes are seen in epidermis. Upper epidermis, palisade and spongy tissues are present, small pith is present, vascular bundles are completely surrounds the pith. Oil glands are not seen in the leaves. The mesophyll cells are loosely arranged parenchymatous cells.
<i>Pimenta dioica</i>		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 sclerenchymatous, Mucilage is present.

Comparative Anatomical characters of selected Samples

Samples	Anatomical characters	
	Stems	Description
<i>Murraya koenigii</i>		Circular transection shows epidermis, oil gland is present near the epidermis and situated in the vascular bundles are arranged in a star shape. cortex, vascular bundle and pith is large.
<i>Pimenta dioica</i>		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 <i>Murraya koenigii</i> . Epidermis is uniseriate.

A. Phytochemical Screening

In the present study was carried out to find out the phytochemical screening of *Murraya koenigii* (L.) Spreng.; and *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 Table-2 and Table-3.

Table-2 Comparative Phytochemical screening of selected Samples in Ethanolic leaf extract

S. No	Phytochemicals	Ethanolic extract of <i>Murraya koenigii</i>	Ethanolic extract of <i>Pimenta dioica</i>
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 *Murraya koenigii* (L.) Spreng.; revealed the presence of carbohydrates, flavonoids, alkaloids and tannins. Protein, Amino acids, glycosides, Steroids, Saponins, etc. are absent in the Ethanolic leaf extract of *Murraya koenigii* (L.) Spreng.; In the case of presence of Protein, Amino acids, steroids, flavonoids, Alkaloids, Tannins etc. Carbohydrates, Glycosides, Saponins are absent in the ethanolic extract of *Pimenta dioica* leaves.

Table-3 Comparative phytochemical screening of selected Samples in Ethanolic Bark extracts

S. No	Phytochemicals	Ethanolic extract of <i>Murraya koenigii</i>	Ethanolic extract of <i>Pimenta dioica</i>
1	Carbohydrates	+	+
2	Protein	-	+
3	Amino acids	-	-
4	Glycosides	+	+
5	Terpenoids	-	+
6	Steroids	+	+
7	Flavanoids	+	+
8	Alkaloids	+	+
9	Saponins	-	-
10	Tannins	+	+

The Bark extract of *Murraya koenigii* shows the presence of carbohydrates, flavonoids, alkaloids, tannins, glycosides, Steroids, Saponins, etc. Protein, Amino acids, Terpenoids, Saponins, etc are absent in the ethanolic Bark extract of *Murraya koenigii*. In the case of ethanolic Bark extract of *Pimenta dioica*, phytochemical screening exhibited the presence of Protein, Carbohydrates, Glycosides, Terpenoids, Steroids, Flavanoids, Alkaloids, Tannins, etc. Only Amino acids and Saponins are absent in the bark extract.

IV. CONCLUSION

The large number of phytoconstituents is present in *Pimenta dioica* leaves and bark. Carbohydrates, saponins, amino acids are absent in *Pimenta dioica*. Some of the phytochemicals are absent in *Murraya koenigii*. They are proteins, amino acids, glycosides, steroids, saponins, etc. Comparatively the amount of phytochemicals quantity is large in *Pimenta dioica*. So, both the plants 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 feature of both the plants are the presence of oil glands in the both stems. There were many multicellular trichomes on both epidermises. The lignified mesophyll cells are present in *Pimenta dioica* plants. Large pith and vascular tissues are present in *Murraya koenigii* stem. The oil glands are absent in *Murraya koenigii* leaves.

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