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## **Ethnobotanical and Phytochemical Study of Medicinal Plants Found in and around Malliputhur**

**Dr. K. Geetha, Ms. R. Lavanya**

**Assistant Professor of Botany, II M.Sc. Botany**

**The Standard fireworks Rajaratnam College for Women (Autonomous), Sivakasi.**

**geetha-bot@sfrcollege.edu.in**

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### **ABSTRACT:**

Medicinal plants have bioactive compounds which are used for curing of various human diseases and also play an important role in healing. The medicinal plants have antifungal, antibacterial and anti-inflammation activities. In this study we have to take survey of 75 medicinal plants and their phytochemical constituents in and around Malliputhur. Most of the plants have alkaloids, terpenoids, various amino acids, flavonoids, tanins and saponins. Among the 75 medicinal plants we have to take only three important medicinal plants naming Piper betle L. (Vetrillai), Abutilon indicum L. (Thuti), Morinda tinctoria Roxb. (Manjanathi) are used for the variety of plant growth. Phytochemicals have two categories i.e., primary and secondary constituents. Primary constituents have chlorophyll, proteins sugar and amino acids. Secondary constituents contain terpenoids and alkaloids. Preliminary screening of phytochemicals in different solvent (hexane, ethanol, and chloroform) of plant extracts i.e., Piper betle, Abutilon indicum, Morinda tinctoria were carried out by employing standard methods for conducting Qualitative phytochemical analysis for studying the presence of active compounds like steroids, reducing sugar, sugar, alkaloids, phenolic compounds, flavonoids, tannins, saponins and amino acids. The test plant extracts, few phytochemical constituents were present in all the solvents.

**Keywords:** Piper betle L. (Vetrillai), Abutilon indicum L. (Thuti), Morinda tinctoria Roxb. (Manjanathi), Ethnobotanical survey and phytochemical analysis.

### **INTRODUCTION:**

Plants play a vital role in the development of new drugs or antibiotics. Plants have many antimicrobial and phytochemical constituents. Most of the plant has these characters and it is used to cure many diseases. Phytochemicals are the natural compounds that occur in plants, vegetables and fruits that work with nutrients and fibers to act against diseases or more specifically to act against diseases. Plants are directly exposed to air, water and soil so it is affected directly by these components. In India medicinal plants play a vital role for the purification of water and soil. It also plays an important role in the preparation of many ayurvedic medicines and it is used to cure many chronic diseases like cancer, diabetes, hemorrhage etc., (Naseemullah et al., 2014).

According to World Health Organization (WHO) medicinal plants would be the best source to obtain variety of drugs. About 80% of individuals in developed countries about 80% of persons use traditional medicines, which has compounds derived from medicinal plants.

Medicinal plants contain some organic compounds which provide definite physiological action on the human body and these bioactive substances include tannins, alkaloids, carbohydrates, terpenoids, steroids and flavonoids (Hassan and Kmarudinet.al., 2017). These compounds are synthesized by primary or rather secondary metabolism of living organisms. Secondary metabolites are chemically and taxonomically extremely diverse compounds with obscure function. They are widely used in the human therapy, veterinary, agriculture, scientific research and countless other areas.

**DESCRIPTION OF THE PLANT:**

**1. Betel (Piper betle L.)**

Class : Magnoliopsida

Subclass: Magnolidae

Order: Piperales

Family: Piperaceae

Genus: Piper L.

Species: Piper betle L



In India and Sri Lanka, the bundle of betel leaves is traditionally offered as a mark of respect and favourable beginnings. Occasions include greeting elders at wedding ceremonies, celebrating the New year and offering payment to Ayurvedic Physicians and astrologers.

Wahidaet. al., 2012 discussed about the preservation of piper species by vacuum drying methods and concluded that increasing drying temperature combined with increasing vacuum pressure accelerated the vacuum drying process.

Kalemet. al., 2005 suggested that Piper betle used effectively in the treatment of diabetes. These results concluded that oxidative stress played a key role in diabetes and treatment with Piper betle leaf extract are useful in controlling glucose and lipid levels of diabetic in both

animal and human beings. Hewageeganaet al., 2011 and Chandra et. al., 2011 also used the same plant to cure diabetes.

**2. Country Mallow(*Abutilon indicum*L.):**

|          |                |
|----------|----------------|
| Class    | :Magnoliopsida |
| Subclass | :Rosanae       |
| Order    | :Malvales      |
| Family   | :Malvaceae     |
| Genus    | :Abutilon      |
| Species  | :indicumL.     |



*Abutilon indicum* (Indian abutilon, Indian mallow) is a small shrub in the comes under the family Malvaceae. The native place of this plant is tropic and subtropical regions and sometimes cultivated as an ornamental. It is located in Karnataka and Tamilnadu. This plant is mainly used as a medicinal plant and is considered invasive on certain tropical islands. Its roots and leaves are used for curing fever.

*Abutilon indicum* is an erect woody plant found commonly in tropical Regions (Archana Sharma, et.al., 2013). The seeds are used as a purgative in piles and in the treatment of cough (Nadakami, 1995). The seeds are also used to cure gonorrhea (Sainiet. al., 2015) and ti is also used to linctus. Seed of *Abutilon indicum* contain an important sugar molecule called raffinose (Badamiet. al., 1975).

**3. Indian Mulberry(*Morindatictoria*Roxb.):**

|          |                  |
|----------|------------------|
| Class    | :Magnoliopsida   |
| Subclass | :Asteridae       |
| Order    | :Gentianales     |
| Family   | :Rubiaceae       |
| Genus    | :MorindaRoxb.    |
| Species  | :Morindatictoria |



Indian Mulberry is an evergreen shrub or small tree growing upto 5-10m tall. The leaves are 15-25 cm long, oblong to lanceolate and the flowers are tubular white, aromatic, about 2 cm long. The fruit is a green syncarp, 2-2.5 cm Diameter.

In case of disturbing the plants increase in the rate of infections with antibiotic resistant microorganisms and due to side effects (Rekhabishtet.al., 2009) of some antibiotics there is an improving the quality of medicinal plants natural alternate to synthetic drugs (Seyyedednejad and Motamedi, 2010). Most of the higher plants store enormous organic substances in quantities it may be significant to be economically useful as pharmaceuticals. Species of higher plants were less much surveyed for antimicrobial activity (Mohanaet. al., 2008).

### **Phytochemical Analysis:**

Photochemical are the chemicals produced by various parts of the plants. These bioactive constituents of plants are steroids, terpenoids, carotenoids, flavonoids, alkaloids, tannins and glycosides. These compounds have various activities such as antimicrobial and antibacterial. Some have been reported to exhibit hemolytic and foaming activity reported by

Feroz et al., (1993). Plant materials are of increasing interest for their applications in pharmaceutical, nutritional and cosmetic application. Plants are rich in active compounds or secondary metabolites such as alkaloids, steroids, tannins, glycosides, volatile oils, fixed oils, resins, phenols and flavonoids.

Extraction processes of these metabolites are related to the difference in solubility of the compounds present in a mixture of solvent. The beneficial action of those phytoconstituents typically comes from the merging or synergic work of these secondary products (Tont hubthimthong et al., 2001). There are several extraction techniques for metabolites present in a vegetal. These techniques can be called conventional (long been used) and new (developed more

recently). Conventional techniques are the ones using organic fluid (hexane, acetone, methanol, ethanol etc.) or water and are carried out generally at atmospheric pressure while new techniques using pressure and elevated temperatures (Luque de Castro et al., 1998). Methods used for extraction are necessary for the differentiation of active components of plant tissues from the originated components by using appropriated solvents. During this process, the solvents move into the solid plant material and solubilize the compounds with similar polarity (Amita and Shalini, 2014). Thus the need in choosing the relevant extraction method is evident because when different methods are practiced on same plant material with the same solvent, extraction efficiency shows significant variations. In addition, the relevant extraction methods most are constant, for a future good reproducibility. More, appropriate solvent is of essential importance along with application. This is related to fact that polar solvents will extract out polar active compounds and non-polar ones will be extracted out by non-polar solvents (Ankit et al., 2012). For the extraction procedures, solvents such as water, ethanol, chloroform, ethyl acetate, methanol, etc. are commonly used and occasionally, for better extraction efficiency, mixtures of solvents can be used.

The vetrillai leaf contains water (85-90%), protein (3-3.5%), carbohydrates (0.5-6.2%), minerals (2.3-3.3%), fat (0.4-1%), fiber (2.3%), essential oil (0.08-0.2%), tannin (0.1-1.3%), alkaloid. The phytochemical investigation on leaves revealed the presence of alkaloids, carbohydrate, amino acids, tannins and steroidal components (Sugumaran, Poornima et al., 2011). Several methods are used to extract the necessary active components of plant tissues from the originated components by using appropriated solvents. During this process, the solvents move into the material and solubilize the compounds with similar polarity (Amita and Shalini et al., 2014). Thus the need in choosing the relevant extraction method is evident because when different methods are practiced on same plant material with the same solvent, extraction efficiency shows significant variations. In addition, the relevant extraction methods most are constant, for a future good reproducibility. More, appropriate solvent is of essential importance along with application. This is related to fact that polar solvents will extract out polar active compounds and non-polar ones will be extracted out by non-polar solvents (Ankit et al., 2012). For the extraction procedures, solvents such as water, ethanol, chloroform, ethyl acetate, methanol, etc. are commonly used and occasionally, for better extraction efficiency, mixtures of solvents can be used. (Manimekalai et al., 2018).

## **MATERIALS AND METHODS:**

### **SAMPLE COLLECTION AND IDENTIFICATION**

The Piper betle L. (Vetrillai), A butilon indicum L. (Thuti), Morinda tinctoria Roxb. (Manjanathi) are used as test plants. It was collected from in an around Malliputhur. The collected plant samples were maintained in the Botany

Lab, The Standard Fireworks Rajaratnam College for women, Sivakasi in Tamilnadu. The collected fresh samples were stored for further analysis.

### **PREPARATION OF EXTRACTS**

The fresh samples were grinded with the help of mortar and pestle. Ten grams of various plant materials was taken, then it was grinded well and the extract was filtered through muslin cloth. The extract was made up with 50ml of different solvents (low polar to high polar) like as hexane, ethanol, and chloroform. After the preparation was over, the extracts were stored in refrigerator for further analysis.

### **PRELIMINARY PHYTOCHEMICAL SCREENING**

Different plant extracts of Vetrillai (Piper betle), Thuti (Abutilon indicum), Manjanathi (Morinda tinctoria) were used to screen the following photochemical namely steroids, reducing sugar, sugar, alkaloids, phenolic compounds, flavanoids, tannins, saponins and amino acids by standard procedures (Harborne, 1985)

#### **Steroids**

One ml of all plant extracts was treated with minimum quantity (0.1ml) of chloroform, 3 to 4 drops of acetic anhydride and one drop of concentrated sulphuric acid. Purple color of the test content was changed into blue green indicates the presence of steroids.

#### **Reducing sugar**

One ml of all plant extracts was treated with 2ml of Fehling's reagent and 3ml of distilled water. The test content was boiled for 1-2 minutes and the development of red orange color indicated the presence of reducing sugar.

#### **Sugar**

One ml of all solvent plant extracts was treated with 0.1ml of anthrone and 2-3 drops of concentrated sulphuric acid and then heated for 1-2 minutes. Change of color from green to purple showed the presence of sugar.

#### **Alkaloids**

The test extracts were treated with 2N hydrochloric acid, the aqueous layer

was formed. It was decanted and to which one or two drops of Mayer's reagent was added. The test content was changed into white turbidity or precipitates, which indicated the presence of alkaloids.

#### **Phenolic compounds**

One ml of all solvent extracts was treated with a drop of neutral ferric chloride. Change of intense color in the test contents shows positive result for phenolic compounds.

#### **Flavonoids**

A bit of magnesium and then one or two drops of concentrated hydrochloric acid were added to the plant extracts and heated. The development of red or orange color indicated the presence of flavonoids.

#### **Tannins**

One ml of all solvent plant extracts were mixed with 1 ml of water and 0.1% lead acetate. Formation of white color precipitate indicates the presence of tannins.

#### **Saponins**

One ml of all solvent extracts of waste were treated with water and shaken well. The test solution was changed into foam or leather, if the test sample contains saponins.

#### **Amino acids**

The plant extracts were heated with ninhydrin in the presence of 1-2 ml of alcohol. The violet color formed and confirmed the presence of amino acids.

### **RESULT AND DISCUSSION:**

#### **IDENTIFICATION OF TEST PLANT MATERIALS:**

The medicinal plants are Piper betle L. (Betle leaf), Morinda tictoria Roxb. (Indian Mulberry), Abutilon indicum L. (Country Mallow) leaves are collected and grinded then it was transferred to the laboratory of Botany, The Standard Fireworks Rajaratnam College for Women, Sivakasi.

The collected plant materials were taken and grinded using mortar and pestle and added to the solvents like hexane, ethanol and chloroform (low polar to high polar). After the preparation was over, the extracts were stored in refrigerator for further analysis.

These plant extracts are using the analysis of antimicrobial activity, phytochemical constituents, TLC (in vitro) and analysis of soil samples were analysed and recorded.

#### **Ethano Botanical Survey**

Plants have been used as traditional medicine for several thousand years. The exploration of ethnomedicinal survey was carried out by the researchers in Malliputhur. There are 75 species belonging to 75 families were recorded. The species are arranged in sequential order (Table- 1). In my survey the family Fabaceae ranks at the top having 7 ethnomedicinal plants species, followed by Cucurbitaceae and Lamiaceae (6sp), Solanaceae (5sp), Amaranthaceae, Rutaceae and Euphorbiaceae

(3sp), Meliaceae, Malvaceae, Arecaceae, Poaceae, Apocyanaceae, Liliaceae, Amaryllidaceae, Arecaceae, Apocyanaceae, Lythraceae, Moraceae, Oleaceae, Rubiaceae (2sps). The remaining 19 families had only one species (Table-1). The present study provides information about some beneficial uses of 75 plant species. The plants are either used individually or in mixture with some other plants or plant parts. Some plant species are claimed to be quite effective remedies for cutaneous affection of head, snakebite, diarrhea, Febrifuge, malaria, cough and cold, leukemia, breast cancer and stomach troubles etc. Since the uses are based on empirical knowledge, the scientific study of all these herbal drugs is highly desirable to establish their efficacy for safe use. Every one of members of the people in the area, use medicinal plants. Some medicinal plants like *Ocimumtenuiflorum* L. leaf parts also used to cough and cold, abscess by different communities of the area. Similar ethnobotanical studies have been reported in some other parts of India (John De Britto et al., 2010; Mohan et al., 2008, Ketewa and Arora, 1997; Reddy et al., 1997; Jain, 2004; Singh, 2004; Muthukumarasamy et al., 2003a, b; 2004a, b), as well as in other parts of the world (Jovelet al., 1996; Bonet et al., 1999; Grierson and Afolayan. 1999; Shinwari and Khan, 2000). Various parts of the plant are used in curing different ailments. During the research project it was noted that the medicinal plant wealth of Malliputhur, Virudhunagar District. Some medicinally important plant species are fast dwindling, mainly due to human interference. So, the area needs proper protection for the conservation and survival bio-resources. Further research works should be formulized on base line of indigenous studies because there are still some diseases like “Cancer” and “AIDS”, for which there are no identified cures. So ethno directed studies can help in these research works (Ahmad and Ali, 1998).

#### **PHYTOCHEMICAL ANALYSIS**

Preliminary screening of photochemical in different plant extracts (hexane, ethanol, and chloroform). The plant extracts were analyzed qualitatively and tabulated in the Table 2.1-2.3 and plate 1.1.

In *Piper betle* the steroid, reducing sugar and sugar was absent in all the solvents. Alkaloids were present in hexane alone. Phenol was present in all the solvents like hexane, ethanol and chloroform. Flavonoids were present only in hexane solvent. Tannins were present in all the solvents (hexane, ethanol and chloroform). Saponins and amino acids were absent in all the solvents. The above result was correlated with the Phytochemical analysis, Identification and Quantification of antibacterial active compounds in Betel leaves, *Piper betle* used methanolic extracts gave by Syahidah et al., 2017.

In *Abutilon indicum* the steroid, reducing sugar and sugar was absent in all the solvents. Alkaloids were present in hexane and ethanol. Phenol was present in all the solvents like hexane, ethanol, and chloroform. Flavonoids were absent in all the solvents. Tannins were present in all the solvents (hexane, ethanol, and chloroform). Saponins and amino acids were absent in all the solvents. Similar observation was noted in Antimicrobial activity of *Abutilon indicum* – A medicinal plant worked by Shital and Megha 2021 using methanol and water extracts.

In *Morinda tinctoria* the steroid was present in ethanol, chloroform. Reducing sugar was

absent in all the solvents. Sugar was present in ethanol. Alkaloids and phenol was present in all the solvents (hexane, ethanol, and chloroform). Flavonoids was present in hexane, ethanol. Tannins was present in all the solvents. Saponins were present in ethanol and chloroform. Amino acids was absent in all the solvents. The report was correlated with Antimicrobial activity and Phytochemical analysis of Morinda tinctoria (leaf extracts) reported by, Deepti et al., 2012 using different organic solvents.

**Table 2.1 - PRELIMINARY PHYTOCHEMICAL SCREENING OF PIPER BETLE L. (LEAF) – USING DIFFERENT SOLVENT**

| S.No | Phytoconstituents | Extracts |         |            |
|------|-------------------|----------|---------|------------|
|      |                   | Hexane   | Ethanol | Chloroform |
| 1.   | Steroids          | -        | -       | -          |
| 2.   | Reducing Sugar    | -        | -       | -          |
| 3.   | Sugar             | -        | -       | -          |
| 4.   | Alkaloids         | ++       | -       | -          |
| 5.   | Phenol            | +        | ++      | ++         |
| 6.   | Flavonoids        | +        | -       | -          |
| 7.   | Tannins           | ++       | ++      | +          |
| 8.   | Saponins          | -        | -       | -          |
| 9.   | Amino acid        | -        | -       | -          |

**Note:** ++ indicate: more quantity, + indicate: moderate quantity, - indicate: meager quantity or absent

**Table 2.2 - PRELIMINARY PHYTOCHEMICAL SCREENING OF ABUTILON INDICUM L. (LEAF) – USING DIFFERENT SOLVENT.**

| S.No | Phytoconstituents | Extracts |         |            |
|------|-------------------|----------|---------|------------|
|      |                   | Hexane   | Ethanol | Chloroform |
| 1.   | Steroids          | -        | -       | -          |
| 2.   | Reducing Sugar    | -        | -       | -          |
| 3.   | Sugar             | -        | -       | -          |
| 4.   | Alkaloids         | ++       | ++      | -          |
| 5.   | Phenol            | +        | +       | +          |
| 6.   | Flavonoids        | -        | -       | -          |

|    |           |   |    |   |
|----|-----------|---|----|---|
| 7. | Tannins   | + | ++ | + |
| 8. | Saponins  | - | -  | - |
| 9. | Aminoacid | - | -  | - |

**Note:** ++ indicate: more quantity, + indicate: moderate quantity, - indicate: meagre quantity or absent

**Table 2.3- PRELIMINARY PHYTOCHEMICAL SCREENING OF MORINDA TINCTORIA L. (LEAF) – USING DIFFERENT SOLVENT.**

| S.No | Phytoconstituents | Extracts |         |            |
|------|-------------------|----------|---------|------------|
|      |                   | Hexane   | Ethanol | Chloroform |
| 1.   | Steroids          | -        | +       | +          |
| 2.   | Reducing Sugar    | -        | -       | -          |
| 3.   | Sugar             | -        | +       | -          |
| 4.   | Alkaloids         | ++       | +       | +          |
| 5.   | Phenol            | +        | +       | +          |
| 6.   | Flavonoids        | +        | +       | -          |
| 7.   | Tannins           | ++       | +       | +          |
| 8.   | Saponins          | -        | ++      | +          |
| 9.   | Aminoacid         | -        | -       | -          |

**Note:** ++ indicate: more quantity, + indicate: moderate quantity, - indicate: meagre quantity or absent

#### CONCLUSION:

From the above discussion we know the importance of medicinal plants and its significance. Each and every person should be responsible for create the disease free environment.

Reduce the level of microorganisms in the air, water and soil through innumerable biological techniques and methodology. Reduce the biowaste things over done with the solid waste management system and produce the new drugs. In future, these medicinal plants were widely used in many pharmaceutical industries and produced the many antibiotics in the form of capsules and syrups.

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