

## **PHYTOCHEMICAL PROFILE OF MEDICINAL PLANTS OCCURRING IN LOCAL AREA OF TIRUCHIRAPPALLI DISTRICT**

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### **ABSTRACT**

The present study involves twelve different medicinal plants *Abutilon hirtum*, *Acacia nilotica*, *Achyranthus aspera*, *Bauhinia variegata*, *Carica papaya*, *Elipta alba*, *Jasminum grandiflorum*, *Leucas aspera*, *Ocimum sanctum*, *Sesbania sesban*, *Vitex negundo* and *Wedelia chinensis* locally available in Tiruchirappalli region of Tamil Nadu. The leaves of the selected medicinal plants were washed, air dried and then powdered. The aqueous, ethanol and acetone extracts of leaf samples were used for the phytochemical analysis to find out the phytochemical constituents in the plants. The main objective of the research work was to check the presence or absence of the phytoconstituents in all the selected medicinal plants. The results of the phytochemical analysis of these medicinal plants showed that the terpenoids, reducing sugar,

Phenols, tannin, glycosides, steroids, flavonoids and alkaloids were found to be present in above mentioned medicinal plants.

**KEYWORDS:** Medicinal plants, phytochemical analysis and phytoconstituents.

### **INTRODUCTION**

Plants are potent biochemists and have been components of phytomedicine since time immemorial. Medicinal plants are nature's gift to human beings for disease free healthy life. In India, different parts of several medicinal plants or their extracts are used for the treatment of various diseases. More than a hundred species of therapeutically important higher plants are listed and described in ancient Indian treatise possessing antimicrobial activity.

According to World Health Organization (WHO), traditional medicine is estimated to be used by 80% of the population of most developing countries. These plant-based medicines are used for primary health care needs (De Silva 1997). Although plants are unique in their activities, it has also been found that a particular plant may be used by different tribes or countries for different ailments. This shows that plants possess a wide range of healing powers which are attributed to their chemical composition. Despite the wealth of human experience and folklore concerning the medicinal uses of plants, proper scientific investigation has only been applied to a small fraction of the world's plants (Kurian, 1995). Tamil Nadu is under strategic geographical location and possesses an invaluable treasure of herbal medicinal plants holding a major share in cultivation and export of more than fifty medicinal plants species. Medicinal plants are cultivated in Tamil Nadu in isolated patches each being grown in favourable soil and agro climatic region. The medicinal plants are useful for healing as well as for curing of human diseases because of the presence of phytochemical constituents (Nostro et al., 2000). Phytochemicals are naturally occurring in the medicinal plants, leaves, vegetables and roots that have defence mechanism and protect from various diseases. Phytochemicals are primary and secondary compounds. Chlorophyll, proteins and common sugars are included in primary constituents and secondary compounds have terpenoid, alkaloids and phenolic compounds (Krishnaiah et al., 2007). Terpenoids exhibit various important pharmacological activities i.e., anti-inflammatory, anti-cancer, anti-malarial, inhibition of cholesterol synthesis, anti-viral and anti-bacterial activities (Mahato and Sen 1997). Terpenoids are very important in attracting useful mites and consume the herbivorous insects (Kappers et al., 2005). Alkaloids are used as anaesthetic agents and are found in medicinal plants (Hérouart et al., 1988). The main objective of our research work was to analyse the presence or absence of different phytochemicals in the selected ten medicinal plants from Tiruchirappalli region, Tamil Nadu used for healing and curing of various diseases.

## MATERIALS AND METHODS

### Plant materials

The present study included plant species which were *Abutilon hirtum* (Malvaceae), *Acacia nilotica* (Leguminosae), *Achyranthus aspera* (Amaranthaceae), *Bauhinia variegata* (Caesalpiniaceae), *Carica papaya* (Caricaceae), *Eclipta alba* (Asteraceae), *Jasminum grandiflorum* (Oleaceae), *Leucas aspera*, *Ocimum sanctum* (Lamiaceae), *Sesbania sesban* (Leguminosae), *Vitex negundo* (Verbenaceae) and *Wedelia chinensis* (Asteraceae) leaves

collected from the local areas of Tiruchirappalli regions, Tamil Nadu, India were identified in department of Botany, Bishop Heber College, Tiruchirappalli. A voucher specimen was deposited in our departmental laboratory.

### **Chemicals**

Acetone, Fehling solution A and Fehling solution B, ethanol, distilled water, aqueous hydrochloric acid, methanol, chloroform, concentrated sulphuric acid, Ammonia solution, picric acid, Hexane.

### **Preparation of plant extract**

The leaves of the selected plants were removed from the plants and then washed under running tap water to remove dust. Leaves were detached and surface sterilized by 0.1% Mercuric chloride with two drops of Tween 80 for 2 minutes, followed by rinsing thrice with sterile distilled water until all traces of sterilent are removed. The plant samples were then air dried for few days and the leaves were crushed into powder and stored in polythene bags for use.

Extraction of the plant parts were done with different solvents based on the polarity of the solvents. The solvents used were acetone, ethanol and water. The extract of the leaf was obtained through the cold percolation method. The powdered plant material was weighed and then soaked in Acetone for 72 hrs. Then the extract was taken by filtering the content. The same procedure was repeated again and the extract was collected. The extracts were pooled together and concentrated on a water bath by keeping the temperature below the boiling point of the solvent used. The concentrated extract was kept in the desiccator for further evaporation of the solvent. Then the extract was weighed and the yield was recorded. The same procedure was repeated for all the solvents. The extracts taken were used for further phytochemical analyses of the plant. The standard qualitative phytochemical tests given for the respective compounds were performed.

### **Qualitative phytochemical analysis**

The concentrated extracts were subjected to qualitative test for the identification of various phytochemical constituents as per standard procedures (Harborne 1984; Trease and Evans 1989 and Sofowora 1993). Based on the results obtained in the qualitative phytochemical analysis.

## RESULTS AND DISCUSSION

The phytochemical screening of eight medicinal plants leaves showed that Table 1. This study has revealed the presence of phytochemicals considered as active medicinal chemical constituents. Important medicinal phytochemicals such as terpenoids, reducing sugar, flavonoids, alkaloids, phenols, saponin, glycosides and phlobatannins were present in the samples. Plant *Eclipta alba*, *Leucas aspera*, *Ocimum sanctum* and *Wedilea chinensis* having all these phytochemicals. All the leaves have rich in flavonoids and phenolic compounds present. Reducing sugars are present only in seven plants out of 8 plants except in *Vitex negundo*.

Phlobatannins are present in *Achyranthus aspera*, *Carica papaya*, *Eclipta alba*, *Leucas aspera* and *Ocimum sanctum* have been reported for its wound healing properties, these are anti-inflammatory and analgesic and antioxidant (Ayinde et al., 2007; Okwu and Okwu 2004). Reducing sugars and Terpenoids are present *Acacia nilotica* are reported to have anti-inflammatory, anti-viral, anti-malarial, inhibition of cholesterol synthesis and anti-bacterial (Mahato and Sen 1997; Sharma and Saxena 1996). Flavonoids are found in *Acacia nilotica*, *Achyranthus aspera*, *Carica papaya*, *Jasminum grandiflorum*, *Leucas aspera*, *Ocimum sanctum*, *Sesbania sesban* and *Vitex negundo*. Epidemiologic studies recommend that coronary heart disease is opposed by dietary flavonoids. Alkaloids are present in *Abutilon hirtum*, *Achyranthus aspera*, *Bauhinia variegata*, *Carica papaya*, *Jasminum grandiflorum*, *Leucas aspera*, *Ocimum sanctum*, *Sesbania sesban*, *Vitex negundo* and *Wedelia chinensis*. Plants having alkaloids are used in medicines for reducing headache and fever. These are attributed for antibacterial and analgesic properties (Balakrishnan and Sharma 2013; Munmi borkataky, 2013; Sharma et. al., 2013).

Phytochemical analysis is the characterization of an active principle responsible for some toxic or beneficial effect shown by a crude plant extract. Alkaloids are heterogeneous group compounds which contain one or more nitrogen atom in acyclic system. These are widely used for medicinal purposes and have positive or negative effects to human beings. Alkaloids are reported to have analgesic, anti-inflammatory function and help to alleviate pain, develop resistance against diseases and endurance against stress (Harborne 1988; Gupta 1994). A better precipitation of alkaloids was obtained in the methanol and ethanol extracts of both stem and root extracts of *Sesbania sesban* (Jain et al., 2004).

Harborne 1988 qualified flavonoids as being probably the most useful class of secondary plant constituents from a systematic point of view. The flavonoids are the compounds structurally derived from the parent substance flavone, and contain conjugated aromatic systems. Flavonoids have been referred to as nature's biological compound because of their inherent ability to modify the reaction taking place in the body due to allergies, virus and carcinogens. They show anti-inflammatory, antimicrobial and anticancer activity.

The selected ten medicinal plants are the source of the secondary metabolites i.e., alkaloids, flavonoids, terpenoids, steroids, phenols, glycosides, terpenoids, phlobatannins and reducing sugars. Medicinal plants play a vital role in preventing various diseases. The antidiuretic, anti-inflammatory, antianalgesic, anti-cancer, anti-viral, anti-malarial, anti-bacterial and anti-fungal activities of the medicinal plants are due to the presence of the above mentioned secondary metabolites. Medicinal plants are used for discovering and screening of the phytochemical constituents which are very helpful for the manufacturing of new drugs. The previous phytochemical analysis and present studied show nearly the similar results due to the presence of the phytochemical constituents. The phytochemical analysis of the medicinal plants are also important and have commercial interest in both research institutes and pharmaceuticals companies for the manufacturing of the new drugs for treatment of various diseases. Thus we hope that the important phytochemical properties identified by our study in the local plant of Tiruchirappalli will be helpful in the coping different diseases of this particular region.

Table: 1 The phytochemical screening of eight medicinal plants leaves

| Plant Name            | Extract Type | Phytochemical analysis |            |            |         |           |        |            |         |          |
|-----------------------|--------------|------------------------|------------|------------|---------|-----------|--------|------------|---------|----------|
|                       |              | Reducing sugar         | Flavonoids | Glycosides | Saponin | Alkaloids | Tannin | Terpenoids | Phenols | Steroids |
| Abutilon hirtum       | Aqueous      | +                      | +          | -          | +       | -         | +      | -          | -       | -        |
|                       | Ethanol      | +                      | +          | -          | +       | +         | +      | -          | -       | -        |
|                       | Acetone      | +                      | +          | -          | +       | +         | -      | -          | -       | -        |
| Acacia nilotica       | Aqueous      | +                      | +          | -          | -       | -         | -      | +          | +       | -        |
|                       | Ethanol      | +                      | +          | -          | -       | -         | -      | +          | +       | -        |
|                       | Acetone      | +                      | +          | -          | -       | -         | -      | +          | +       | -        |
| Achyranthus aspera    | Aqueous      | +                      | +          | +          | +       | +         | +      | +          | +       | -        |
|                       | Ethanol      | +                      | +          | +          | +       | +         | +      | +          | +       | -        |
|                       | Acetone      | +                      | +          | +          | +       | +         | +      | +          | +       | -        |
| Carica papaya         | Aqueous      | +                      | +          | +          | +       | +         | +      | -          | +       | -        |
|                       | Ethanol      | +                      | +          | +          | +       | +         | +      | -          | +       | -        |
|                       | Acetone      | +                      | +          | +          | +       | +         | +      | -          | +       | -        |
| Eclipta alba          | Aqueous      | +                      | -          | +          | +       | -         | +      | -          | +       | +        |
|                       | Ethanol      | +                      | +          | +          | +       | +         | +      | +          | +       | +        |
|                       | Acetone      | +                      | +          | +          | +       | +         | +      | +          | +       | +        |
| Jasminum grandiflorum | Aqueous      | +                      | +          | -          | -       | +         | -      | +          | +       | -        |
|                       | Ethanol      | +                      | +          | -          | -       | +         | -      | +          | +       | -        |
|                       | Acetone      | +                      | +          | -          | -       | +         | -      | +          | +       | -        |
| Leucas aspera         | Aqueous      | +                      | +          | +          | +       | +         | +      | +          | +       | +        |
|                       | Ethanol      | +                      | +          | +          | +       | +         | +      | +          | +       | +        |
|                       | Acetone      | +                      | +          | +          | +       | +         | +      | +          | +       | +        |
| Ocimum sanctum        | Aqueous      | +                      | +          | +          | +       | +         | +      | +          | +       | +        |
|                       | Ethanol      | +                      | +          | +          | +       | +         | +      | +          | +       | +        |
|                       | Acetone      | +                      | +          | +          | +       | +         |        | +          | +       | +        |
| Sesbania Sesban       | Aqueous      | +                      | +          | +          | -       | +         | -      | -          | +       | +        |
|                       | Ethanol      | +                      | +          | +          | -       | +         | -      | -          | +       | +        |
|                       | Acetone      | +                      | +          | +          | -       | +         | -      | -          | +       | +        |

|                   |         |   |   |   |   |   |   |   |   |   |
|-------------------|---------|---|---|---|---|---|---|---|---|---|
| Vitex negundo     | Aqueous | - | + | - | + | + | - | - | + | + |
|                   | Ethanol | - | + | - | + | + | - | - | + | + |
|                   | Acetone | - | + | - | + | + | - | - | + | + |
| Wedilea chinensis | Aqueous | + | - | - | + | + | - | - | - | + |
|                   | Ethanol | + | + | + | + | + | + | + | + | + |
|                   | Acetone | + | + | + | + | + | + | + | + | + |

Key: + : present; - : absent.

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