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## COMPARITIVE PHYTOCHEMICAL ANALYSIS OF *MELOCHIA CORCHORIFOLIA* AND *LUDWIGIA PERENNIS* USING DIFFERENT SOLVENT EXTRACTS

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### ABSTRACT

Plants produce a diverse range of secondary metabolites, making them an excellent source of a variety of medicines. The continued and widespread use of medicinal plants around the world has raised concerns about their safety, efficacy and quality. As a result, proper knowledge of phytochemical is required. Plant bio-active constituents are relevant because this information will be useful in the synthesis of new drug formulations. The current investigation's primary goal was to investigate the qualitative preliminary findings. *Melochia corchorifolia* and *Ludwigia perennis* analysis, both plants are well-known medicinal plants because of their diverse pharmaceutical properties. The investigation of its qualitative phytochemical analysis for stem, root, leaf, fruit of *Melochia corchorifolia* and stem, bark, leaf, root for *Ludwigia perennis* is critical for the discovery of several other compounds. To obtain this result, five different solvents were used; water, ethanol, methanol, carbinol extracts of different plant parts. These extracts were used for qualitative preliminary phytochemical analysis using standard chemical tests. Data show the presence of alkaloids, flavonoids, steroids, terpenes, tannins, saponins, phenolic compounds, cardiac glycosides and reducing sugars. The ethanol extract of *Melochia corchorifolia* and chloroform extract of *Ludwigia perennis* contained the majority of the phytochemical components. Because of the active compounds of *Melochia corchorifolia* highly soluble in ethanol and active compounds of *Ludwigia perennis* highly soluble in chloroform. The presence of these secondary bioactive phytochemicals indicates the significance of these medicinal plants as an effective sources for the therapeutic agents.

### KEYWORDS

Phytochemical, Aqueous, Ethanol, Chloroform and Carbinol.

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### INTRODUCTON

Importance of plants in the modern medical field is increasing day by day. This is because of the phytochemicals present in the plants. Many countries are gradually increasing their use of phytochemicals for pharmaceutical purposes these days. According to the world health organization (WHO), medicinal plants are the best source of

wide range of drugs. Traditional medicine, which contains compounds derived from medicinal plants, is used by approximately 80% of people in developed countries<sup>1</sup>. Primary and secondary compounds are referred to as phytochemicals. Primary compounds contain chlorophyll, proteins, and common sugars, whereas secondary compounds do not. Alkaloids, flavonoids, steroids, tannins and phenolic compounds<sup>2</sup>.

Plants grow in a variety of environments. Deserts, rain forests, temperate zones, wet lands, etc. are home to various plants. Wetlands are the most important of these plant growing environments. Many countries have begun scientific investigations into medicinal plants because of their contributions to healthcare. With the associated side effects of modern medicine, traditional medicines are gaining traction and are now being researched to determine the scientific basis of their therapeutic actions<sup>3</sup>.

*Melochia corchorifolia*, also known as chocolate weed, is a weed that is commonly found in uncultivated lands. It has been observed to grow most frequently in open areas, such as highways. Seedling completes the process of proliferation. Germination is frequently thought to be difficult. Scarification improves significantly. Germination of the seeds occurs at temperature 35-40°C. The leaves have traditionally been used for variety of medicinal purposes. It was used to treat ulcers, abdominal swelling, headaches, and chest pain, among other things, the plant's roots and leaves can help with snake bites, sores, and the sap (plant sap)<sup>4</sup>.

#### **Vernacular names**<sup>5</sup>

Bengali: Bon-pat, Tikikora

Hindi: Bilpat, chitrabee

Indonesia: gendiran, jarring, orangaring

Kannada: Bettadatutti mara

Malayalam: Ketam

Tamil: Punnakkukkirai

Marathi: Lahan methuri

#### **Taxonomic Tree**<sup>6</sup>

Kingdom: Plantae

Phylum: Spermatophyta

Class: Dicotyledonae

Order: Malavales

Family: Sterculiaceae

Genus: Melochia

**Species:** *Melochia corchorifolia*

#### **Folk uses**

To treat headaches in Papua New Guinea, the leaves of an unidentified Melochia species are applied to the forehead. *Melochia corchorifolia* is used to make cattle fodder. Vegetables are sometimes made from the leaves. Fruit powder is used to treat ear infections, as an antihelmintic and to treat dysentery, abdominal swelling and snake bites<sup>7</sup>. *Melochia corchorifolia* leaves are consumed as sag in Jharkand and the leaves and roots are anti-dysentric. The leaf is used as a poultice to treat abdominal swelling and sores. Water snake bites can be prevented by boiling the leaves and stems in oil<sup>8</sup>. The bark of the stem yields a valuable fibre. Decoction of stems and leaves. Snake bites can be avoided by using oil; leaves can also be used on occasionally edible<sup>9</sup>.

*Ludwigia perennis* L. commonly called water primrose is a 20-100cm- tall annual tap-rooted plant with branched stems. The leaves are foraged in the wild for local consumption. They are occasionally sold in West African local markets. Flood plains, road side ditches, muddy wallows, and abandoned rice paddies at elevations ranging from near sea level to 1000-1200 meters in Southern China. Propagation naturally occurring through the seeds.

#### **Vernacular names**<sup>10</sup>

Common name: Perennial Primrose, paddy clove

Kannada: Kaere bandu gida, Kere bendu gida

Malayalam: Neerkarayambu

Telugu: lavanga kaaya

Tamil: musalkathilal

#### **Taxonomic Tree**<sup>11</sup>

Kingdom: Plantae

Phylum: Spermatophyta

Class: Dicotyledonae

Order: Myrtales

Family: Ongraceae

Genus: Ludwigia

Species: Ludwigia Perennis

#### **Folk uses**

Tender shoot is applied to sore gums. The plant is boiled in oil and applied to the body to reduce fever<sup>12</sup>. *Melochia corchorifolia*, *Ludwigia perennis*

are both Wet land plants. In this present study, different parts of two wetland plants, *Melochia corchorifolia*, *Ludwigia perennis*, were extracted with four different types of solvents and analysed for phytochemical studies.

## MATERIAL AND METHODS

### Collection of medicinal plants

*Melochia corchorifolia* (leaf, root, stem, fruit) *Ludwigia perennis* (leaves, roots, stem, bark) have been used in the present study and they were collected from Nandipulam (village) at Thrissur (District), Kerala, India and were authentically identified by Dr P Santhan, Taxonomist, Proprietor (Durva Herbal Centre), Pammal, Chennai and voucher specimen No(SK 3423 For *Melochia corchorifolia* and SK 3564 for *Ludwigia perennis*).

### Extraction of the plant material

The extraction of *Melochia corchorifolia* (leaf, stem, root, fruit) and *Ludwigia perennis* (leaf, root, stem, bark) using different solvents water, ethanol, chloroform and carbinol via, soxhlet apparatus.

## METHODOLOGY

### Phytochemical tests

Phytochemical analysis was done following standard methods<sup>13-15</sup>

#### Test for alkaloids

##### Mayers Test

Test solution 1ml was taken in test tube and few drops of Mayer's reagent were added into it. Presence of yellow precipitation or turbidity shows the presence of alkaloids.

#### Test for flavonoids

##### Alkaline reagent test

1ml test solution was treated with few drops of sodium hydroxide and Hydrochloric acid was added. A yellow solution that turns colorless indicates the presence of alkaloids.

Lead acetate test: Test solution 1ml was taken in test tube and few drops of lead acetate solution was added to it and observed for yellow colour precipitate.

#### Test for tannins

##### Ferric chloride test

To 1ml of plant extract, 2ml of 5% Ferric chloride was added. Formation of dark blue indicates the presence of tannins.

#### Test for steroids

##### Sulphuric acid test

To 2ml of plant extract, 2ml of chloroform was added. 2ml of concentrated sulphuric acid was added by the sides of the test tubes and observed for red color at the lower chloroform layer.

#### Test for Terpenoids

##### Sulphuric acid test

Test solution 2ml was taken in a clean and dried test tube and 2ml of chloroform and few drops of concentrated sulphuric acid were added into it. Shaken well and allowed to stand for some time and observed for reddish brown colour at the interface.

#### Test for carbohydrates

##### Benedicts test

Test solution is mixed with few drops Benedict's reagent (alkaline solution containing cupric citrate complex) and boiled in waterbath, observed for the formation of reddish brown precipitate to show a positive result for the presence of carbohydrate.

#### Test for saponins

##### Foam test

About 2ml of the extract was shaken with 10ml of distilled water and shaken vigorously. Formation of frothing (appearances of the creamy miss of small bubbles) shows the presence of saponins.

#### Test for Phenol

##### Ferric chloride test

To 2ml of plant extract, 2ml of distilled water followed by 10% of FeCl<sub>3</sub> solution was added. Bluish colour indicates the presence of phenol.

#### Test for Proteins

##### Ninhydrins test

Test solution were boiled with 0.2% solution of ninhydrin and observed for violet colour to appear.

#### Test for reducing sugars

##### Fehling's test

1ml of extract was taken into clean and dried test tube and 0.5ml of Fehling's A and B solutions were added to it. Boiled and observed for brick red coloration.

## Test for cardiac glycosides

### Salkowski's test

When 2ml of organic extract was dissolved in 2ml of chloroform and 2ml of concentrated Sulphuric acid was added in it. A red colour produced in the lower chloroform layer indicates the presence glycosides.

## RESULTS AND DISCUSSION

The presence of bioactive chemical constituents in all of these plants is responsible for their pharmacological effects. *Melochia corchorifolia* and *Ludwigia perennis* contained all tested constituents as shown in Table No.1 and Table No.2. Plant extracts were subjected to phytochemical analysis, which revealed the presence of constituents known to have medicinal and physiological properties<sup>16</sup>. The phytochemicals found were: alkaloids, flavonoids, tannins, steroids, terpenes, carbohydrates, saponins, phenols, proteins, reducing sugars, cardiac glycosides.

Phytochemical profiling of *Melochia corchorifolia*: Phytochemical constituents of four different plant parts, stem, leaf, root, and fruit of *Melochia corchorifolia* plant were studied using four different types of solvents. Flavanoids and tannins were the only bioactive compounds detected in four different plant parts in studies using aqueous extracts. Steroids and terpenes are present in leaf, root and fruit. Cardiac glycosides and saponins are also present in leaf and stem. The stem and fruit of this plant have been shown to be a good source of alkaloids. A trace amount of reducing sugar which is present in the leaf. Phytochemical studies using ethanol extract of *Melochia corchorifolia* plant found flavanoids, tannins, steroids, terpenes, carbohydrates, saponins and cardiac glycosides in all plant parts taken stem, leaf, root, and fruit. The leaves, root and fruit shows the presence of reducing sugar. Leaf and fruit has a main source of alkaloids and phenols. Phytochemical studies using chloroform solvent of *Melochia corchorifolia* contained flavonoids, tannins, steroids and saponins in stem, leaf, root and fruit parts. Cardiac glycosides and reducing sugars are present in the leaf, roots

and fruits. Phytochemical studies of *Melochia corchorifolia* using carbinol extract revealed flavonoids, tannins, terpenes, saponins and cardiac glycosides in the stem, leaf, root and fruit parts of the plant. Steroids are present in the stem, leaf and root of the plant. Reducing sugar is only present in the leaves. Protein were absent in all four type of solvents.

### Phytochemical profiling of *Ludwigia perennis*

A phytochemical study using water extract of *Ludwigia perennis* plant revealed tannins, steroids, terpenes, carbohydrates, reducing sugars, and cardiac glycosides secondary metabolites in stem, leaf, root and bark. Flavanoids are present only in the leaf and stem. The root and stem are good sources of saponins. Phenol content was detected in all three parts except stem. Phytochemical studies using ethanol found that all other phytochemicals except protein were present in different parts of the plant ie, stem, leaf, root and bark. Phytochemical studies using the chloroform extract of *Ludwigia perennis* revealed that flavonoids, tannins, steroids, terpenes, saponins, and cardiac glycosides were all present in the leaf, root, stem and bark parts. Alkaloids and carbohydrates were found to be present in all three parts except the root. Only the plants leaves contained phenols and reducing sugars. Phytochemical studies using carbinol extract of *Ludwigia perennis* plant showed that flavonoids, tannins, terpenes, saponins and cardiac glycosides are present in all parts of the plants such as leaf, root, stem and bark. Tannins, steroids and phenols are present in all three parts except the root. Alkaloids were only present in all three parts except the root. Proteins were absent in all four solvents.

### Discussion

An ecosystem called a wetland has many plants. Each has its own medicinal properties. *Melochia corchorifolia* and *Ludwigia perennis* these two plants exist in same ecosystem. Both plants have been widely used in traditional medicine. Being a plant with medicinal properties, its likely to contain many phytochemicals. In this analysis it was possible to find different types of phytochemicals present in different part of these two plants. This is a proof that these two plants have many medicinal

properties as they contain phytochemicals. Very little research has been done on the adequate medicinal properties of these plants. Therefore, it is very important to reveal more medicinal properties of these two plants. This study can be seen as a first step towards uncovering medicinal properties of *Melochia corchorifolia* and *Ludwigia perennis*.

**Table No.1: Phytochemical profiling of *Melochia corchorifolia***

S.No	Phytochemical	Aqueous extract				Ethanol extract				Chloroform extract				Carbinol extract				
		stem	leaf	root	fruit	Stem	leaf	root	fruit	Stem	leaf	root	fruit	Stem	leaf	root	fruit	
1	Alkaloid	+	-	-	+	-	+	-	+	-	-	-	-	-	-	-	-	-
2	Flavanoids	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
3	Tannins	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
4	Steroids	-	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
5	Terpenes	-	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
6	Carbohydrate	-	-	-	-	+	+	+	+	-	-	-	-	-	-	-	-	-
7	Saponins	+	+	-	-	+	+	+	+	+	+	+	+	+	+	+	+	+
8	Phenols	-	-	-	-	-	+	-	+	-	-	-	-	-	-	-	-	-
9	Proteins	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
10	Reducing sugars	-	+	-	-	-	+	+	+	-	+	+	+	-	+	-	-	-
11	Cardiac glycosides	+	+	-	-	+	+	+	+	-	+	+	+	+	+	+	+	+

Key= (+) Presence (-) Absence

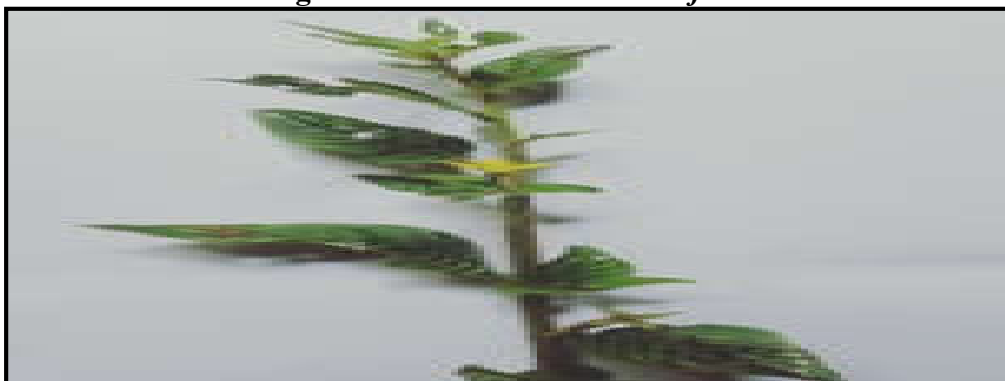
**Table No.2: Phytochemical profiling of *Ludwigia perennis***

S.No	Phytochemical	Aqueous extract				Ethanol extract				Chloroform extract				Carbinol extract			
		Leaf	root	Stem	Bark	leaf	root	stem	bark	leaf	root	Stem	bark	leaf	root	stem	bark
1	Alkaloid	-	-	-	-	+	+	+	+	+	-	+	+	+	+	-	-
2	Flavanoids	+	-	+	-	+	+	+	+	+	+	+	+	+	+	+	+
3	Tannins	+	+	+	+	+	+	+	+	+	+	+	+	+	-	+	+
4	Steroids	+	+	+	+	+	+	+	+	+	+	+	+	+	-	+	+
5	Terpenes	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
6	Carbohydrate	+	+	+	+	+	+	+	+	+	-	+	+	+	-	-	-
7	Saponins	-	+	+	-	+	+	+	+	+	+	+	+	+	+	+	+
8	Phenols	+	+	-	+	+	+	+	+	+	-	-	-	+	-	+	+
9	Proteins	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
10	Reducing sugars	+	+	+	+	+	+	+	+	+	-	-	+	+	-	-	-
11	Cardiac glycosides	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+

Key= (+) Presence (-) Absence



**Figure No.1: *Melochia corchorifolia***



**Figure No.2: *Ludwigia perennis***

## CONCLUSION

Herbs have been used as medicine by humans since their inception. Modern medicine revealed several side effects at the expense of quick relief. This medicine has several shortcomings in terms of treatment for aids, cancer, diabetes, arthritis, and other diseases. As a result, the world is looking to folk medicine with renewed optimism. The phytochemicals from different parts of *Melochia corchorifolia* and *Ludwigia perennis* were investigated. Alkaloids, flavonoids, steroids, terpenes, saponins, tannins, proteins, phenols, cardiac glycosides and reducing sugars are all constituents tested. Some of Phytochemicals were found to be beneficial roles. Some of the results were positive, while others were negative. Each secondary metabolite has its own medicinal properties. For example, presence of tannins suggests that this plant has antidiarrheal properties while the presence of saponins indicates that it has antihypercholesterol properties. Finally, it is suggested that the different plant parts of *Melochia*

*corchorifolia* and *Ludwigia perennis* be recommended as useful source for preparing natural bioactive products from which we can develop new drugs that will be cost effective due to plants availability. It is hoped that this research will lead to the identification of a compound that can be used to formulate new drugs and more potent natural sources of drug.

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## CONFLICT OF INTEREST

The authors declare that they have no conflict of interest.

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