

# Extraction and Qualitative Analysis of *Alternanthera Sessilis* and *Pueraria Tuberosa*

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**Abstract:** *Alternanthera sessilis* (Linn) and *Pueraria Tuberosa* are the treasure house of phytochemicals. The main objective of present paper was to study the qualitatively preliminary phytochemical analysis of such plant's species. The present paper deals with the extraction and phytochemical studies of *Alternanthera sessilis* (Linn) and *Pueraria Tuberosa*. A phytochemical analysis process was carried out to test the plant extract for therapeutic substances. The result of the study showed that the fresh plant or parts contains different classes of secondary metabolites such as flavonoids, phenols, tannins, saponins, alkaloids, carbohydrates, cardiac-glycosides, flavonoids, terpenoids, quinones, coumarins etc. Phytochemical are certain non-nutritive plant chemicals which have allelopathic properties. These phytochemical constituents play an important role in formulation of pharmaceutical and pharmacological drug. This study on above mentioned plants was carried out to standardize its components. Various examinations of extraction of plant indicates the presence of different phytochemical groups and yield in each extract. The objective of paper is to present an overview of phytochemical investigation carried out in *Alternanthera sessilis* (Linn) and *Pueraria Tuberosa*.

**Keywords:** *Alternanthera sessilis* linn., *Pueraria Tuberosa*, Phytochemical studies, Extraction, Soxhlation, biologically active compound

## I. INTRODUCTION

Since prehistorically era, shrubs, plants and trees have played a very important role in the life of human beings as well as all living organisms. They give us all the essential things for survival of life. Amongst all these, some of plants or trees have a lots of medicinal and herbal properties. Plants based Medicine has been used in whole world as traditional healthcare for hundreds of decade (Newman et al., 2000; Vadlapudi and Naidu KC. 2010). They are very safe and have no adverse effects. The herbal remedial plants, i.e. Rasayana are those plants whose each and every part like seeds, root, trunk, stem, leaves, foliage, etc. have been widely used in the Indian custom (Ayurveda) in the form of powder, latex, kadha, for the treatment of various diseases and infections (Kumar et al., 2011). For these some important reasons, our ancestors or vaidhya studied the medicinal value of plants and collected and transferred all the necessary knowledge to the next generation. The new generation continue this habit of studying and researching the medicinal values of plants as a further source of drugs because herbal or ayurvedic plant medicine has a strong tradition. It can heals different types of diseases without showing any adverse effects. The adverse or hazardous effects of herbal or ayurvedic drugs are very low in human belief, but the collated knowledge on these effects remains poor. (Anokwuru et al., 2012).

Ethno-pharmacology is a study that leads to how an individual gets medicine from plants, shrubs, fungi, animals, and all other remaining naturally present resources (T Rabe, and J.V. 1997). In the current scenario, mainly native people are continuously developing new medicinal drugs from plants or shrubs. Peoples of the whole world use plants as medicine with different names and processes, like allopathy, unani, siddha Ayurveda etc. (Kirtikar KR, B.B. 1996). Many types of diseases can be treated by medicine prepared from these plants. The roots, the bark, the stems, and the leaves can be used for different diseases.

*Alternanthera sessilis* Linn is a treasure house of phytochemicals. This weed plant belongs to family Amaranthaceae, commonly known as joy weed, sessile joy weed, stalkless, dwarf copperleaf, kanchari, Garundi, and Guroo. It is a constantly flourishing component of the vegetation of germination of seeds in any seasons of the year (S. R. Nikam and Dr. D. D. Namdas, 2022). *Pueraria tuberosa* is a perpetual herb generally named as 'vidarikanda', widely found throughout south East Asia. This plant's tuber is widely used in ethnomedicine as well as in traditional systems of

medicine particularly in ayurveda to prepare the medicine of some most common diseases (*Amal K. et al., 2014*). It has been used in different ayurvedic medicine as antiaging, spermatogenic restorative tonic, and immune booster and highly suggested for the treatment of fertility disorders in women, cardiovascular diseases, hepatosplenomegaly, sexual debility, menopausal syndrome, and spermatorrhoea. Numerous bioactive phytochemicals, mostly iso flavonoids such as puerarin, genistein, daidzein, tuberosin and so on have been identified in the tuber. The main objective of current investigation was to study the qualitatively preliminary phytochemical screening of such species. The fresh leaves of plant *Alternanthera Sessilis* and *Peuraria Tuberosa* were analyzing to understand the phytochemical potential with the use of four extracts such as aqueous, acetone, methanol and ethanol. Phytochemical are non-nutritive plant chemicals which have the properties of interaction of biochemical among plants. These phytochemical constituents play an essential role in preparation or formulation of pharmaceutical and pharmacological drugs.

### 1.1 Plant Material Collection

The fresh leaves of plant *Alternanthera sessilis* and *Pueraria tuberosa* were collected from natural habitats from some fields near by localities of Bhopal district, Madhya Pradesh, India in August 2021. The plant was authenticated at the Department of Chemistry, Sam Global University, Bhopal (Madhya Pradesh). A herbarium was prepared and kept for further reference. These active parts of plants that are used for research are washed properly in tap water. Then the plant parts are allowed to dry at room temperature in some shaded place. The leaves are then cut into tiny pieces and leave them to dry for 8-10 days in a shaded area without being contaminated. The material must not come in direct sunlight exposure. Completely dried leaves pieces of the plant *Alternanthera sessilis* and *Pueraria tuberosa* were examined macroscopically and microscopically. The dried materials are then grinded into coarse powder with the help of an electronic grinder. The powder is ground into coarse particles. The powder of plant material was stored in an airtight container in shaded place at room temperature.

### 1.2 Defatting of Material

The process of removal of dust, dirt, oil, fat and other foreign material from plant material to get the suitable material for the process is known as defatting of material. For this process, we store plant material i.e. coarse powder of the selected plant in petroleum ether and leave for 24 hours. After a period of 1 day, the sample material filtered with the help of spatula, funnel and filter paper (*Harborne JB 1998*) so that the impure particles that collected in petroleum ether separated from the required material. Dry the material and keep in a tight container. The material of both plant stored separately.

### 1.3 Chemical Reagent

A chemical reagent is a compound or substance added to a product to cause a chemical reaction. For phytochemical analysis, we used some chemical reagents. They are Fehling solution A, Fehling solution B, Hydrochloric acid (HCl), Picric acid  $C_6H_3N_3O_7$ , Ferric chloride ( $FeCl_3$ ), Lead acetate  $Pb(C_2H_3O_2)_2$ , Gelatin solution, Copper acetate  $Cu(CH_3COO)_2$ .

### 1.4 Extraction of Plant Material

Extraction of plant material is the process of separation of active plant materials from inactive plant material by the use of a suitable solvent and standard extraction. For extraction process, we use the Soxhlation method with the help of Soxhlet apparatus. In this method we use four solvents selected on the basis of their polarity. They are ethyl acetate ( $C_4H_8O_2$ ), Ethanol ( $C_2H_5OH$ ), chloroform ( $CHCl_3$ ) and water ( $H_2O$ ). The polarity of water is higher and polarity of chloroform is least amongst these. The mixture obtained from Soxhlet apparatus was filtered, evaporate, and stored at  $4^\circ C$  in an air-tight jar. This extract of plant material was used for further study (*Veena and pracheta 2013*).

### 1.5 Extraction of Material in Soxhlet Apparatus with Solvents

*Alternanthera sessilis* and *Pueraria tuberosa* Plant material were extracted separately using the Soxhlation method. Here different solvents like ethyl acetate, ethanol, petroleum ether, chloroform and water were used. Detailed phytochemical testing was performed to identify the presence or absence of different phyto constituents.

**Presence of Alkaloid**

The extract of both plant material were separately treated with 4 drops of hydrochloric acid (HCl) and shaken for some time as the extract was mixed completely with HCl, then 5 to 6 drops of Picric acid were added. The yellow precipitate was formed. This formation of yellow precipitate may show the presence of alkaloids.

**Presence of Carbohydrates**

The extract of both plant material were separately treated with 4 drops of hydrochloric acid (HCl) and 4 drops of Sodium Hydroxide (NaOH) and shook it well and then heated it with the flame heat, after that 3 drops of Fehling solution A and 3 drop of Fehling solution B were added. The red precipitate was formed. This formation of yellow precipitate may show the presence of carbohydrates.

**Presence of Saponins**

The extract of both plant materials were separately diluted with distilled water and shaken for 15 minutes. Formation of a 1c.m. layer of foam indicates the presence of phenols.

**Presence of Phenols**

The extract were treated with 3 to 4 drops of Ferric chloride to form a blushing black colour that indicates the presence of phenols.

**Presence of Flavonoids**

The extracts were treated with a few drops of Lead Acetate solution. The formation of yellow precipitates may show the presence of flavonoids.

**Presence of Tannins**

The extracts were treated with a few drops of NACL and 1% Gelatin solution. The formation of white precipitate indicates the presence of tannins.

**Presence of Diterpene**

The extracts were treated with 3 to 4 drops of Copper Acetate solution. The formation of an emerald green colour indicates the presence of Diterpene.

**Presence of Xenthoproteins**

The extract of both plant material were separately treated with concentrated nitric acid. The formation of a yellow colour indicates the presence of Xenthoproteins.

**Table 1:** Pytochemical analysis of the Alternanthera Sessilsplant extract.

Pytochemicals	Solvent		
	Petroleum ether	Ethanol	Water
Alkaloid Mayer's Test:	-ve	+ ve	+ve
Carbohydrates Moli's Test:	-ve	+ ve	-ve
Saponins Froth's Test:	- ve	+ ve	+ ve
Phenols Alkaline Reagent:	- ve	+ ve	+ ve
Flavonoids Lead Acetate Test:	+ve	+ ve	+ ve

Flavonoids Alkaline Reagent:	+ve	+ve	+ve
Diterpene Salkowski Test:	+ve	+ ve	+ ve
Proteins Xenthoproteins Test	- ve	+ ve	+ ve
Tannins Gelatin Test:	- ve	- ve	+ ve
Glycosides Legal's test	+ ve	+ ve	+ ve
Triterpenoid Salkowski Test:	- ve	+ ve	+ ve

**Table 2:** Phytochemical analysis of the Pueraria Tuberosa extract.

Phytochemicals	Solvent		
	Petroleum ether	Ethanol	Water
Alkaloid Mayer's Test:	+ve	+ ve	-ve
Carbohydrates Moli's Test:	+ve	+ ve	+ve
Saponins Froth's Test:	- ve	+ ve	+ ve
Phenols Alkaline Test:	+ ve	+ ve	+ ve
Flavonoids Lead Acetate Test:	+ve	+ ve	+ ve
Flavonoids Alkaline Reagent:	+ve	+ve	+ve
Diterpene Salkowski Test:	- ve	+ ve	- ve
Proteins Xenthoproteins Test	- ve	+ ve	- ve
Tannins Gelatin Test:	- ve	- ve	+ ve
Glycosides Keller Kiliani's test	+ ve	+ ve	+ ve
Triterpenoid Salkowski Test:	- ve	- ve	- ve

Here (+) sign indicate the presence of phytoconstituent and (-) sign indicate the Absence of Phytoconstituent like Alkaloid, Carbohydrates, Saponins, Phenols, Flavonoids, Diterpene, Xenthoproteins, and Tannins.

In this study and research of the Qualitative examination or phytochemical investigation of plant *Alternanthera sessilis* and *Pueraria tuberosa* extracts, shows the presence of variuos phytoconstituents.

## II. CONCLUSION

The present study showed that plant *Alternanthera sessilis* and *Pueraria tuberosa* has a wide array of phytochemical constituents with high concentration, which possess a number of medicinal properties. On the basis of this study it has

been proved that both plant *Alternanthera sessilis* and *Pueraria tuberosa* are the therapeutically important plant. Further studies are required to evaluate and understand a clear image depicting this plants utilization against diseases.

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