

Phytochemical Analysis of Medicinal Plants Occurring in Local Area of Zari Tahsil Dist. Yavatmal Maharashtra

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ABSTRACT

Medicinal plants have bioactive compounds which are used for curing various human diseases and also play an important role in healing. 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. Medicinal plants have antifungal, antibacterial, and anti-inflammation activities. The present study involves ten different medicinal plants *Acacia nilotica*, *Psidium guajava*, *Luffa cylindrical*, *Butea monosperma*, *Careya arborea*, *Momordica charantia*, *Cissus quadrangularis*, *Punica granatum*, *Ficus Mucuna pruriens* and *Combratum ovalifolium* locally available in Zari tahsil region of Maharashtra. The leaves of the selected medicinal plants were washed, air-dried, and then powdered. The aqueous extract 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 phytochemical constituents in all the selected medicinal plants. The results of the phytochemical analysis of these medicinal plants showed that the terpenoids, phlobatannins, reducing sugar, flavonoids and alkaloids were found to be present in the aforementioned medicinal plants. The phytochemical analysis of the plants is very important commercially and has a great interest in pharmaceutical companies for the production of new drugs for curing of various diseases. It is expected that the important phytochemical properties recognized by our study in the indigenous medicinal plants will be very useful in the curing of various diseases of this region.

Keywords: Medicinal plants; Phytochemicals; Anti-fungal; Antibacterial; Anti-inflammation activities

INTRODUCTION

The medicinal plants are useful for healing as well as for curing of human diseases because of the presence of phytochemical constituents [1]. Phytochemicals are naturally occurring in the medicinal plants, leaves, vegetables, and roots that have defense 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 [2]. Terpenoids exhibit various important pharmacological activities i.e., anti-inflammatory, anticancer, anti-malarial, inhibition of cholesterol synthesis, anti-viral and anti-bacterial activities [3]. Terpenoids are very important in attracting useful mites and consume the herbivorous insects [4]. Alkaloids are used as anaesthetic agents and are found in medicinal plants [5]. The *Momordica charantia* belongs to the Cucurbitaceae family and it has common names such as bitter melon, karela and bitter gourd. More than a thousand herbal products of *Momordica charantia* are used for treatment of diabetic patients and also helpful in lowering of glucose level in the blood [6]. The bioactive constituents are present in *Momordica charantia* that is charantosides, momordin and goyaglycosides. It also includes terpenoids constituents such as momordicin, momordenol, momordicin-28, momordicilin and momordol [7-11] *Caeya Arborea* is the botanical name of the Kumbhi and it belongs to the family Lecylhidaceae. Kumbhi have shown various biological properties such as anti-inflammatory activities [12]. Guava is the common name of the *Psidium guajava* and it belongs to the family

Myrtaceae. Its phytochemical study shows that its extracts have more than twenty compounds [13,14]. *Combretum ovalifolium* belongs to the Combretaceae family. It is used as medicinal plants in African countries and this medicinal plant has shown strong anti-fungal activities [15].

Pomegranate is the common name of the *Punica granatum* (PG) and belongs to the family Lythraceae. It has much medical significance and used as medicines for centuries. The recent studies have investigated that pomegranates are used for the treatment of a number of diseases e.g., diabetes, dysentery, diarrhoea, cough, asthma, bleeding disorders, bronchitis, fever, AIDS, inflammation, ulcers, malaria, prostate cancer, hypertension, atherosclerosis, hyper lipidemia, male infertility, infant brain ischemia and obesity. *Cissus quadrangularis* (Vitaceae) is one of the plants which are locally used in Maharashtra as a cure of snake bite. *Acacia nilotica*, it is the member of the Leguminosae family. The subfamily of the *Acacia nilotica* is Mimosoideae. *Luffa cylindrica* is the botanical name of the sponge gourds and belongs to Cucurbitaceae family. The fruits of this plant have flat seeds and black in colour which is enclosed by group of fibers. Medicinal and nutritional properties are the characteristics of *Luffa cylindrica* and seeds of this plant are used for curing of asthma, fever and sinusitis. *Butea monosperma* is included in the Fabaceae family. Their leaves and fruits are used for curing prematurely grey hair. Its root bark is used by humans for more than 4 thousand years. *Mucuna pruriens* is included in the family of Fabaceae and is used as a dry vegetable. It is a herbaceous perennial plant. Its leaves have hypotensive actions. The main objective of our research work was to analyze the presence or absence of different phytochemicals in the selected ten medicinal plants from the Zari tahsil region (Maharashtra) used for healing and curing various diseases.

MATERIALS AND METHODS

Plant materials

The present study included plant species which were *Acacia nilotica*, *Punica granatum*, *Psidium guava*, *Mucuna pruriens*, *Butea monosperma*, *Careya arborea*, *Cissus quadrangularis*, *Momordica charantia*, *Combretum ovalifolium* and *Luffa cylindrica*.

Chemicals

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

Sample collection

Ten medicinal plants were collected locally from the farm lands of Zari tahsil area (Maharashtra). The plants were used for the purpose of their phytochemical analysis. The plants collected were identified botanically in the department of Botany Lokmanya Tilak Mahavidyalaya, Wani. Fresh and tender leaves of selected plants were used for phytochemical analysis. Plant species selected during the present investigation were given in Table 1.

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. The plant samples were then air-dried for a few days and the leaves were crushed into powder and stored in polythene bags for use.

The plant powder was taken in a test tube and distilled water was added to it such that plant powder soaked in it and shaken well. The solution was then filtered with the help of filter paper and filtered extract of the selected plant samples were taken and used for further phytochemical analysis.

Table No.1 : List of Plants used for Phytochemical Analysis.

Sr. No.	PLANT SPECIES	LOCAL NAME	PART USED
1	<i>Acacia nilotica</i>	Babhul	Leaves
2	<i>Psidium gujauva</i>	Jamb	Leaves
3	<i>Luffa cylindrica</i>	Dodka	Leaves
4	<i>Butea monospema</i>	palas	Leaves
5	<i>Careya arborea</i>	Kumbhi	Leaves
6	<i>Momordica charantia</i>	Karale	Leaves
7	<i>Cissus quadrangularis</i>	Haddi jod	Leaves
8	<i>Punica granatum</i>	Dalimb	Leaves
9	<i>Mucuna pruriens</i>	Khaj khujali	Leaves
10	<i>Combretum ovalifolium</i>	Piwar wel	Leaves

Test for phlobatannins

Plant powder sample was mixed with distilled water in a test tube, then shake it well, and filtered to take plant extract. Then to each plant extract, 1% aqueous hydrochloric acid was added and each plant sample was then boiled with the help of a Hot plate stirrer. The formation of red coloured precipitate confirmed a positive result.

Test for reducing Sugar

An amount of 0.50 g of the selected plant sample was added in 5 ml of distilled water. Then 1 ml of ethanol mixed in the plant extract. After that, we took 1 ml of Fehling solution A and 1 ml of Fehling solution B in a test tube, heated it to boiling, and then poured it in the aqueous ethanol extract. When the color reaction was observed, it shows a positive result.

Test for terpenoids

An amount of 0.8 g of the selected plant sample was taken in a test tube, then poured 10 ml of methanol in it, shaken well, and filtered to take 5 ml extract of plant sample. Then 2 ml of chloroform were mixed in extract of selected plant sample and 3 ml of sulphuric acid was added in the selected sample extract. The formation of reddish-brown color indicates the presence of terpenoids in the selected plants.

Test for flavonoids

For the confirmation of flavonoid in the selected plants, 0.5 g of each selected plant extract were added in a test tube and 10 ml of distilled water, 5 ml of dilute ammonia solution were added to a portion of the aqueous filtrate of each plant extract followed by addition of 1 ml concentrated H₂SO₄. The indication of yellow colour shows the presence of flavonoids in each extract.

Test for alkaloids

For the purpose of phytochemical analysis of the selected plants, 0.2 g of the selected plant samples were added in each test tube and 3 ml of hexane were mixed in it, shaken well, and filtered. Then took 5 ml of 2% HCl and poured in a test tube having the mixture of plant extract and hexane. Heated the test tube having the mixture, filtered it, and poured a few drops of picric acid in a mixture. The formation of yellow colour precipitate indicates the presence of alkaloids.

Table No. 2 : Preliminary phytochemical analysis of screened medicinal plant species.

S.No	Plant species	Phlobatannins	Reducing sugar	Terpenoid	Flavonoids	Alkaloids
1	<i>Punica granatum</i>	-	-	-	+	+
2	<i>Psidium gujauva</i>	+	+	+	+	++++
3	<i>Careya arborea</i>	-	-	-	-	++
4	<i>Butea monosperma</i>	-	-	-	+	-
5	<i>Mucuna pruriens</i>	-	-	-	+	-
6	<i>Momordica charantia</i>	+	-	-	-	-
7	<i>Luffa cylindrica</i>	-	-	-	-	-
8	<i>Combretum ovelifolium</i>	+	-	-	-	++
9	<i>Cissus quadrangulais</i>	-	-	++	+++	-
10	<i>Acacia nilotica</i>	-	+	+	+	-

+ = indicates presence of phytochemicals and

- = indicates absence of phytochemicals.

++++ = shows high concentration.

+++ = shows moderate concentration.

RESULTS

This study has revealed the presence of phytochemicals considered active medicinal chemical constituents. Important medicinal phytochemicals such as terpenoids, reducing sugar, flavonoids, alkaloids and phlobatannins were present in the samples. The result of the phytochemical analysis shows that the ten plants are rich in at least one of alkaloids, flavonoids, terpenoids, reducing sugars and phlobatannins. Plant *Psidium gujauva* having all these phytochemicals. The phytochemical screening and qualitative estimation of 10 medicinal plants studied showed that the leaves were rich in phlobatannins, terpenoid, flavonoids, alkaloids and reducing sugar (Table 2). Phlobatannins are present in *Psidium gujauva*, *Momordica charantia* and *Prunus persica*. Phlobatannins have been reported for its wound healing properties, these are anti-inflammatory and analgesic and antioxidant. Reducing sugars are present only in two plants out of 10 plants i.e., *Psidium gujauva* and *Acacia nilotica*. Terpenoids are present in *Psidium gujauva*, *Fagonia cretica* and *Acacia nilotica*. Terpenoids are reported to have anti-inflammatory, anti-viral, anti-malarial, inhibition of cholesterol synthesis and anti-bacterial [3]. Flavonoids are found in *Punica granatum*, *Psidium gujauva*, *Butea monosperma*, *Mucuna pruriens*, *Cissus quadrangularis* and *Acacia nilotica*. Epidemiologic studies recommend that coronary heart disease is opposed by dietary flavonoids. Alkaloids are present in *Punica granatum*, *Psidium guava*, *Careya arborea* and *Combratum ovalifolium* as shown in Table 2. Plants having alkaloids are used in medicines for reducing headache and fever. These are attributed for antibacterial and analgesic properties.

DISCUSSION

The research work was carried out on the ten selected medicinal previous studies it is confirmed that flavonoids and reducing sugars were present in the methanolic extract of , *Cissus quadrangularis* while terpenoids were present in the n-hexane extract of the, *Cissus quadrangularis*. cretica and in our recent research studies, it is investigated that flavonoids and terpenoids were found to be present in this plant. In our

research studies, alkaloids were found to be present in *Combretum ovalifolium* while the previous studies showed that flavonoids were present in this plant.

CONCLUSION

The selected ten medicinal plants are the source of the secondary metabolites i.e., alkaloids, flavonoids, terpenoids, phlobatannins and reducing sugars. Medicinal plants play a vital role in preventing various diseases. The antidiuretic, anti-inflammatory, antianalgesic, anticancer, 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 will be helpful in the coping different diseases of this particular region.

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