

Phytochemical Analysis of Some Medicinal Plants Found in Local Area of Moradabad District of Uttar Pradesh

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Abstract: The present study was carried out to investigate the phytochemical profile of some selected plants. This paper aimed to study of ten medicinal plants *Solanum nigrum*, *Argemone maxicana*, *Cuscuta reflexa*, *Boerhaavia diffusa*, *Butea monosperma*, *Rumex dentatus*, *Tribulus terrestris*, *Alocasia indica*, *Ricinus communis*, *Amaranthus spinosus*, locally available in Moradabad of Uttar Pradesh. These medicinal plants have phytochemical compounds which are used for curing of human disease. The aqueous extract of leaves was used for the phytochemical analysis to find out the phytochemical constituents in plants. Phytochemical analysis shows the presence or absence of flavonoids, alkaloids, terpenoids, phlobatannins and reduced sugar. Medicinal plants have antifungal, antibacterial, anti inflammation and antioxidant activities due to these phytochemical compounds. The present study will be very useful in the curing of various diseases.

Keywords: Phytochemical analysis, Medicinal plants

1. Introduction

Medicinal plants contain some organic compounds which produce definite physiological action on the human body and these bioactive substances include tannins, alkaloids, carbohydrates, terpenoids, steroids and flavonoids.(4,5) They are of great importance to the health of individuals and communities. The phytochemical is a natural bioactive compound found in plants, such as vegetables, fruits, medicinal plants, flowers, leaves and roots that work with nutrients and fibers to act as an defense system against disease or more accurately, to protect against disease.(2)

Phytochemicals are divided into two groups, which are primary and secondary constituents; according to their functions in plant metabolism. Primary constituents comprise common sugars, amino acids, proteins and chlorophyll while secondary constituents consists of alkaloids, terpenoids and phenolic compounds and many more such as flavonoids and tannins etc.(3) The pharmacology provides an alternative approach for the discovery of antivity agents namely the study of medicinal plants with a history of traditional use as a potential source of substance with significant, pharmacological and biological activities such as antioxidant, anticancer, and hepatoprotective(6) The recent studies have investigated that all these selected plants used for the treatment of a number of diseases eg. Diabetes, diarrhea, cold and cough, asthma, fever, inflammation, ulcer, malaria, hypertension, etc.

2. Material and Methods

On the bases of ethnobotanical knowledge of available literature and visual observations of plants that were relatively free from diseases and insect damages 10 plant species have been selected for the present study, which are as follows:

Amaranthus spinosus, *Cuscuta reflexa*, *Argemone maxicana*, *Solanum nigrum*, *Boerhaavia diffusa*, *Butea monosperma*,

Rumex dantatus, *Alocasia indica*, *Ricinus communis* and *Tribulus terrestris*.

The phytochemical screening of plants was done following the standarder procedures adapted by various worker (7,8,9).

Chemicals

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

Collection of sample

Ten medicinal plants were collected locally from the study area. The plants were used for the purpose of their phytochemical analysis. The plants collected were identified botanically in department of Botany. Fresh and tender leaves and other parts of plant were used for phytochemical analysis. Plant species selected during present investigation were given in Table-1.

Table 1

S. No.	Plant species	Local name	Parts used
1	<i>Solanum nigrum</i>	Makoi	Whole plant
2	<i>Argemone maxicana</i>	Pili kateeli	Whole plant
3	<i>Cuscuta reflexa</i>	Amarbel	Whole plant
4	<i>Boerhaavia diffusa</i>	Punarva	Whole plant
5	<i>Butea monosperma</i>	Tesu	Leaves
6	<i>Rumex dentatus</i>	Jangli palak	Leaves
7	<i>Tribulus terrestris</i>	Gokhru	Whole plant
8	<i>Alocasia indica</i>	Elephant ear	Leaves
9	<i>Ricinus communis</i>	Arandi	Leaves
10	<i>Amaranthus spinosus</i>	Gojhua	Whole plants

Preparation of plant extract

The leaves and other parts of the selected plants were removed and then washed under running tap water to remove dust. The plant samples were then air dried for few days and they 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 then filtered with the help of filter

paper and filtered extract of the selected plant samples were taken and used for further phytochemical analysis.

Test for phlobatannins

Plant powder sample was mixed with distilled water in a test tube, then shaken 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 Hot plate stirrer. Formation of red colored precipitate confirmed a positive result.

Test for reducing Sugar

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

Test for terpenoids

An amount of 0.8 g of 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 were added in selected sample extract. 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 distill 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. Indication of yellow color shows the presence of flavonoid 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 few drops of picric acid in a mixture. Formation of yellow color precipitate indicates the presence of alkaloids.

3. Results

This study has revealed the presence of phytochemicals considered as 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 Butea monoperma*, *Alocasia indica* having all these phytochemicals. The phytochemical screening and qualitative estimation of 10 medicinal plants studied showed that the used parts were rich in phlobatannins, terpenoid, flavonoids, alkaloids and reducing sugar (Table 2). Phlobatannins are present in *Cuscuta reflexa*, *Amaranthus spinosus*, *Boerhaavia diffusa*, *Alocasia indica*, *Butea monosperma*, *Rumex dantatus*, *Solanum nigrum*, *Ricinus communis*. Phlobatannins have been reported for its wound healing properties, these are anti-inflammatory and analgesic(10) and antioxidant(11). Reducing sugars are present in seven plants out of 10 plants i.e., *Tribulus terrestris*, *solanum nigrum*, *Argimone maxicana*, *Amaranthus spinosus*, *Alocasia indica*, *Ricinus communis*, *Butea monosperma*. Terpenoids are present in *Argimone maxicana*, *Cuscuta reflexa*, *Boerhaavia diffusa*, *Butea monosperma* and *Alocasia indica*. Terpenoids are reported to have anti-inflammatory, anti-viral, anti-malarial, inhibition of cholesterol synthesis and anti-bacterial(12). Flavonoids are found in *Solanum nigrum*, *Amaranthus spinosus*, *Boerhaavia diffusa*, *Tribulus terrestris*, *Ricinus communis*, *Alocasia indica*, *Argimone maxicana*, *Rumex dantatus*, *Butea monosperma*. Epidemiologic studies recommend that coronary heart disease is opposed by dietary flavonoids. Alkaloids are absent in *Amaranthus spinosus*, *Ricinus communis*, 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(13).

Table 2

S.No.	Plant species	Phlobatannins	R.Suger	Terpenoids	Flavonoids	Alkaloids
1	<i>Solanum nigrum</i>	+	+	-	+	+
2	<i>Argimone maxicana</i>	-	+	+	+	+
3	<i>Cuscuta reflexa</i>	+	-	+	-	+
4	<i>Boerhaavia diffusa</i>	+	-	+	+	+
5	<i>Butea monosperma</i>	+	+	+	+	+
6	<i>Rumex dentatus</i>	+	-	-	+	+
7	<i>Tribulus terrestris</i>	-	+	-	+	+
8	<i>Alocasia indica</i>	+	+	+	+	+
9	<i>Ricinus communis</i>	+	+	-	+	-
10	<i>Amaranthus spinosus</i>	+	+	-	+	-

4. Discussion

The research work was carried out on the ten selected medicinal plants which shows that phytochemical constituents i.e., terpenoids, flavonoids, alkaloids, reducing sugars and

phlobatannins are either present or absent in these plants and the results were summarized in Table- 2.

In present study it was investigated that alkaloids, flavonoids, phlobatannins, and reducing sugars are present in *Solanum nigrum* and terpenoids were found to be absent(16). In some studies it was reported that flavonoids and terpenoids were

present in aqueous extract,(14) while the previous studies showed that alkaloids and phlobatannins were found to be absent in it. The result of present research and previous researches were different so it might be due to the change in location and genetic variation due to cross pollination, so their genetic makeup were changed and that is why shows the different results. Reducing sugars, flavonoids and traces of alkaloids were found to be present in *solanum nigrum*(16) according to the previous investigations while in present investigation, reducing sugars, alkaloids, flavonoids and phlobatannins all were present in it and alkaloids were more in concentration as compared to other phytochemicals in *solanum nigrum* plant. Except phlobatannins all remaining phytochemical constituents alkaloids, flavonoids, terpenoids and sugar were present in *Argimone maxicana*.(17) From previous research work it was reported that in the leaves of *Argimone maxicana*, phytoconstituents i.e., alkaloid contents were found to be present.

In our present investigation flavonoids and reducing sugars were found to be absent in *Cuscuta reflexa* while the previous research studies showed that flavonoids and sugar were present in it.(15) The phytochemical analysis of *Boerhaavia diffusa* showed the presence of terpenoids, phlobatannins and flavonoids. While the previous studies showed that the flavonoids were present. The researchers found the same result about the flavonoids and they did not study the remaining phytochemicals in *Boerhaavia diffusa*(21)

The result obtained from this work revealed that *Amaranthus spinosus* contained flavonoids. The previous research work showed that flavonoids were present in methanolic extract and petroleum ether extracts of *Amaranthus spinosus*. It was reported that the ethanolic/aqueous extract of *Rumex dantatus* contained alkaloids, flavonoids and phlobatannins while in our research investigations alkaloids were found to be present in it. *Butea monosperma* and *Alocasia indica*(21) show all phytochemical constituents(19). Terpenoid are absent in *Tribulus terrestris*(18) and *Ricinus communis*. *Ricinus communis* showed the absence of alkaloids(20). It was investigated that flavonoids were found to be present in all selected plants and the flavonoids in the leaves have excellent antioxidant activities and are important bioactive components in plants, which can cause inhibition of the oxidative modification of the human lipoproteins.

5. 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.

6. Acknowledgement

Authors are thankful to Prof. J.S Verma, Senior Scientist, Department of Genetics and Plant Breeding, G. B. Pant University of Agriculture and Technology, Pantnagar, Uttarakhand and Dr. Anamika Tripathi, Associate professor, Department of Botany, Hindu College, Moradabad for their support.

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