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Qualitative Phytochemical Screening of Some Selected Medicinal Plants of Shivpuri District (M.P.)

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ABSTRACT- The phytochemicals are the most important sources for the treatment of common diseases. The present investigation deals with the qualitative phytochemical analysis of leaves of ten medicinal plants. These are *Bauhinia variegata* Linn. (Caesalpiniaceae), *Calotropis procera* (Ait.) R.Br. (Asclepiadaceae), *Catharanthus roseus* (Linn.) Don. (Apocynaceae), *Lantana camara* (Linn.) Var. (Verbenaceae), *Mangifera indica* Linn. (Anacardiaceae), *Moringa oleifera* Lamk. (Moringaceae), *Ocimum sanctum* Linn. (Lamiaceae), *Pithecellobium dulce* (Roxb) Benth. (Mimosaceae), *Solanum nigrum* Linn. (Solanaceae), *Tinospora cordifolia* (Willd.) Mier. ex Hook. f. and Th. (Menispermaceae). Methonolic extracts of the powder of the leaves were screened for qualitative determination of different phytochemicals like alkaloids, carbohydrates, glycosides, phytosterols, flavonoids, protein and amino acid, diterpenes, phenols and tannin. All plant materials were collected from Shivpuri district (M.P.).

Key-words- Medicinal plants, Methanolic extracts, Phytochemical study

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INTRODUCTION

Phytochemicals are chemical compounds that are naturally found in plants. They are responsible for the colour and organoleptic properties of the plant [1]. It is also referred to as those chemicals that may have biological significance but are not established as an essentials nutrient in plant [2]. Phytochemicals could be available as dietary supplements, but the potential health benefits of phytochemicals are derived from consumption of the whole plant [3].

Several phytochemicals have a wide range of activities, which helps to give immunity against long term disease. The phytochemicals like alkaloids, flavonoides, tannins, saponins, carbohydrates, glycosides, phytosterols, phenols, protein and amino acid, diterpens etc. are known to show medicinal activity as well as exhibit physiological activity [4]. Medicinal Plant is of great importance of the health of individual and communities.

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The medicinal value of plants lies in some chemical active substances that produce define physiological action on the human body. The most important of these chemically active (bioactive) constituents of plant are alkaloids, tannin, flavonoids and phenolic compounds. Many of these indigenous medicinal plants are also used for medicinal purposes [5]. During the course of study ten medicinal plants were selected for their qualitative analysis. The selection was made on the basis of greater ICF value and FL% value.

MATERIALS AND METHODS

Plant collection and identification

Fresh leaves of ten medicinal plants of *Bauhinia variegata* Linn. (Caesalpiniaceae), *Calotropis procera* (Ait.) R.Br. (Asclepiadaceae), *Catharanthus roseus* (Linn.) Don. (Apocynaceae), *Lantana camara* (Linn.) Var. (Verbenaceae), *Mangifera indica* Linn. (Anacardiaceae), *Moringa oleifera* Lamk. (Moringaceae), *Ocimum sanctum* Linn. (Lamiaceae), *Pithecellobium dulce* (Roxb) Benth. (Mimosaceae), *Solanum nigrum* Linn. (Solanaceae), *Tinospora cordifolia* (Willd.) Mier. ex Hook. f. and Th. (Menispermaceae) were collected from Shivpuri district (M.P.), India. They were identified in Taxonomy Division, Botanical Survey of India (BSI), Allahabad and herbarium deposited in the Department of Botany Govt. S.M.S. Model Science College, Gwalior, India. The qualitative analyses of ten medicinal plants were conducted at Eco lab city center, Gwalior, India.

Fresh mature leaves of the selected plants were washed thoroughly 2-3 times with running tap water. The plant materials were kept in until all the water content evaporated and the plant became well dried for grinding. After drying the plant material were grounded using with mechanical blender to get fine powder and the powder was stored in airtight plastic container with proper labeling for future use.

Extraction Technique

It involves the separation of a medicinally active portion of plant tissues from inactive or inert compounds by using selective solvent in standard extraction procedure. The purposes of standard extraction procedure for crude drugs are to attain the therapeutic portion and eliminate the inert material by treatment with a selective solvent known as menstrum [6].

METHOD OF PLANT EXTRACTION

Solvent extraction

The crude plants extract was prepared by the Soxhlet extraction method [7]. About 20 grams of powdered plant materials were uniformly packed into a thimble and extracted with 250 ml. solvents separately. A solvent used to be methanol. The process of extraction continued for 24 hours or till the solvent in siphon tube of an extractor become colourless. After that the extract was taken in a beaker and kept on hot plate and heated at 30–40^{0}C till all the solvent got evaporated. Dried extract was kept in the refrigerator at 4^{0}C for their future use in phytochemical analysis.

Methods of Qualitative phytochemical analysis

The leaf extracts were tested for the presence of bioactive compounds by using following standard methods [8].

Test for Alkaloid- The plant extract was mixed in 1% v/v HCL, warmed and filtered, then this filtered was used for following test.

Mayer's test- The filtrate was treated with Mayer's reagent (Mercuric chloride+Potassium iodide in water). Formation of a yellow coloured precipitate indicated the presence of alkaloids

Hager's test- The filtrate was treated with Hager's reagent (saturated picric acid solution). Formation of yellow coloured precipitate indicated the presence of alkaloids.

Test for Carbohydrates- The plant extract was dissolved in 5 ml distilled water and filtered. The filtrates were used to test for the presence of carbohydrates.

Molisch's test- Filtrate was treated with two drops of alcoholic ά-naphthol solution in a test tube. Carefully, incline tubes and pour drop wise conc. Sulphuric acid using a dropper, along the sides of the test tube. Formation of violet colour at the junction or interface of two liquids indicated the presences of carbohydrates.

Benedict's test- Filtrate is treated with Benedict's reagent (Sodium carbonate + sodium citrate and copper sulphate solution), then the mixture was heated on a boiling water bath for 5 minutes and cooled. Orange red precipitate indicated the presence of carbohydrates.

Test for Glycosides- Glycosides are of three types of saponin, cardiac glycosides and anthraquionone glycosides.

Legal's test for Cardiac glycosides- The plant extract is treated with dil. HCl, this solution treated with sodium nitroprusside in pyridine and sodium hydroxide. Formation of pink to blood red colour indicated the presence of cardiac glycosides.

Froth test for Saponin glycosides- The plant extract was diluted with distilled water and this was shaken in graduated cylinder for 15 minutes. Formation of 1 cm layer of foam indicated the presence of saponins.

Borntragers test for Anthraquinone glycosides The plant extract was treated with a Ferric chloride solution and immersed in boiling water bath for 5 minutes. The mixture was cooled and treated with benzene. The benzene layer was separated and added with 2ml ammonia solution. Formation of rose pink colour in the ammonical layer indicated the presence of anthraquinone glycosides.

Test for Phytosterols

Salkowski's test- The plant extract was mixed with chloroform and filtered. The filtrateis treated with 5-6 drops of conc. Sulphuric acid carefully and shaken gently allowed standing. A golden yellow colour indicated the presence of triterpens (phytosterol).

Test for Flavonoids

Alkaline Reagent test- The plant extractis treated with 2-3 drops of sodium hydroxide solution. Formation of intense yellow colour, which becomes colourless on addition of a few drops of sulphuric acid which indicated the presence of flavonoids.

Test for Protein and Amino Acid

Xanthoproteic test- The plant extract was treated with a few drops of conc. Nitric acid. Formation of yellow colour indicated the presence of proteins.

Ninhydrin test: The plant extract is treated with 0.25% v/v ninhydrin reagent and boiled for a few minutes. Formation of blue colour indicated the presence of amino acids.

Test for Diterpenes

Copper acetate test- The plant extract was dissolved in distilled water and treated with the copper acetate solution. Formation of emerald green colour indicated the presence of diterpenes.

Test for Phenols and Tannin

The powdered sample of leaves is boiled in 20 ml of distilled water in a test tube and then filtered. The 3–4 drops of 0.1% v/v Ferric chloride is added to the filtered sample and observed brownish green or blue colouration, it indicated the presences of phenols or tannins.

RESULTS AND DISCUSSION

From the qualitative analysis of leaves of selected ten medicinal plants, the presence or absence of carbohydrates, proteins, flavonoids, alkaloids, phenols, glycosides, phytosterol and diterpenes was investigated. The result of this study is shown in Table 1.

Table 1: Qualitative phytochemical analysis of methanolic leaf extract of some selected plant species

S.No	Name of plants	Alkaloids		Carbohydrates		Phytosterols	Glycosides			Phenols	Flavonoids	Protein		Diterpenes
		Mayer	Hager	Molisch	Benedict		Sap.	Card.	A.Q.			Xa.	Nin.	
1	***Bauhinia variegata* Linn.**	+	+	+	+	+	+	+	+	+	+	+	+	+
2	***Calotropis procera* (Ait) R.Br.**	+	+	+	+	-	+	+	+	+	+	+	+	+
3	***Catharanthus roseus* (Linn.) Don.**	+	+	+	+	-	+	+	+	+	+	+	+	+
4	***Lantana camara* Linn. Var.**	-	-	+	+	-	+	+	-	+	+	+	+	+
5	***Mangifera indica* Linn.**	-	-	+	+	+	+	+	+	+	+	+	+	+
6	***Moringa oleifera* Lamk.**	+	+	+	+	+	+	+	+	-	+	+	+	+
7	***Ocimum sanctum* Linn.**	+	+	+	+	+	+	+	+	+	+	+	+	+
8	***Pithecellobium dulce* (Roxb.) Benth.**	+	+	+	+	+	-	-	-	+	+	+	+	+
9	***Solanum nigrum* Linn.**	+	+	+	+	-	+	+	+	+	+	+	+	+
10	***Tinospora cordifolia* (Willd) Mier. ex Hook f. & Th.**	-	-	+	+	-	-	-	-	+	+	+	+	+

Note – The presence of phytochemical is indicated by '+' and the absence is indicated by –sign

The result of qualitative analysis of leaves of ten medicinal plants shown that carbohydrates, proteins, diterpenes and flavonoids were present in leaves of all ten medicinal plants studied. The alkaloids were found to be present in seven medicinal plants, *Bauhinia variegata* Linn., *Calotropis procera* (Ait) R.Br., *C. roseus* (Linn.) Don. *M. oleifera* Lamk., *O. sanctum* Linn., *P. dulce* (Roxb) Benth., *S. nigrum* Linn., Phytosterols were found to be present in five medicinal plants, *B. variegata* Linn. *M. indica* Linn., *M. oleifera* Lamk., *O. sanctum* Linn., *P. dulce* (Roxb.) Benth. Glycosides were found to be

present in eight medicinal plants, *B. variegata* Linn., *C. procera* (Ait) R.Br., *C. roseus* (Linn.) Don., *L. camara* (Linn.) Var., *M. indica* Linn., *M. oleifera* Lamk., *O. sanctum* Linn., *S. nigrum* Linn., phenols were found to be present in nine medicinal plants, *B. variegate* Linn., *C. procera* (Ait) R.Br., *C. roseus* (Linn.) Don., *L. camara* (Linn.) Var., *M. indica* Linn., *O. sanctum* Linn., *P. dulce* (Roxb.) Benth. *S. nigrum* Linn., T. *cordifolia* (Willd.) Mier.ex Hook. f. and th.

CONCLUSIONS

It can be concluded that the selected medicinal plants are the source of secondary metabolites like alkaloids, phytosterols, glycosides, phenols, flavonoids and diterpenes. Due to the presence of these secondary metabolites the selected medicinal plants have high healing potential. The alkaloids were found to be present in seven medicinal plants, *B. variegata* Linn., *C. procera* (Ait) R.Br., *C. roseus* (Linn.) Don. *M. oleifera* Lamk., *O. sanctum* Linn., *Pithecellobium dulce* (Roxb) Benth., *S. nigrum* Linn., Phytosterols were found to be present in five medicinal plants, *B. variegate* Linn. *M. indica* Linn., *M. oleifera* Lamk., *O. sanctum* Linn., *P. dulce* (Roxb.) Benth. Glycosides were found to be present in eight medicinal plants, *B. variegata* Linn., *C. procera* (Ait) R.Br., *C. roseus* (Linn.) Don., *L. camara* (Linn.)Var., *M. indica* Linn., *M. oleifera* Lamk., *O. sanctum* Linn., *S. nigrum* Linn., phenols were found to be present in nine medicinal plants, *B. variegata* Linn., *C. procera* (Ait) R.Br., *C. roseus* (Linn.) Don., *L. camara* (Linn.) Var., *M. indica* Linn., *O. sanctum* Linn., *P. dulce* (Roxb.) Benth. *S. nigrum* Linn., *T. cordifolia* (Willd.) Mier.ex Hook. f. and th.

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