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Phytochemical analysis of ten medicinal plants

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Abstract

Phytochemicals are the major sources of all plants and it is use for the treatment of different health problem. The present investigation deals with the phytochemical studies of leaves from ten medicinal plants form different families like *Costus igneus*, *Clerodendron infortunatum*, *Antigonon leptopus*, *Achyranthes aspera*, *Andrographis paniculata*, *Dioscorea bulbifera*, *Withania somnifera*, *Lagerstroemia speciosa*, *Adhatoda vasica* and *Terminalia bellirica*. Aqueous leaves extract were used for further detection of primary metabolites. These ten medicinal plants contain important bioactive compounds and it justifies their use in the traditional medicines for the treatment of different diseases. Current study was concluded that the plants having rich in phytochemicals with significant pharmacological and medicinal applications.

Key words- Phytochemicals analysis, medicinal plants, ethanolic extract, primary metabolites

Introduction

There are two types of metabolites produced in plants viz. Primary metabolites and Secondary metabolites. Phytochemicals are generally present in plant parts and it is most important bioactive compounds also known as secondary metabolites. Primary metabolites are important for the plants growth regulators. Medicinal plants contain some organic compounds which provide definite physiological action on the human body and these bioactive substances include tannins, alkaloids, carbohydrates, protein, phenols, terpenoids, steroids and flavonoids (Mann 1978 and Edoga *et al.*, 2005). These compounds are synthesized by primary or rather secondary metabolism of living organisms.

The potential of the phytochemicals have large scale pharmacological and biological activities such as antioxidant constituents (hydrolysable tannins, phenolic acid and flavonoids etc.) of the plant materials for the care of health and protection from coronary heart diseases, cancer, anti-carcinogenic and anti-mutagenic effects. Secondary metabolites are chemically and taxonomically extremely diverse compounds with obscure function. They are widely used in the human therapy, veterinary, agriculture, scientific research and countless other areas (Vasu *et al.*, 2009).

In the present work, preliminary phytochemical analysis were carried out in ten plants *Costus igneus*, *Clerodendron infortunatum*, *Antigonon leptopus*, *Achyranthes aspera*, *Andrographis paniculata*, *Dioscorea bulbifera*, *Withania somnifera*, *Lagerstroemia speciosa*, *Adhatoda vasica* and *Terminalia bellirica*.

Material and Methods

i.Collection of Sample

Fresh leaves of ten medicinal plants *Costus igneus*, *Clerodendron infortunatum*, *Antigonon leptopus*, *Achyranthes aspera*, *Andrographis paniculata*, *Dioscorea bulbifera*, *Withania somnifera*, *Lagerstroemia speciosa*, *Adhatoda vasica* and *Terminalia bellirica* were collected from different regions of Nagpur district. The plant materials were taxonomically identified. The plant materials were shade dried until all the water molecules evaporated and plants became well dried for grinding. After drying, the plant materials were ground well using mechanical blender into fine powder and stored it into airtight containers with proper labeling for future use.

ii. Preparation of plants extract

Hot water extraction

5 gm of dried powdered plant material was taken in a beaker and 200ml of distilled water was added. The mixture was heated on a hot plate with continuous stirring at 30° to 40°C for 20 minutes. Then the water extract was filtered through filter paper and the filtrate was used for the phytochemical analysis.

Primary metabolites

The extract was tested for the presence of bioactive compounds by using following standard methods.

1. Test for carbohydrates

Benedict's test Extract when mixed with 2ml of Benedict's reagent and boiled, redish brown precipitate formed which indicates the presence of carbohydrates.

2. Test for phenols

Extract was mixed with 2ml of 2% solution of FeCl₃. A blue-green or black coloration indicated the presence of phenols.

3. Test for starch

2ml iodine solution with potassium iodine were added to 2 mL of test extract, and the appearance of a blue colour indicated that presence of starch.

4. Test for flavonoids

Shinoda test Extract was mixed with few fragments of magnesium ribbon and conc. HCL was added drop wise. Pink scarlet colour appeared after few minutes which indicates the presence of flavonoids.

5. Test for alkaloids

Mayer's test few drops of Mayer's reagent were added to 1 mL of extract. A yellowish or white precipitate was formed, indicating the presence of alkaloids.

6. Test for steroids

Crude extract mix with 2ml of chloroform. Then 2ml of each of concentrated H₂SO₄ and acetic acid were poured into the mixture. The development of a greenish coloration indicated the presence of steroids.

7. Test for tannin

Extract was mixed with 2ml of 2% solution of FeCl₃. A blue-green or black coloration indicated the presence of tannins.

Result and Discussion

The preliminary phytochemical screening carried out on ethanolic extracts of *Costus igneus*, *Clerodendron infortunatum*, *Antigonon leptopus*, *Achyranthes aspera*, *Andrographis paniculata*, *Dioscorea bulbifera*, *Withania somnifera*, *Lagerstroemia speciosa*, *Adhatoda vasica* and *Terminalia bellirica* leaves revealed the presence of phytoconstituents such as protein, Carbohydrates, phenol, Starch, flavonoid, alkaloids, steroid and tannin (Table 1). All phytochemicals i.e protein, carbohydrates, phenol, Starch, flavonoid, alkaloids, steroid and tannin were present in all selected medicinal plants. Carbohydrates are absent in *Antigonon leptopus* and *Andrographis paniculata*. Phytochemical constituents such as tannins, flavonoids, alkaloids and several other aromatic compounds or secondary metabolites of plants serve as defence mechanism against predation by many microorganism, insects and herbivores. The curative properties of medicinal plants are perhaps due to the presence of various secondary metabolites such as alkaloids, flavonoids, glycosides, phenols, saponins, steroids etc (Sofowara, 1993). Yadav and Agrawal (2011) studied on seven medicinal plants and found alkaloids were absent in the roots of *Ricinus communis*, leaves of *Terminalia bellerica* and also in the leaves of *Tinospora cordifolia*.

It may be concluded that these medicinal plants are very useful. These plants may be used to cure some common and other various diseases.

Table 1. Phytochemical constituents of ten medicinal plants studied.

Sr. No.	Plant Name	Protein	Carbohydrate	Phenol	Starch	Flavonoid	Alkaloids	Steroid	Tannin
1	<i>Costus igneus</i>	+	+	-	+	+	-	-	-
2	<i>Clerodendron infortunatum</i>	+	+	+	+	+	+	-	+
3	<i>Antigonon leptopus</i>	+	-	+	-	-	+	-	-
4	<i>Achyranthes aspera</i>	+	+	+	-	-	+	+	+
5	<i>Andrographis paniculata</i>	+	-	-	-	+	+	-	+
6	<i>Dioscorea bulbifera</i>	+	+	-	+	+	+	+	+
7	<i>Withania somnifera</i>	+	+	+	+	+	+	+	-
8	<i>Lagerstroemia speciosa</i>	+	+	+	-	+	-	+	+
9	<i>Adhatoda vasica</i>	+	+	-	+	+	+	+	-
10	<i>Terminalia belarica</i>	+	+	+	+	+	-	+	+

Conclusion

The phytochemical study of ten medicinal plants revealed the presence of proteins, carbohydrates, alkaloids, tannins, phenols, steroids and flavonoids which are compounds capable of causing varied physiochemical and pharmacological effects. Several studies confirmed the presence of these phytochemicals contribute medicinal as

well as physiological properties to the plants studied in the treatment of different ailments. Therefore, extracts from these plants could be seen as a good source for useful drugs. Their presence therefore seems to support the traditional use of the plant in the management of various diseases. Also additional work is encouraged to elucidate the possible mechanism of action of these extract.

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Conflicts of interest

The authors declare that there are no conflicts of interest regarding the publication of this paper.

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