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Phytochemical analysis of some important medicinal plant from Kopargaon Tahsil, District-Ahilyanagar (M. S.), India

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Abstract

Phytochemicals are bioactive compounds obtained from the plants and are widely applied in the traditional herbal medicine. These herbal medicines are used by the local people to cure the various diseases which include the major diseases such as Diabetes Mellitus, Cancer, HIV etc. The objective of the present study was to screen such a phytochemical content in selected medicinal plant extracts. The present study involves ten different medicinal plants locally available in Kopargaon tehsil district of Ahilyanagr. viz *Azadirachta Indica*, *Justica Adathoda*, *Tamarindus Indica*, *Curcuma amada*, *Aloe vera*, *Aegle marmelos*, *Moringa oleifera*, *Withania somnifera*, *Cassia tora* and *Citrus limon*. The phytochemical analysis of the plants is very important commercially and has great interest in pharmaceutical companies for the production of new drugs for curing various diseases. It is expected that the important phytochemical properties recognized by our study in the indigenous medicinal plants of Kopargaon Tehsil will be very useful for farmers because they have bioactive compounds which show antifungal and antibacterial activities against plant pathogens.

Keywords: Phytochemical, alkaloids, saponin, flavonoids, terpenoids, tannin, glycoside antibacterial, antifungal, anti-inflammation activities, medicinal plants

Introduction

The medicinal plants are useful for healing as well as for caring of human diseases because of the presence of phytochemical constituents. Phytochemicals are naturally occurring in the medicinal plants, leaves, vegetables and roots that have defence mechanism and protect from various diseases studied by Nostro A. et.al (2000) [13]. 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 studied by Krishnaiah D. et. al (2007) [8]. Secondary metabolites are chemically and taxonomically extremely diverse compounds with obscure function. They are widely used in human therapy, veterinary, agriculture, scientific research and countless other areas observed by the Mahato S.B. and Sen S. (1997) [9].

According to Vasu, K.et.al. (2009) [18]. A large number of phytochemicals belonging to several chemical classes have been shown to have inhibitory effects on all types of microorganisms *in vitro*.

Cowan, M. M. (1999) [3], Observed by the plant products have been part of phytomedicines since time immemorial. According to Mojab F.et.al (2003) [11], Parekh, J. & (2007) [14] Parekh, J. (2008) [15]. Knowledge of the chemical constituents of plants is desirable because such information will be value for synthesis of complex chemical substances.

The present work, qualitative and quantitative phytochemical analysis were carried out in ten plants, that are *Azadirachta Indica*, *Justica Adathoda*, *Tamarindus Indica*, *Curcuma amada*, *Aloe vera*, *Aegle marmelos*, *Moringa oleifera*, *Withania somnifera*, *Cassia tora* and *Citrus limon*.

Materials and Methods

Collection of plant materials Fresh parts of ten medicinal plants was collected from Kopargaon Tehsil from Maharashtra.

Table 1: Ethnobotanical information of selected medicinal plant species for phytochemical analysis.

Sr. No.	Plants name	Common name	Plant parts
1.	<i>Azadiracta Indica</i>	Neem	Leaves
2.	<i>Justica Adathoda</i>	Adulsa	Leaves
3.	<i>Tamarindus Indica</i>	Cheench	Leaves
4.	<i>Curcuma amada</i>	Ambehalad	Rhizome
5.	<i>Aloe vera</i>	Korphad	Leaves
6.	<i>Aegle marmelos</i>	Bael	Leaves
7.	<i>Moringa oleifera</i>	Shevga	Leaves
8.	<i>Withania somnifera</i>	Ashwagandha	Leaves
9.	<i>Cassia tora</i>	Tarvat	Leaves
10.	<i>Citrus limon</i>	Limbu	Leaves

Collection of plant materials

Fresh parts of ten medicinal plants, *Azadiracta Indica*, *Justica Adathoda*, *Tamarindus Indica*, *Curcuma amada*, *Aloe vera*, *Aegle marmelos*, *Moringa oleifera*, *Withania somnifera*, *Cassia tora* *Citrus limon* was collected from from Kopargaon Tahsil from Maharashtra. The plant materials were shaded until all the water molecules evaporated and plants became well dried for grinding. After drying, the plant materials were grind well using mechanical blender into fine powder and transferred into airtight containers with proper labeling for future use.

Extract Preparation

Hot water extraction

5gm of dried finely 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°-40°C for 20 minutes. Then the water extract was filtered through filter paper and the filtrate was used for the phytochemical analysis. The water extract was kept in refrigerator when not in use.

Phytochemical Screening

Phytochemical Analysis

To identify the presence of phytochemical like Alkaloids,

Saponin, Flavonoids, Terpenoids Tannin, Glycoside According to (Mehta Kavita *et al.*, 2013)^[10].

1. Test for Alkaloid

Add 3ml of aqueous extract was stirred with 3ml of 1% HCl on steam bath. Mayer and Wagner's reagent was then added to extract. Turbidity of the resulting precipitate was taken as an evidence for the presence of Alkaloids

2. Test for Tannins

Add about 3ml of the aqueous extract was stirred with 3ml of distilled water and few drops of FeCl₃ solution Were added. The formation of green color precipitate was Indication of presence of Tannins.

3. Test for Flavonoids

Add 3ml of aqueous extract 1ml of 10% lead acetate solution was added. The formation of a yellow precipitate was taken as a positive result for Flavonoids.

4. Test for Saponins

Add 3ml of aqueous extract was shaken vigorously with equal volume of distilled water in a test tube and warmed. The formation of stable foam was taken as an indication of the presence of Saponins.

5. Test for Terpenoids

Add 3ml of the organic extract was dissolved in 2ml of chloroform and evaporated to dryness. 2ml of concentrated sulphuric acid was then added and heated for about 2min. Development of greyish /brown color indicates the presence of Terpenoids.

6. Test for glycoside

2 ml of test solution, 3 ml of glacial acetic acid and 1 drop of 5% ferric chloride were integrated in a test tube. 0.5 ml of concentrated sulphur acid was integrated by the sides of the test tube. Formation of blue color in the acetic acid layer indicates the presence of cardiac glycosides.

Table 2: Preliminary phytochemical analysis of medicinal plant species.

Sr. No	Plant	Alkaloids	Saponin	Flavonoids	Terpenoids	Tannin	Glycoside
1.	<i>Azadiracta Indica</i>	+	+	-	+	-	+
2.	<i>Justica Adathoda</i>	+	-	-	+	-	-
3.	<i>Tamarindus Indica</i>	+	-	+	+	-	+
4.	<i>Curcuma amada</i>	+	+	+	+	-	+
5.	<i>Aloe vera</i>	+	+	+	+	+	+
6.	<i>Aegle marmelos</i>	+	+	+	+	+	+
7.	<i>Moringa oleifera</i>	+	+	+	+	+	+
8.	<i>Withania somnifera</i>	+	+	+	+	-	+
9.	<i>Cassia tora</i>	+	-	+	+	+	+
10.	<i>Citrus limon</i>	-	+	+	-	+	+

+ = indicates presence of phytochemicals and - = indicates absence of phytochemicals.

Results

The present studied showed that phytochemical characteristics of ten medicinal plants tested were summarized in the table-II. The phytochemical analysis of the medicinal plants is also important and has commercial interest in both research institutes and pharmaceuticals companies for the manufacturing of the new drugs for treatment of various diseases. The results revealed the presence of medically active compounds in the ten plants studied.

It could be observed that, Alkaloids, Saponin, Flavonoids, Terpenoids, Tannin and Glycoside all these phytochemicals were present in *Aloe vera*, *Moringa oleifera* and *Aegle marmelos*. Alcoloids is absent only in *Citrus limon*. While saponin phytochemical was absent in *Justica adathoda*, *Tamarindus indica* and *Cassia tora*. Then Flavonoids phytochemical were absent in *Azadiracta indica* and *Justica adathoda*. Terpenoids phytochemical were absent only in *Citrus limon* plant out of studied by ten plants. Tannins phytochemical were present in *Aloe vera*, *Moringa oleifera*,

Aegle marmelos, *Cassia tora* and *citrous limon*. While Glycosides was absent in *Justica adathoda*.

Discussion

Studies by alkaloids are the basic natural products which occur in plants. They generally found in the form of salt with organic acids. They are considered to be the most efficient therapeutic agent among plant substances. Purely synthesized alkaloid can be used as medicinal agents because of their analgesic and anti-bacterial properties (Eleazu *et al.*, 2012)^[4].

Tannin used as a acetylated mannose polymers hence it is used for medicinal purpose. Saponin used as a natural cleansers and cardiac glycosides are used for ulcer and diabetic treatment. (Karunyadevi *et al.*, 2009)^[6] Flavonoids are the phytochemical present in plants which possess many useful activities like anti-inflammatory, anti-bacterial and antioxidant. Terpenoids used as anti-microbial, anti-diarrheal agent. (Harborne *et al.*, 2000)^[5].

Phytochemical analysis conducted on the plant extracts revealed the presence of constituents which are known to exhibit medicinal as well as physiological activities observed by the (Sofowara, A. 1993)^[17] P. M.

Nobori, T. et al (1994)^[12] studied by the phenolic compounds are one of the largest and most ubiquitous groups of plant metabolites. Alkaloids have been associated with medicinal uses for centuries and one of their common biological properties is their cytotoxicity.

Several studies have described the antioxidant properties of medicinal plants which are rich in phenolic compounds studied by Brown, J. E. (1998)^[2] and Krings, U. and Berger, R.G (2001)^[7].

Analysis of the plant extracts revealed the presence of phytochemicals such as phenols, tannins, flavonoids, saponins, glycosides, steroids, terpenoids and alkaloids. The phenolic compounds are one of the largest and most ubiquitous groups of plant metabolites Studied by Singh, *et al.* (2007)^[16].

Natural antioxidants mainly come from plants in the form of phenolic compounds such as flavonoid, phenolic acids, tocopherols etc. observed by the Ali, *et al.* (2008)^[11].

The results obtained in this study thus suggest the identified phytochemical compounds may be the bioactive constituents and these plants are proving to be an increasingly valuable reservoir of bioactive compounds of substantial medicinal merit.

Conclusion

The selected medicinal plants are the source of the secondary metabolites i.e. Flavonoids, Tannins, Steroids, Terpenoids, Cardiac glycosides. Medicinal plants play a vital role in preventing various diseases. The anti-diuretic, anti-inflammatory, anti-analgesic, anticancer, antiviral, anti-malarial, antibacterial, anti-fungal activities of the medicinal plants are due to the presence of the above-mentioned secondary metabolites. 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 of Kopargaon Tehsil will be helpful in the coping different diseases of this particular region.

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