



Phytochemical Screening and Analysis of Selected Medicinal Plants in Gujrat

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Abstract

The medicinal properties shown by different medicinal plants are due to the phytochemicals present in the plant. These phytochemicals are the most vital sources for the treatment of destructive diseases. Different phytochemicals have an extensive range of activities, which helps to enhance the immune system and give resistance against long term disease to protect the body from harmful pathogens. To examine and investigate the phytochemicals present in the selected medicinal plants commonly used in Gujrat was the main purpose of this study. The medicinal importance of these plants depends upon the chemically vital and active substances that produce specific physiological action on the human body. Flavonoids, tannin, phenolic compounds and alkaloids are the most important bioactive components of plants. The names of plants are *Calotropis procera* (Ait.) R.Br. (Asclepiadaceae), *Lantana camara* (Linn.) Var. (Verbenaceae) and *Mangifera indica* Linn. (Anacardiaceae). Standard procedures were used to test the presence of various phytochemicals. Tannins, saponins, flavonoids and phenol all were found in medicinal plants. Methanolic extracts of powder of leaves were used for the qualitative measurement of various phytochemicals present in these plants. Identification of phytochemicals in medicinal plants is among the first steps in the process of discovering new plant-based drugs. The present study concluded that these medicinal plants have possessed different vital phytochemicals that helps in the medicinal properties of the studied plants commonly used in Gujrat.

Keywords: Medicinal plant; Phytochemical properties; Phytochemical constituents; Bioactive compound

Introduction

In plants the naturally occurring chemical compounds are phytochemicals. They give organoleptic properties and color to the plant. In many places, as a dietary accessory they are comfortably approachable but dormant health advantages of phytochemicals are only reachable from the utilization of whole plant.

Phytochemicals are beneficial to boost up immunolatory responses and also provide immunity against many diseases. Some phytochemicals are known to reveal medicinal and physiological activities which are phenols, tannins, flavonoids, saponins, carbohydrates, alkaloids, phytosterols etc [1-3]. Therapeutic or curing activities of plants were conventionally proclaimed to have medicinal properties by small researchers. In worldwide medicinal plants the presence of phytochemicals checked in recent researches. Anti-inflammatory and anti-nociceptive activities of *Calotropis procera*, are the significant properties of conventional medicinal plants against many pathogens. So because of the presence of bioactive constituents medicinal plants show these medicinal properties [4-7].

Since time immemorial, people in Gujrat have been using medicinal plant to tackle different livestock and human diseases. In the processing of novel plant based drugs, the first step is the screening of phytochemicals [8]. To pinpoint the secondary bioactive constituents endow in the medicinal plants which are mostly used in Gujrat is the main purpose of this study.

Material and Method

Plant collection and identification

In this study, the plants were collected from Gujrat District of kharian and its surroundings. Then washed leaves of the plants with tap water about 2-3 times. For evaporating the water content the washed plants leaves were kept in for drying. After drying, sample was

grounded to get fine powder with the help of mechanical blender. Then for the future use with proper labeling, the powder stored in air tight plastic container.

Extraction technique

From medicinally active part of plant tissue constituent, the separation of inactive part of plant tissue is called as extraction by using standard extraction procedure. Men strum is a selective solvent which is used to reduce the inert material and to get the curative part by treatment is the main objective of this procedure.

Method of Plant Extraction (Figure 1)

Solvent extraction

By using soxhlet extraction method, crude plant extract was prepared. In a thimble 20 gram of powdered plant material was loaded and 250 ml solvents were also extracted independently. As a solvent methanol was used. Till the solvent changed to colorless, the process of extraction sustained for 24 hours, in siphon tube of an extractor. Then in a beaker took extract. Then at 30-40°C till all the solvent was evaporated, kept and heated this extract on hot plate. At 4°C in a refrigerator, the dried extract was stored for use in future phytochemical analysis.

Methods of phytochemical analysis

By utilizing following standard techniques as shown in Table 1, the leaf extracts were tested for presence of bioactive compounds:

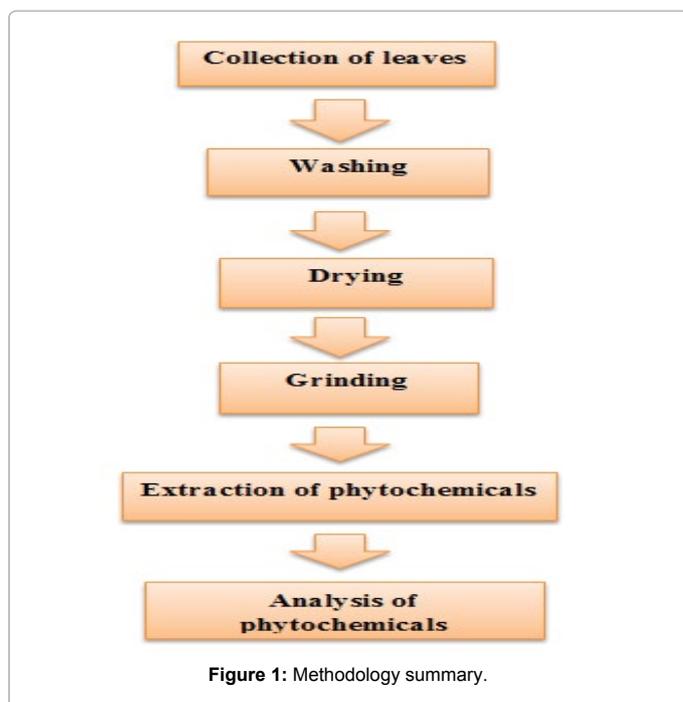
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1. Test for alkaloid: In 1% v/v HCL the plant extract is mixed, warmed and filtered. Now this filtered is used for following test.
 - a. Mayer's test: With Mayer's reagent (Mercuric chloride + Potassium iodide in water) the filtrate is treated. The presence of alkaloids specify by the formation of yellow colored precipitates.
2. Test for carbohydrates: In 5 ml distilled water, the plant extract is dissolved and filtered. By using this filtrate, the presence of carbohydrates can be tested
3. Molisch's test: Two drops of alcoholic α - naphthol solution is treated with filtrate in a test tube. Carefully, using a dropper along with side of test tube, disposed tubes and pour drop wise conc. Sulphuric acid. At junction or interface of two liquids, the presence of carbohydrates indicates by the formation of violet color.
4. Test for glycosides: Glycosides are also of great importance and following test indicates its presence.
 - a. Froth test for saponins glycosides: By using distilled water the plant extract is diluted and this was shaken for 15 minutes in graduated cylinder. The presence of saponins was indicated by the formation of 1 cm layer of foam.
5. Test for phytosterols: Its presence indicates by the following test.
 - a. Salkowski's test: With chloroform and filtered the plant extract was mixed. 5-6 drops of conc. Sulphuric acid is treated with filtrate and shaken gently and allowed to stand carefully. The presence of triterpens (phytosterol) indicates by the appearance of golden yellow color.
6. Test for flavonoids: Following test indicates its presence.
 - a. Alkaline reagent test: The plant extract is treated with 2-3 drops of sodium hydroxide solution. Acute yellow color formation, that indicates presence of the flavonoids, by the addition of some drops of sulphuric acid that changed to colorless.
 - b. Test for phenols and tannin: Took 20 ml of distilled water in a test tube, the powdered sample of leaves is boiled and then filtered. The addition of 3-4 drops of 0.1% v/v Ferric chloride to the filtered sample changed the color to brownish green or blue, it indicates presences of phenols or the tannins.



Quantitative analysis of phytochemicals

1. Alkaloids: 5 g of plants sample are grabbing in a beaker and then solution of C_2H_5OH and 10% of CH_3CO_2H of 200 ml is included to plant sample. Encrusted the mixture and allowed it to stand for 4 hours then filtered. In a water bath until it reaches 1/4 of the native volume, extract was enabled to become concentrated then added conc. NH_4OH until the precipitation completed. Resolved the whole solution then collect precipitate and wiped with dilute NH_4OH and finally filtered. Then dried and weighed the alkaloid which is sublimate.
2. Flavonoids: 10 g of plant sample is frequently separated with 100 ml of 80% aqueous methanol at room temperature. Through filter paper the whole solution is filtered then the filtrate is relocated into a water bath and solution is evaporated into dryness. Weighed the sample until a constant weigh.
3. Tannins: Quantity of tannins is deliberated by operating the spectrophotometer method. 0.5 g of plant sample is weighed into a 50 ml plastic bottle. 50 ml of distilled is included and agitated

Phytochemicals	Test procedure	Observation
Alkaloids	Filtrate + Mayer's reagent	Yellow coloured precipitate
Carbohydrates	Filtrate + Naphthol + Sulphuric acid	Violet colour
Glycosides	5 ml extract + 5 ml water shake	Foam produced
Phytosterols	2 ml extract + 2 ml $CHCl_3$ + 2 ml H_2SO_4	Golden yellow colour
Flavonoids	2 ml extract + few drops of NaOH	Yellow color that clear on adding dil. HCL
Phenol and Tannins	Extract + 4 drops of $FeCl_3$	Blue-black coloration

Table 1: Phytochemical analysis procedures.

S. No	Name of plants	Alkaloids	Carbohydrates	Glycosides	Phytosterols	Flavonoids	Phenols
1	<i>Catotropis procera (Ait)R.Br.</i>	+	+	+	-	+	+
2	<i>Lantana camara Linn.Var.</i>	-	+	+	-	+	+
3	<i>Mangifera indica Linn.</i>	-	+	+	+	+	+

Note: The presence of phytochemical is indicated

Table 2: Qualitative phytochemical analysis of methanolic leaf extract of some selected plant species.

S.No	Plants	Alkaloids	Flavonoids	Tannins	Phenols
1	<i>Calotropis procera</i>	10.3 ± 0.11	0.718 ± 0.23	1.0 ± 0.05	0.52 ± 0.10
2	<i>Lantana camara</i>	10.2 ± 0.10	0.719 ± 0.19	2.3 ± 0.09	0.48 ± 0.08
3	<i>Mangifera indica</i>	10.0 ± 0.8	0.680 ± 0.10	2.1 ± 0.07	0.30 ± 0.06

Table 3: Quantitative analysis.

for 1 hr. The sample is filtered into a 50 ml volumetric flask and made up to mark. 5 ml filtered sample is then pipette out into test tube and assorted with 2 ml of 0.1 M FeCl₃ in 0.1 M HCl and 0.008 M K₄Fe(CN)₆·3H₂O. With a spectrophotometer at 395 nm wavelength within 10 min. Measured the absorbance of the sample

4. Phenols: The quantity of phenols is deliberated operating the spectrophotometer method. Boiled the plant sample for 15 min with 50 ml of (CH₃CH₂)₂O. Added 10 ml of distilled water and 5 ml boiled sample in 50 ml flask. After the introduction of distilled water, in a mixture added 2 ml of NH₄OH solution and 5 ml of concentrated CH₃(CH₂)₃CH₂OH. By using a spectrophotometer, the sample is made up to the mark to proceed left for 30 min for color indication and sustained at 505 nm wavelength.

Results and Discussion

From the qualitative analysis of leaves of selected medicinal plants, the presence or absence of alkaloids, carbohydrates, flavonoids, glycosides, phytosterols and phenols was investigated. The results of this study are shown in the following Table 2.

The result of these analyses of leaves of medicinal plants shows that carbohydrates, alkaloids, glycosides, phenols and flavonoids are present in leaves of *calotropis procera*. Whereas, *lantana camara* studies shown that it contain carbohydrates, glycosides, flavonoids and phenols. Similarly *Mangifera indica* contains all phytochemical except alkaloids. Literature suggests those plants which are rich in tannins exhibit anti diarrhea activity and anti-inflammatory and antioxidant activity. Saponins, phenols and flavonoids are present in all the studied plants. These phytochemicals are known to be behind the antimicrobial activities, antifungal, anti-allergenic, antispasmodic and anti-inflammatory properties of medicinal plants. Alkaloids were found in the *calotropis procera*. Alkaloids have been found to aid in anti-diuretic activity of medicinal plants. The presence of this phytochemical implies that these plants may be used as anti-microbial agents.

Mangifera indica is the best phytochemical because it present in all compounds which describe in the Table 3 expects the alkaloids it is absent. The quantitative analysis shows the concentration which is present in different plant species. *Calotropis procera* has Alkaloids concentration is 10.3 ± 0.11, Flavonoids is 0.718 ± 0.23, Tannins is 1.0 ± 0.05, and Phenols is 0.52 ± 0.10. *Lantana camara* has concentration of Alkaloids is 10.2 ± 0.10, Flavonoids is 0.719 ± 0.19, Tannins is 2.3

± 0.09, Phenols is 0.48 ± 0.08. *Mangifera indica* has concentration of Alkaloids is 10.0 ± 0.8, Flavonoids is 0.680 ± 0.10, Tannins is 2.1 ± 0.07, Phenols is 0.30 ± 0.06.

Conclusion

It can be concluded that the source of secondary metabolites like flavonoids, carbohydrates, glycosides, alkaloids, phenols and phytosterols are present in the selected medicinal plants which are used in Gujrat. Because of the presence of these secondary metabolites the selected medicinal plants have high healing potential. These phytochemicals render the medicinal values of the studied plants.

Conflict of Interest

The authors declared no conflict of interest with anyone.

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