Journal of Research in Chemistry

E-ISSN: 2709-9423
P-ISSN: 2709-9415
Impact Factor (RJIF): 5.29
JRC 2026; 7(1): 94-96

www.chemistryjournal.net
Received: 06-10-2025
Accepted: 08-11-2025

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Phytochemical analysis of leaf extracts of some medicinal plants collected from Kutch, Gujarat

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DOI: https://www.doi.org/10.22271/reschem.2026.v7.i1b.254

Abstract
The qualitative analysis is very important for identifying the phytochemicals present in medicinal plants. Plants show antimicrobial, antifungal, antiseptic, anticancer etc values due to presence of bioactive components. To identify the phytoconstituents in the leaves extract of six different medicinal varieties includes Solanum virginianum, Balanites aegyptica, Salvadora Persica, Ziziphus nummularia, Passiflora foetida and Laggera crispatethe present analysis was carried out. The plants species were collected from different areas of Mundra tahsil. The selected plant extracts were prepared in diethyl ether and aqueous solutions. The extract were treated for qualitative analysis of phytoconstituents.

Keywords: Kutch, Phytochemicals, Qualitative analysis, Diethyl ether and aqueous extracts

Introduction
Medicinal plants are a group of species which contain an active ingredient that can be utilised to treat various diseases in human and animals [1].The varieties of plants are treasure house of potential drugs. Drugs from the plants are easily available, safe, cheap and rarely have side effects [2]. WHO identified all internationally used medicinal plants and recognised over 20000 species. India is rich in plant species that have therapeutic significance and most corners of Indian society utilise these plants as herbal remedies [3].The medicinal properties of plants lie in their phytochemical components which produce definite physiological actions on the human body. These phytochemicals in smaller quantities in higher plants include alkaloids, steroids, flavonoids, terpenoids, tannins, phenolic compounds, coumarins, lignin and many other components [4]. Phytochemicals can be separated from the plant material by various extraction techniques like maceration, percolation, infusion, digestion, Soxhlet extraction etc. [5].

Methods and Materials
Sample preparation: The following plants species were collected from natural habitats in Kutch district Gujarat. The leaves were allowed to dry at room temperature and were placed in airtight bags.
Preparation of plant extract: 20 g of dried leaves were extracted with 150 ml of each diethyl ether and water in reflux flask for 4-5 hrs. The obtained extracts were evaporated in oven.


Laggera crispata (Vahl)


Salvadora persica L.


Ziziphus mauritiana Lam.


Solanum virginianum L.


Passiflora foetida L.


Balanites aegyptiaca (L.) Delile

Phytochemical analysis

1. Test for Alkaloids - Wagner's Test

A small portion of the extract was acidified with dilute hydrochloric acid and treated with Wagner's reagent (iodine in potassium iodide solution). The formation of a reddish-brown precipitate indicated the presence of alkaloids.

2. Test for Saponins - Foam Test

About 1 mL of the extract was diluted with 10 mL of distilled water and shaken vigorously for 30 seconds. The formation of stable, persistent foam for more than 10 minutes indicated the presence of saponins.

3. Test for Lignin - $KMnO_4$ Test

A small quantity of the extract was treated with potassium permanganate solution. The appearance of a brown coloration or precipitate indicated the presence of lignin.

4. Test for Phenolic Compounds - Ferric Chloride Test

A few drops of neutral 5% ferric chloride solution were added to the extract. The development of a blue, green, or black coloration indicated the presence of phenolic compounds.

5. Test for Phytosterols - Salkowski's Test

The extract was mixed with chloroform and a few drops of concentrated sulfuric acid were carefully added along the sides of the test tube. The appearance of a reddish-brown or golden-yellow color at the interface indicated the presence of phytosterols.

6. Test for Flavonoids - Shinoda Test

The extract was treated with small pieces of magnesium ribbon followed by the addition of concentrated hydrochloric acid. The formation of an orange, red, or pink coloration indicated the presence of flavonoids.

7. Test for Quinones - Chloroform Shake Test

The extract was shaken with chloroform and a few drops of concentrated hydrochloric acid were added. The appearance of a red, yellow, or pink color indicated the presence of quinones.

8. Test for Phlobatannins - Boiling HCl Test

The extract was boiled with 1% hydrochloric acid. The formation of a red precipitate indicated the presence of phlobatannins.

9. Test for Coumarins - Lead Acetate Test

A small amount of the extract was treated with 10% lead

acetate solution. The formation of a white or yellowish precipitate indicated the presence of coumarins.

10. Test for Glycosides - Keller-Killiani Test (for Cardiac Glycosides)
The extract was mixed with glacial acetic acid containing a trace of ferric chloride, followed by the addition of concentrated sulfuric acid along the sides of the test tube. The appearance of a brown ring at the interface indicated the presence of deoxy-sugar-containing cardiac glycosides.

11. Test for Reducing Sugars - Fehling's Test
Equal volumes of Fehling's solution A and Fehling's solution B were mixed and added to the extract. The mixture was heated in a water bath. The formation of a brick-red precipitate indicated the presence of reducing sugars.

12. Test for Tannins - Ferric Chloride Test
A few drops of 5% ferric chloride solution were added to the extract. The appearance of a blue-black or greenish coloration indicated the presence of tannins.

13. Test for Steroids - Salkowski Test
The extract was dissolved in chloroform and concentrated sulfuric acid was added carefully along the side of the test tube. The development of a red or reddish-brown coloration indicated the presence of steroids.

14. Test for Terpenoids - Salkowski Test
The extract was mixed with chloroform and concentrated sulfuric acid was added carefully. The appearance of a reddish-brown coloration at the interface confirmed the presence of terpenoids.

Results and Discussion
The results of the phytoconstituents for the aqueous and ether extract listed the table No:1

Table No. 1: Results

Sr. No	Extracts	Solanum virginianum		Balanites aegyptica		Salvadora Persica		ziziphus nummularia		passiflora foetida		Laggera crispata	
		water	Ether	water	Ether	water	Ether	water	Ether	water	Ether	water	Ether
1.	Alkaloids	+	+	+	+	+	+	+	+	+	+	+	+
2.	Saponins	-	-	-	-	-	-	+	+	-	-	-	-
3.	Lignin	+	+	-	-	+	+	+	+	-	-	-	-
4.	Phenolic compounds	+	+	+	+	+	+	+	+	+	+	+	+
5.	Phytosterol	+	+	+	+	+	+	+	+	+	+	+	+
6.	Terpenoids	+	+	+	+	+	+	+	+	+	+	+	+
7.	Flavonoids	+	+	+	+	+	+	+	+	+	+	+	+
8.	Quinones	-	-	-	-	+	+	+	+	+	+	-	-
9.	Phlobtannins	+	+	+	+	-	-	-	-	-	-	-	-
10.	Coumarins	+	+	-	-	+	+	+	+	+	+	-	-
11.	Glycosides	-	-	-	-	-	-	+	+	+	+	-	-
12.	Reducing sugars	+	+	-	-	-	-	+	+	-	-	-	-
13.	Tannins	+	+	+	+	+	+	+	+	+	+	+	+
14.	steroids	-	-	-	-	+	+	+	+	+	+	-	-

Conclusion
The present study reveals that the detection of these bioactive constituents underscores the pharmacological potential of selected species. Although the present study was limited to qualitative analysis, the findings establish a foundational scientific basis for the ethnomedicinal applications of these plants. From the literature review it has been concluded that the selected species possess various medicinal values

1. **Solanum virginianum:** use for respiratory issues, inflammation, as a general tonic.
2. **Balanites aegyptica:** Medicinal values for diabetes, hypertension, and infections.
3. **Salvadora Persica:** Antioxidant, antifungal and antimicrobial activities.
4. **Ziziphus nummularia:** Medicinal uses for anti-inflammatory, antioxidant, antidiabetic, and antimicrobial activities.
5. **Passiflora foetida:** Anti-inflammatory, antioxidant, and anti-cancer properties.
6. **Laggera crispatethe:** Antioxidant, antimicrobial, and potential anti-cancer properties.

Future research should focus on the quantitative estimation of the identified phytochemicals, isolation and structural characterization of active compounds, and comprehensive evaluation of their biological activities.

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