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## Phytochemical analysis of leaf extract of the medicinal plants

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### Abstract

Phytochemicals are highly effective in terms of medicine. There is a constant and urgent need to create new pharmaceutical compounds with novel chemical structures and modes of action due to the worrisome increase in the incidence of new diseases. The qualitative analysis is extremely important for identifying the phytochemical elements present in medicinal plants. Plants have therapeutic value because they contain certain bioactive components. To identify the phytoconstituents in the leaf extracts of Three different medicinal plants, including *Cassia fistula*, *Acacia nilotica*, and *Balanites aegyptiaca*, the current investigation was carried out. Three different plant species leaves were collected from their native habitats, washed, and air dried before being crushed. The solvent extracts of the various leaves were produced using the Soxhlet equipment and ethanol. By using the accepted techniques, alkaloids, steroids, flavonoids, saponins, tannins, and terpenoids were qualitatively estimated. Alkaloids, Steroids, Tannin and Saponin were present in all plants. Terpenoids absent in all plants. Flavonoids present in all plants except *Balanites aegyptiaca*.

**Keywords:** Preliminary phytochemical analyses, *Cassia fistula*, *Acacia nilotica*, and *Balanites aegyptiaca*

### 1. Introduction

Different plant chemicals are extracted by phytochemical screening in order to assess their biological activity or medicinal potential. Plants have medicinal value because they contain certain chemical components that clearly affect the biological system physiologically [1]. Plant-based chemicals have recently received a lot of interest due to their wide range of applications. Medicinal plants are a group of species that possess a wide range of active ingredients that can be utilised to treat various human or animal illnesses. They are the most plentiful source of bio-drugs on earth. Chemical entities and pharmacological intermediaries, modern medications, conventional medical procedures, natural medicines, dietary supplements, and nutraceuticals, as well as counterfeit drugs [2]. Alkaloids, carbohydrates, terpenoids, steroids, flavonoids, and tannins are only a few examples of phytochemicals found in medicinal plants that have a certain physiological impact on the human body and are useful for treating and curing human illnesses [3]

*Cassia fistula* known as Golden Shower in English, is a Leguminosae family plant, used as Hepatoprotective, anti-inflammatory, cough-suppressant, anticancer, antioxidant, and antibacterial activities [4].

*Acacia nilotica* It is a multifunctional herbal plant with important medicinal characteristics that has long been used to treat a variety of diseases [5].

*Balanites aegyptiaca* Stomach pains, syphilis, epilepsy, haemorrhoids, malaria, herpes zoster, and yellow fever have all been treated using this herb [6].

### 2. Materials and Methods

#### 2.1 Plant sample collection

The healthy leaves of *Cassia fistula*, *Acacia nilotica*, and *Balanites aegyptiaca* were collected from their natural habitats in Ajmer, Rajasthan, and brought to the laboratory. The leaves were rinsed under running water and allowed to air dry at room temperature before being ground up in a blender and placed in airtight plastic bags for further examination. According to APG IV classification, every plant underwent botanical authentication.

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## 2.2 Preparation of plant extract

10 g of the dried and powdered plant material was extracted with 150 ml of each ethanol using a Soxhlet apparatus for 7 to 8 hours at a temperature below the boiling point of the solvents. The obtained crude extracts were concentrated using a rotary evaporator at 45 °C while under vacuum, filtered using Whatman No. 1 filter paper, and then kept at 4 °C for further use.

## 2.3 Phytochemical analysis

**2.3.1 Test for Alkaloids:** In order to extract 1 g of powdered material, 5 ml methanol and 5 ml 2N hydrochloric acid were used. The filtrate was then treated with Meyer's and Wagner's reagents. Turbidity was classified in the samples as either positive or negative [7].

**2.3.2 Test for Steroids:** When 1 ml of the extract was mixed with 2 ml of strong sulfuric acid and 2 ml of acetic anhydride, the colour changed from blue to dark green, suggesting the presence of steroids [8].

**2.3.3 Test for Flavonoids:** 1 g of powdered material was cooked in 10 ml of ethyl acetate for 5 minutes over a steam bath (40–50 °C). The filtrate was treated with 1 cc of diluted ammonia. An accurate test for flavonoids revealed a golden colouring [7].

**2.3.4 Test for Saponins:** 20 ml of distilled water and 2 g of the powdered sample were boiled in a water bath before the mixture was filtered. 10ml of the filtrate was mixed with 5ml of distilled water and vigorously shaken to form a stable, long-lasting foam. The foam was mixed with three drops of olive oil and quickly swirled to generate an emulsion, which revealed the presence of saponins [8].

**2.3.5 Test for Tannins:** 10% ferric chloride solution was combined with 1-2 ml of methanolic extract (1:1). The solution took on a dark blue hue, suggesting the presence of tannins [9].

**2.3.3 Test for Terpenoids:** The Salkowski test was run. 5 ml of the aqueous extract and 2 ml of chloroform were mixed. Then, 3ml of strong sulfuric acid was added to form a layer. The reddish brown colour of the interface suggested the presence of terpenoids [8].

## 3. Results

The pharmacological effects of these all plants are due to the presence of bioactive chemical constituents. Alkaloids, Steroids, Tannin and Saponin were present in all plants. Terpenoids absent in all plants. Flavonoids present in all plants except *Balanites aegyptiaca*.

Following table shows the results of qualitative analysis of different medicinal plants.

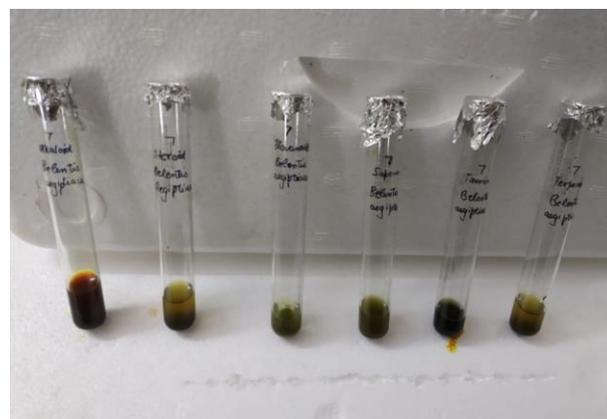
**Table 1:** Preliminary phytochemical analysis

S.N.	Plant name	Alkaloids	Steroids	Flavonoids	Saponin	Tannin	Terpenoids
1	<i>Cassia fistula</i>	+	+	+	+	+	-
2	<i>Acacia nilotica</i>	+	+	+	+	+	-
3	<i>Balanites aegyptiaca</i>	+	+	-	+	+	-

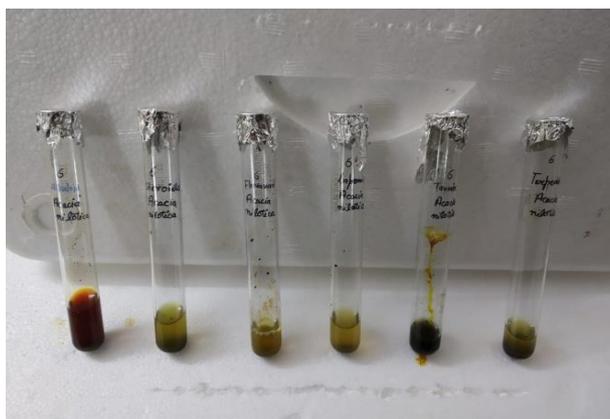
Where; + Positive, - Negative



**Fig 1:** Preliminary phytochemical analysis in *Cassia fistula*



**Fig 3:** Preliminary phytochemical analysis in *Balanites aegyptiaca*



**Fig 2:** Preliminary phytochemical analysis in *Acacia nilotica*

## 4. Discussion

The medicinal plants employed in this study all include the phytochemicals that make them up, and these phytochemicals have a variety of important biological roles, according to a preliminary phytochemical analysis. According to research, alkaloids have pharmacological effects such antibacterial [10], antiarrhythmic, analgesic [11], and antihyperglycemic [12] properties. Flavonoids were recognised to have alpha-glucosidase activity [13], antioxidant activity [14], and anti-inflammatory action [15].

Glycosides are well-known for their effects on the contractile forces of cardiac muscle, whereas saponins are renowned for their antifungal, antibacterial, anti-protozoal, and lipid-lowering properties. Ascorbic acid has been found in various

plant species, which has shown to significantly increase the overall antioxidant capacity of plants. All plant species contain saponin, a substance that can be used to lower cholesterol and give plants their antibacterial and anthelmintic characteristics. All of these can be used as cytotoxic and expectorants by producing an upper digestive tract reaction because saponins are present in them <sup>[16]</sup>.

Flavonoids can also reduce the activity of many enzymes, including those suspected to be involved in the production of free radicals such as xanthine oxidase, peroxidase, and nitric oxide synthase. As a result, macromolecules experience less oxidative damage <sup>[17]</sup>.

The phenolic compounds found in all plants have been proven to provide a number of biological advantages, including antioxidant, free radical scavenging, anti-inflammatory, and anti-carcinogenic capabilities. They may aid in preventing a number of chronic ailments since they contain phenolic chemicals, such as diabetes, cancer, cardiovascular disease, and parasitic and bacterial infections <sup>[18]</sup>.

These plants include reducing sugars, which have reductive capabilities, but tannins also have astringent, antioxidant, and free radical-scavenging properties that promote wound healing and can be used to treat peptic ulcers <sup>[19]</sup>. The terpenoids listed here may have anti-inflammatory and cardiovascular protective properties <sup>[20]</sup>. Steroids are frequently utilised as signalling molecules in biological systems and decrease membrane mobility.

## 5. Conclusion

The overall findings of the study indicate that all plant leaves, including those of *Cassia fistula*, *Acacia nilotica*, and *Balanites aegyptiaca*, have at least one pharmacologically active component. It is also used to discover a new molecule that can be used as a medicine to cure disease in order to develop therapies that show promise in the treatment of dysfunctional disorders. It is important to conduct more quantitative and chromatographic research on the phytochemical substances found in all plants.

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