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Phytochemical study of some medicinal plants in Rajasthan

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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. The goal of the current study was to identify the phytoconstituents present in leaf extracts from a variety of medicinal plants including *Cocculus hirsutus, Solanum nigrum, Datura innoxia, Cuscuta reflexa* and *Salanum surattense*. Plants' leaves were gathered from their natural habitats, cleaned, dried by air, and then ground. Using the Soxhlet apparatus with ethanol, the solvent extracts of the different leaves were created. Alkaloids, Steroids, Flavonoids and Glycosides were estimate qualitatively by following the standard methods.

Keywords: Preliminary phytochemical analyses, *Cocculus hirsutus, Solanum nigrum, Datura innoxia, Cuscuta reflexa* and *Salanum surattense*

1. Introduction
Several 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 intermediates, modern pharmaceuticals, conventional medical procedures, natural cures, dietary supplements, and nutraceuticals [2]. Due to the existence of phytochemical components that have a clear physiological effect on the human body, including as alkaloids, carbohydrates, terpenoids, steroids, flavonoids, and tannins, medicinal plants are effective for both treating and curing human ailments [3].
Due to its strong medicinal value, the roots and leaves of *C. hirsutus* are used both internally and externally for therapeutic purposes. The bitter root is used as a laxative, demulcent, tonic, diuretic, alternative medicine, and a treatment for constipation and renal problems. Several substances, including ginnol, glycosides, sterols, alkaloids, and essential oil, are said to be present in the *C. hirsutus* plant. Mice were used to investigate the oral acute toxicity of the *C. hirsutus* aerial component aqueous extract.
Compounds found in *S. nigrum* L. are widely known for helping with a range of tasks and are useful for treating illnesses. The principal chemical constituents of this plant include polysaccharides, glycoproteins, and glycoalkaloids. Solamargine, solasonine, steroidal glycosides, and steroid alkaloids are all abundant in *S. nigrum* L. extracts. They have been found to be quite effective in treating liver diseases brought on by carbon tetrachloride, such as cirrhosis and fibrosis.
Due to the variety of its metabolites, *Datura innoxia* is a species that may be considered for use in a variety of contexts, such as the management of phytopathogenic fungi that damage different crops and result in financial losses in agricultural production.
The parasitic weed plant *Cuscuta reflexa* needs nutrients from the host plant in order to grow and thrive.

The parasitic weed plant *Cuscuta reflexa* needs nutrients from the host plant in order to grow and thrive. As a result, the host plant also affects its phytoconstituents. A variety of phytoconstituents have been identified from Cuscuta grown on different host plants. Alkaloids, Flavonoids, Saponins, Terpenoids, Glycosides, Tanins, Phenols, and Steroids were subjected to routine phytochemical analysis for secondary metabolites.

In Indian traditional medicine, *S. surattense* is frequently used to cure a range of ailments, including asthma, gonorrhoea, rheumatism, fever, and respiratory problems Fever, cough, asthma, and chest pain can all be treated with the herb as a decoction or an electuary. Fruit and leaf extract has been reported to have significant antihyperglycemic effect. More and more people are getting interested in using natural antioxidants like polyphenols, which are present in food and medicine plants and may help to prevent oxidative damage.

2. Materials and Methods

2.1. Plant sample collection: The healthy leaves *Cocculus hirsutus, Solanum nigrum, Datura innoxia, Cuscuta reflexa* and *Salanum surattense*. were collected from their natural habitats in Ajmer, India, and brought to the laboratory. The leaves were washed with tap water and air dried at room temperature. The dried samples of plants were powdered in an blender and stored in air tight plastic bags for further analysis. All the plants were botanically authenticated as per APG IV classification.

2.2. Preparation of plant extract: Using a Soxhlet apparatus, 10 g of the dried and powdered plant material was extracted for 6 to 8 hours at a temperature below the boiling point of the solvents with 160 ml each of ethanol. The resulting crude extracts were filtered using Whatman No. 1 filter paper, concentrated using a rotary evaporator at 40° C while under vacuum, and then kept at 4° C for further use.

2.3 Phytochemical analysis

Quantitative analysis of phytochemicals

1. Test for Alkaloids

a. Mayer's test: To a 1 mL of plant sample extract, 2 mL of Mayer's reagent was added along the sides of the test tube. Appearance of white creamy precipitate indicates the presence of alkaloids.

b. Wagner's test: To a 1 mL of plant sample extract, 2 mL of Wagner's reagent was added along the sides of the test tube. A reddish-brown precipitate confirms the test as positive.

c. Hager's test: To a 1 mL of extract, 3 mL of Hager's reagent was added and appearance of yellow precipitate gives positive result.

2. Test for Steroids

a. Libermann-Burchard's test: The extract was dissolved in of 2 mL acetic anhydride. To this, 1 or 2 drops of concentrated sulphuric acid was added slowly along the sides of the test tube. An array of colour change shows the presence of steroids.

b. Salkowaski test: 1 mL of extract, chloroform and concentrated sulphuric acid was mixed and two layers were formed. Colour change from bluish red to cherry red in chloroform layer and green fluorescence in acid layer gives positive result.

3. Test for Flavonoids

a. Lead acetate test: 1 mL of plant extract was taken and slowly few drops of 10% Lead acetate solution was added. Formation of yellow precipitate gives a positive result.

4. Test for Glycosides

a. Keller kilani test: 1 mL of extract was mixed with acetic acid containing traces of ferric chloride, mixture was then transferred to a test tube containing concentrated sulphuric acid. Colour change from reddish brown to blue at function of two phase gives positive result.

3. Results

The pharmacological effects of these all plants are due to the presence of bioactive chemical constituents. *Datura innoxia*, contained all tested constituents as shown in Table. *Cocculus hirsutus* and *Cuscuta reflexa* contained all tested constituents as shown in Table except Glycosides. *Solanum nigrum* contained all tested constituents as shown in Table except Steroids. *Salanum surattense*. contained all tested constituents as shown in Table except Flavonoids and Glycosides

Table 1: Preliminary phytochemical analysis

Tests	Plant Extracts		
	Cuscuta reflexa	***D.inoxia***	***S.surattense***
(A) Alkaloids			
Wagner's test	+ve	+ve	+ve
Mayer's test	+ve	+ve	+ve
Hager's test	+ve	+ve	+ve
(B) Steroids			
Salkowaski test	+ve	+ve	+ve
(C) Flavonoids			
Lead acetate test	+ve	+ve	-ve
(D) Glycosides			
Keller kilani test	-ve	+ve	-ve

Where; + Positive, - Negative

Tests	Plant Extracts	
	C. Hirsutus	***S. Nigrum***
(A) Alkaloids		
Wagner's test	+ve	+ve

Mayer's test	+ve	+ve
Hager's test	-ve	+ve
(B) Steroids		
Salkowaski test	+ve	-ve
(C) Flavonoids		
Lead acetate test	+ve	+ve
(D) Glycosides		
Keller kilani test	-ve	+ve

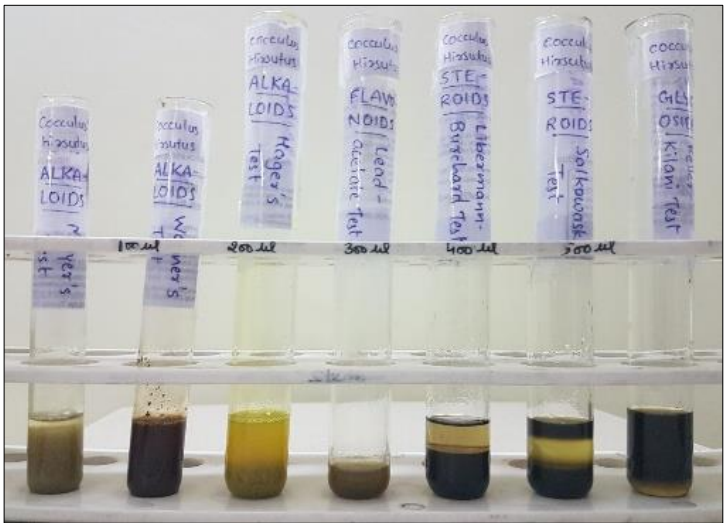

Fig 1: Phytochemical analysis of *Cocculus hirsutus* plant extract

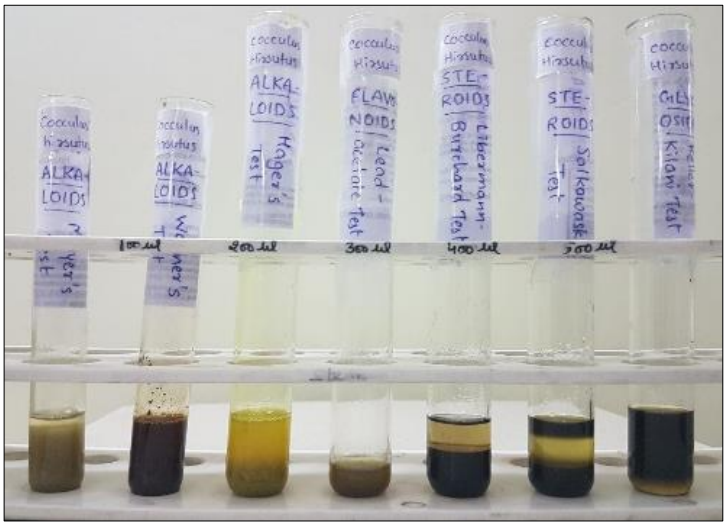

Fig 2: Phytochemical analysis of *Solanum nigrum* plant extract

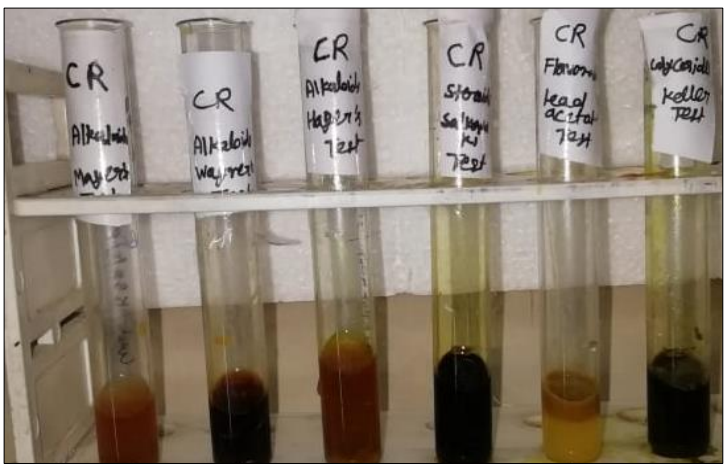

Fig 3: Phytochemical analysis of *Cuscuta reflexa* plant extract

Fig 4: Phytochemical analysis of *Salanum surattense* plant extract

Fig 5: Phytochemical analysis of *Datura innoxia* plant extract

4. Discussion

The preliminary phytochemical analysis of the four medicinal plants used in this study revealed that they all possess the phytochemicals that make up them and that these phytochemicals have a variety of significant biological functions. Alkaloids have pharmacological actions such as antibacterial [4], antiarrhythmic, analgesic [5], and antihyperglycemic [6] actions, according to reports. Alpha-glucosidase activity [7], antioxidant activity [8], and anti-inflammatory activity [9] were all known properties of flavonoids.

Due to the presence of the aforementioned biologically significant phytochemicals that the current study was able to identify in the leaves *Cocculus hirsutus, Solanum nigrum, Datura innoxia, Cuscuta reflexa* and *Salanum surattense*. these research findings clearly support the medicinal use of these plants.

Saponins have antifungal, antibacterial, anti-protozoal, and lipid-lowering characteristics, while glycosides are known for their effects on the contractile forces of cardiac muscle. The presence of ascorbic acid in plant species has demonstrated significant levels of overall antioxidant qualities of plants. The presence of saponin in all plant species demonstrates that they can be utilised to decrease cholesterol and have antibacterial and anthelmintic properties. Due to the presence of saponins, all of these may be utilised as cytotoxic and expectorants by inducing an upper digestive tract response [10].

The activity of numerous enzymes, including those thought to be involved in the formation of free radicals such xanthine oxidase, peroxidase, and nitric oxide synthase, can also be inhibited by flavonoids. As a result, the oxidative damage to macromolecules is reduced [11].

All plants contain phenolic chemicals, which have been found to have a variety of biological benefits, including antioxidant, free radical scavenging, anti-inflammatory, and anti-carcinogenic properties. Due to the presence of phenolic compounds, they may help prevent a number of chronic illnesses, including diabetes, cancer, cardiovascular disease, and infections caused by bacteria and parasites [12].

While the presence of reducing sugars in these plants has a reductive qualities, tannins also have astringent, antioxidant, and free radical scavenger properties that aid in wound healing and are useful in treating peptic ulcers [13]. Terpenoids included here may have antioxidant and cardio protecting effects [14]. In biological systems, steroids are commonly used as signalling chemicals and reduce membrane fluidity.

5. Conclusion

In conclusion, the overall results of study suggest that that all plants of leaves *Cocculus hirsutus, Solanum nigrum, Datura innoxia, Cuscuta reflexa* and *Salanum surattense*. have at least one component that is pharmacologically active. To create therapies that show promise in the treatment of dysfunctional disorders, it is also use discover a new compound use as drugs for treatment of disease. Further quantitative and chromatographic studies should be carried out on the phytochemical compounds present in all plants.

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