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PHYTOCHEMICAL STUDY OF *CHROZOPHORA PLICATA* PLANT

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ABSTRACT

The present study was aimed to investigate phytochemicals present in the leaves, roots and seed extract of *Chlozophora plicata.* This plant is typically found in the northern and central parts of India, particularly in dry, warm and rocky regions. It is also known to grow in sandy soils and areas with low moisture availability. This plant is often considered a weed in agricultural fields due to its ability to thrive in disturbed soil. The plant has medicinal properties and has been used in traditional Ayurvedic medicine for various purposes, including the treatment of gastrointestinal disorders and skin ailments. Some studies suggest that it has potential bioactivity, though more research is needed to fully understand its medicinal value. The plant is also important for its role in local ecosystems, providing habitat and food for various insects and animals. The various part of *Chlozophora plicata plants like* leaves, roots and seedswere extracted separately in ethanol and tested for thepresence of different phytochemicals. The physicochemical study produced positive findings, demonstrating the plant material's integrity and purity for therapeutic usage. The phytochemical investigation findings of glycosides, tannins, flavonoids, resins, steroids, proteins, lipids, oil and saponins supports its traditional use indicating that it may have anti-inflammatory, antimicrobial, antioxidant and expectorant properties. This phytochemical study supports the traditional use of *Chrozophora plicata*, which also offer scientific proof for its possible medicinal advantages.

KEYWORDS: *Chlozophora plicata*, Phytochemistry, Flavonoids, Alkaloids.

INTRODUCTION

Plants extract have been used to cure many diseases since ancient time.[1] Today though we are living in modern world having various synthesized drugs for treating the various diseases easily. Still some people uses traditional medicines for treatment of various diseases because of its no or less harmful side effects which makes them better option oversynthesized drugs which have lot of side effects on human body. The various compounds isolated from different parts of the plants as like leaves, stem, seedsand roots showbiological activityas like anticancer, antibacterial, anti-inflammatory,analgesic, antimicrobial and antiviral activity with many other activities toa greater or lesser extent.[2-5]

The extracts obtained from medicinal plants has some important organic compounds like tannins, alkaloids, carbohydrates, terpenoids, steroids and flavonoids which impacts on various physiological action in the human body.[5-6] In living organism these organic compounds aresynthesized by primary or rather secondary metabolism. Many researchers has studied photochemical study of different plants to find out the active compounds present in them.[7-11] Because ofits potential therapeutic benefits, it is a traditional medicinal plant that has been used in many herbal remedies.

Fig. 1: Chrozophora plicata plant.

This plant species belongs to the Euphorbiaceae family which is frequently found in tropical and subtropical areas, including India. This herbaceous shrub grows well in arid and semi-arid conditions and is frequently found growing beside roadsides, in grasslands and in disturbed areas. The plant is distinguished by its lance-shaped, pleated leaves, which have a prominent central vein and smaller veins that run parallel to it. The leaves of *Chrozophora plicata* plant contain triterpenoids and related compounds (sterols, alcohols and hydrocarbons), phenolic compounds (flavonoids, lignans, coumarins, tannins, phenanthrenes, quinones, phenolic acids, etc.) that are possessing antioxidant properties.[12] Chrozophoraplicata possess ulcer protective principles and flavonoids may be responsiblefor gastroprotective activity.[13] New secondary metabolites have been isolated from *Chrozophora plicata* β-sitosterol, methyl p-coumarate, 4-hydroxyphenylacetic acid, succinic acid, speranberculatine A, β-sitosterol-3-O-β-D-glucopyranoside and apigenin-5-O-β-D-glucopyranoside have also been isolated.[14] The anti-Inflammatory effects of *Chrozophora plicata* was studied.[15] The leaves of *Chrozophora plicata* provide valuable insights into its medicinal potential as it contains glycosides, tannins, and flavonoids which has potential antioxidant, antimicrobial, and anti-inflammatory properties.[16] The leaves and seeds of *Chrozophora plicata* have novel therapeutic value against various degenerative diseases as they are good sources of essential antioxidants.[17] The flavonoid3,5,7-trihydroxy-2-(4-hydroxyphenyl)chromen-4-one (kaempferol) extracted from *Chrozophora plicata* leaves has good antioxidant property.[18]

Experimental

The leaves, roots and seeds of *Chrozophora plicata* were collected from, Deulgaon Raja region of Buldana district, Maharashtra.

Sample collection and preparation of extract

Plant leaves, roots and seeds were collected, washed and dried in dark. Then it was grounded using mortar and pestle to fine powder. Dried powder of plant leaves, roots and seeds separately were used to obtain extract using soxhlet apparatus and ethanol solvent at 80^0C for 3 hr. The solvent extract was then stored in air-tight containers for further use.

Preliminary phytochemical screening

The analysis of phytochemicals from the extract of *Chrozophora plicata* leaves, roots and seeds was individually performed using standard procedures.[18-22] Different tests were done for alkaloids, flavonoids, saponins, tannins, phenolic compound, coumarins, protein, anthraquinones, quinines, phytosterols, terpenoids, glycosides and carbohydrates.

Detection of phenolic compounds

Ferric chloride test:In 2-3 ml of plant extract add 5% ferric chloride solution, if dark blue or greenish color product appears inside the solution it indicates presence of phenolin the samples.

Detection of coumarins

In 2 ml of plant extract add 1 ml of 10% KOH solution, if yellow color formed it confirms the presence of coumarins in the samples.

Detection of alkaloids

Mayer's test: Few drops of Mayer's reagent was added to 2 ml of the plant extract samples. If white precipitate or green color formed, it confirms the presence of alkaloids in the samples.

Hager's test: Few drops of Hager's reagent was added to2 ml of the plant extract. If bright yellowprecipitate is formed, it confirms the presence of alkaloids in the sample.

Wagner's Test: Few drops of Wagner's reagent was added to 2 ml of the plant extract. If brown/reddish precipitate formed it confirms the presence of alkaloids in the sample.

Detection of quinines

1 ml of conc. sulphuric acid was added to 2 ml of plant extract. If red color formed, it confirms the presence of quinones in the samples.

Detection of protein

Xanthoproteic Test: Few drops of conc. HNO_3were added to 2 ml of plant extract. If yellow color formed, it confirms the presence of proteins in the sample.

Biuret test: 2 ml of 10% NaOH and5 drops of 1% copper sulphate solution was added to 2 ml of plant extract and were mixed thoroughly. Purple or violet color formation confirms the presence of proteins in the sample.

Detection of anthraquinone

1 ml of 2% HCl was added to2 ml of plant extract. Formation of red precipitate confirms the presence of anthraquinones in the samples. In another test, 1 ml benzene was added to 1 ml of plant extract followed byaddition of 10% ammonia solution. Formation of red colorconfirms the presence of anthraquinones in the samples.

Detection of saponins

Foam Test: 2ml of distilled water and 2 ml of plant extract was taken in a graduated cylinder and shake it vigorously for 15 min. if a layer of1 cm or more thick of foam is formed it confirms the presence of saponins in the samples.

Detection of flavonoids

Alkaline reagent test: Few drops of dil. NaOH were added to 1 ml of the plant extract.If an intense yellow colour produced, it confirms the presence of flavonoids in the samples.

Detection of tannins

Ferric chloride Test: 1 ml of ferric chloride was added to 1 ml of the plant extract. Greenishblack or dark blue color formation confirms the presence of tannins in the samples.

Detection of terpenoids

Salkowski test: 2 ml of chloroform was added to crude extract (about 100 mg) and shake well for few minutes and then added 2 ml conc. H_2SO_4along the side of the test tube. Reddish brown colour formation at the interface confirms the presence of terpenoid in the samples.

Detection of glycosides

Keller Killani test: 1 ml of glacial aceticacid and 1 ml of plant extract samples were taken in test tube andcooled, then add 2 drops of $FeCl_3$. Now careful add 2ml Conc.H_2SO_4 along theside of the test tube. If reddish brown colour ring is formed at the interface of two liquidsit confirms the presence of glycosides in the samples.

Detection of carbohydrates

Benedict's test: Few drops of Benedict's reagent (alkalinesolution of cupric-citrate complex) were added to the plant extract and thenthe mixture is boiled in water bath for few minute. Ifthere is formation to reddish-brown precipitate, confirms the presence of carbohydrates in the samples.

RESULT AND DISCUSION

The preliminary phytochemical screening for leaves, roots, and seeds of *Chrozophora plicata* is tabulated as table No.1.

Table No. 1: Phytochemical screening of *Chrozophora plicata* plant extract.

Sr. No.	Component Tested	Leaves	Roots	Seeds
1	Phenolic compound	Positive	Positive	Positive
2	Coumarins	Negative	Negative	Negative
3	Alkaloids	Positive	Positive	Positive
4	Quinines	Positive	Positive	Positive
5	Protein	Negative	Negative	Negative
6	Anthraquinones	Negative	Positive	Negative
7	Saponins	Positive	Positive	Positive
8	Flavonoids	Positive	Positive	Positive
9	Tannins	Positive	Positive	Positive
10	Terpenoids.	Positive	Positive	Positive
11	Glycosides	Positive	Positive	Positive
12	Carbohydrates	Positive	Positive	Positive

Phytochemical analysis revealed the presence of key bioactive compounds in all parts (leaves, roots, seeds) of the plant. Phenolic compounds, alkaloids, quinines, saponins, flavonoids, tannins, terpenoids, glycosides, and carbohydrates were consistently detected across all samples, indicating a rich phytochemical profile. Proteins and coumarins were absent in all parts, while anthraquinones were exclusively present in roots, suggesting tissue-specific distribution. These findings highlight the medicinal potential of the plant, particularly due to the uniform presence of antioxidant and antimicrobial compounds like flavonoids and tannins. The variation in anthraquinone content may relate to distinct physiological roles in root metabolism.

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