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CLEOME CHELIDONI: PHYTOCHEMICAL AND PHARMACOLOGICAL REVIEW

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ABSTRACT

Cleome chelidonii Linn. (Family: Capparaceae) is a rare plant grown as perennials throughout dry seasons and widely distributed as a weed in wet places. However, the plant having wide therapeutic properties has not been scientifically validated. In present investigation, the detailed Pharmacognostical study of Cleome chelidonii is carried out to lay down the standards which could be useful in future experimental studies. The study includes macroscopy, microscopy, preliminary phytochemical screening, separation and isolation of plant constituents by chromatographic methods, characterization of isolated plant constituents and fluorescence analysis, elemental analysis and spectral studies. These studies provided referential information for correct identification and standardization of this plant material and to differentiate the plant Cleome chelidonii from other species of Cleome.

KEYWORDS: Cleome chelidonii, Pharmacognostical study, Therapeutic properties, Phytochemical screening, Chromatographic methods, Standardization, Identification.

INTRODUCTION

The plant *Cleome chelidonii* Linn. (Family: Capparaceae) is grown as perennials throughout dry seasons and widely distributed as a weed in wet places. It is found in India, Myanmar, Malaysia, Indo China and Java. In Tamil it is called Neela Naikadugu. However, the plant having wide therapeutic properties has not been scientifically validated. The leaves of *Cleome chelidonii* is generally known to be used for the treatment of colic, dysentery, headache, otitis, and rheumatism. The whole plant has also been found to possess multiple therapeutic

properties such as its use a vermifuge, in the treatment of skin diseases including leucoderma, and with anti-inflammatory, anti microbial, anti nociceptive and anti pyreticproperties. The objective of the presentwork has been aimed to investigate the Pharmacognostical and Phytochemical properties of the plant *Cleome chelidonii.*

Fig: Cleome chelidonii.

MATERIALS AND METHODS

Materials

The fresh plant material was collected from Tiruchirappalli, Tamil Nadu in the month of June 2019.The plant material was taxonomically authenticated for its botanical identity by Botanist, and voucher specimen deposited in herbarium of the institute. Transverse section of leaf along the midrib, stem and roots were done. The coarsely powered plant material was subjected to extraction by solvents with increasing polarityand the dried extracts were subjected to phytochemical studies using standard test procedures.

Observations Morphology

Height -	0.3 - 0.9 m.
Leaves -	1- or 3 - foliate at the top and 5- or 7-foliate at the base
Leaflets-	obovate, 2-3 cm long, 0.5-1.5 cm wide.
Stem branches -	striate, glabrous.
Flowers	, rose coloured petals, and big mass of over 100 Stamens in the center. Capsule is hairless.
Pods -	5 - 6 cm in length.
Seeds -	asymmetrical, spherical to oval, comma shaped,

Compressed and Diameter 1.5 to 2.0 mm. Brown to blackish brown, central portion paler and smooth. Cleft fairly open about 0.7 to 1.00 mm deep. Testaechinate to muricate, with rough and blunt tubercles of various heights.

Taxonomy

- Order : Brassicales
- Family : Clelomaceae
- Genus : Cleome
- Species : C.chelidonii.

Microscopical studies

The required samples of different organs were cut and removed from the plant and fixed in FAA (Formalin- 5ml + Acetic acid- 5 ml +70% ethyl alcohol-90 ml). After 24 hrs of fixing, the specimens were dehydrated with graded series of tertiary – butyl alcohol as per the schedule given by Sass, 1940. Infiltration of the specimens was carried by gradual addition of paraffin wax (melting point 58 – 60°C) until TBA solution attained super saturation. The specimens were cast into paraffin blocks.[12,15]

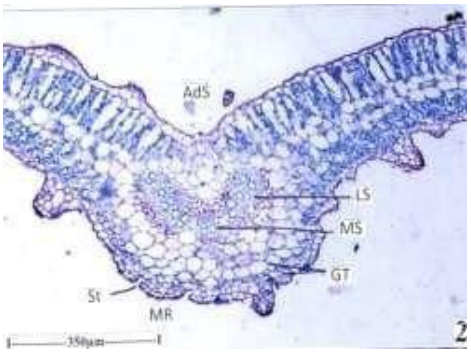


Fig. 1: Midrib Enlarged.

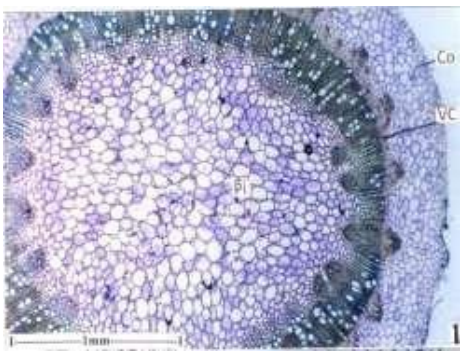


Fig. 2: T. S. of the Stem – Ground Plan.

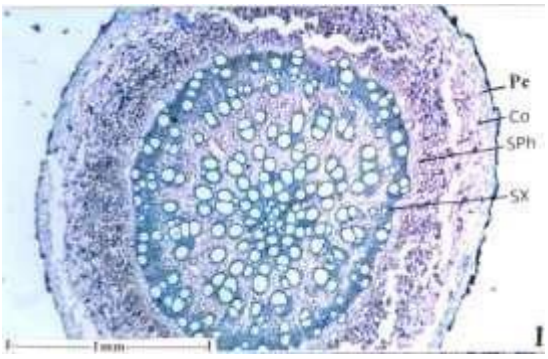


Fig. 3: T. S of the Root – Entire View.

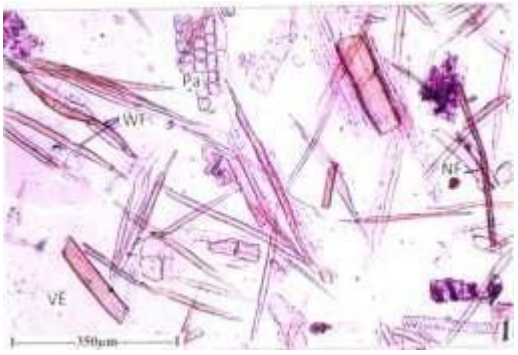


Fig. 4: Vessel elements and Fibres.

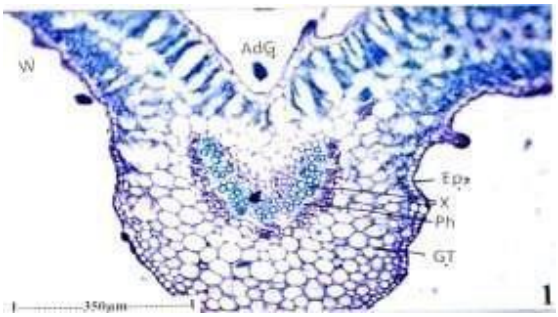


Fig 5: T.S of basal (Proximal) part of the petiole.

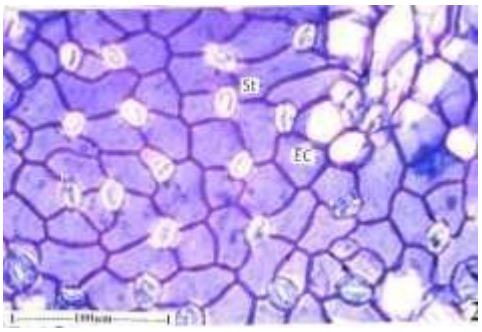


Fig. 6: Paradermal sections.

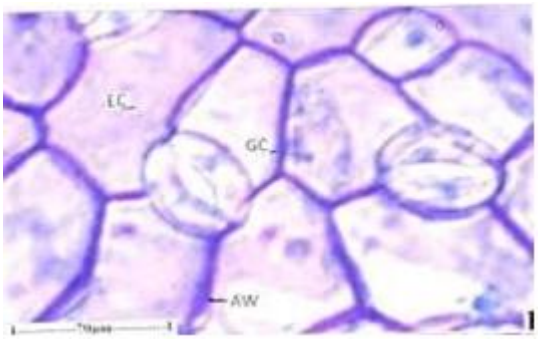


Fig. 7: Paradermalsections of the.

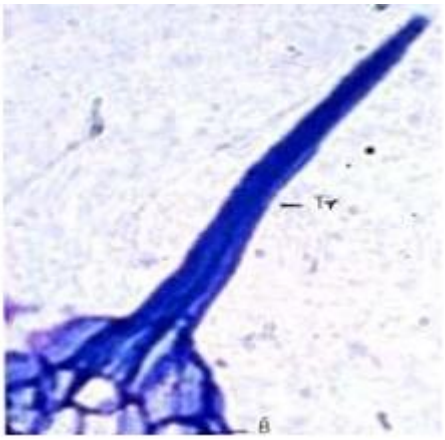


Fig. 8: One Trichome enlarged abaxial.

Phytochemical Review

Cleome chelidonii is known for a variety of phytochemical constituents that contribute to its medicinal properties. Phytochemical analysis of the plant reveals the presence of bioactive compounds, some of which are responsible for its anti-inflammatory, antimicrobial, and antioxidant activities. Below is a general overview of the phytochemicals identified in Cleome chelidonii:

1. **Flavonoids**

- Flavonoids are key compounds that contribute to the plant's antioxidant and anti-inflammatory properties. They help neutralize free radicals and reduce oxidative stress in the body.
- Examples of flavonoids commonly found in the plant include kaempferol and quercetin, which are also known for their antimicrobial effects.

2. **Alkaloids**

- Alkaloids are known for their pharmacological effects, including pain relief and

antimicrobial activities. These compounds contribute to the plant's use in traditional medicine for pain management and as an antiseptic.

3. Tannins

- Tannins have astringent properties, and they play a role in the wound-healing capabilities of the plant by helping to coagulate proteins and form a protective layer over wounds.

4. Saponins

- Saponins are glycosides with soap-like properties that help reduce cholesterol levels, enhance the immune response, and exhibit antifungal and antibacterial activities.

5. Terpenoids

- Terpenoids are compounds with various bioactive properties, including anti-inflammatory, antimicrobial, and anticancer activities. They are also responsible for the aromatic qualities of the plant.

6. Phenolic Compounds

- Phenolic compounds are known for their antioxidant activities. These compounds help in scavenging free radicals and preventing cell damage caused by oxidative stress.

7. Glycosides

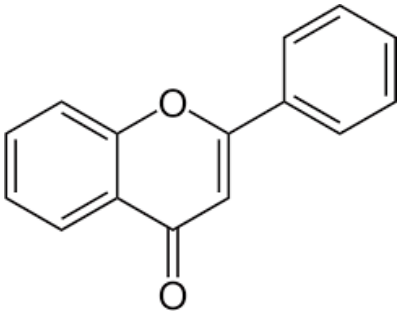
- Glycosides, another class of phytochemicals present in Cleome chelidonii, are important for their role in supporting heart health and displaying antimicrobial and anti-inflammatory properties.

8. Steroids

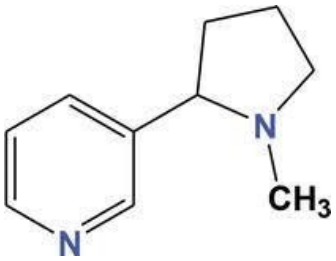
- Steroidal compounds in the plant may contribute to its anti-inflammatory and analgesic effects, making it useful in the treatment of joint pain and other inflammatory conditions.

9. Essential Oils

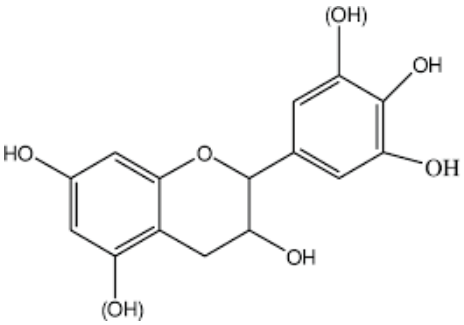
- The essential oils extracted from Cleome chelidonii contain volatile compounds that may possess antibacterial, antifungal, and insecticidal properties.



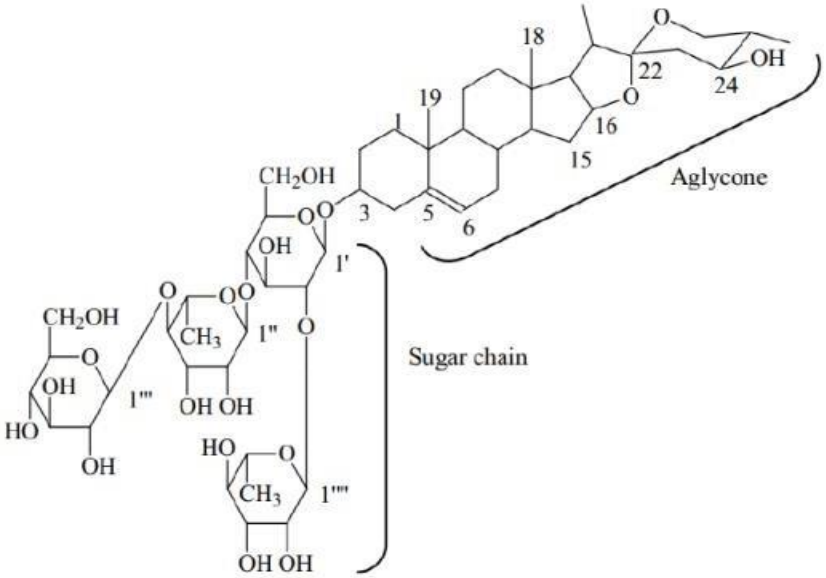
Flavanoid



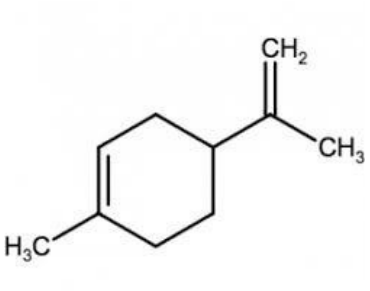
Alkaloids



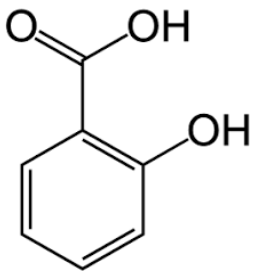
Tannins



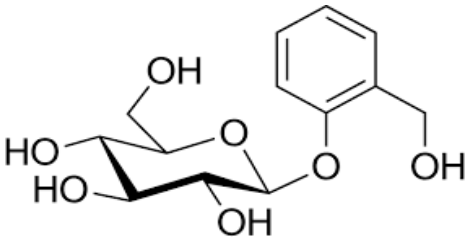
Saponin



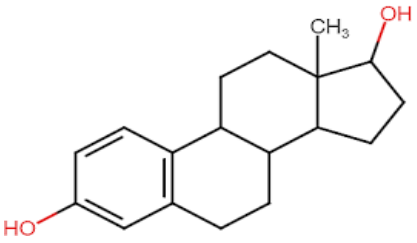
Terpenoid



Phenolic Acid



Glycoside



Sterloids

Pharmacognostical studies

Cleome chelidonii is a plant known for its various medicinal properties in traditional medicine. Here are some of its common medicinal uses:

1. **Anti-inflammatory:** The plant has been used traditionally to reduce inflammation. It is applied externally in poultices to treat joint pain, swelling, and other inflammatory conditions.

2. Anltimicrobial: Extracts from *Cleome chelidonii have shown antimicrobial properties, making it useful in treating infections caused by bacteria or fungi.

3. Wound healing: The leaves or other parts of the plant are sometimes used in traditional medicine to treat wounds and promote faster healing.

4. Fever reduction: It has been used to alleviate fever and febrile conditions, acting as a natural antipyretic.

5. Respiratory issues: The plant is also used to manage respiratory conditions like coughs, asthma, and bronchitis. It is believed to help in clearing mucus and providing relief from breathing difficulties.

6. Digestive health: In some traditions, the plant is used to treat digestive problems like indigestion or to stimulate appetite

Traditional uses

- Eae infection
- Constipation
- Stomachic
- Conjunctivity
- Skin disease
- Tumer
- Diluretics
- Malaria fever

Worldwide Medicinal Uses of Cleome chelidonii

1. India

- Abdominal discomfort: The plant is used as a digestive aid to alleviate indigestion and abdominal discomfort.
- Diarrhea and Dysentery: Leaf and seed extracts are used in Ayurveda to treat diarrhea and dysentery.
- Skin disorlders: The juice of the leaves is applied externally for treating skin diseases such as boils, scabies, and insect bites.
- Headaches: Crushed leaves are often applied to the forehead to relieve headaches.
- Fevers: Leaf decoctions are used to reduce fevers and combat malarial symptoms.

- Respiratory ldisolrders: Seeds are used to treat respiratory infections, asthma, and bronchitis.
- Anti-inflammatory properties: Used for pain relief in arthritis and rheumatism.

2. Bangladesh

- Cough and fever: Traditionally, the plant is used to treat cough, mucus buildup, and fever.
- Piles: It is used in folk medicine to alleviate piles.

3. Pakistan

- Wounds and skin infections: The plant is applied externally to treat wounds, cuts, and skin infections.

4. Africa (Tropical regions):

- Antimicrobial activity: Cleome chelidonii has been used for its antibacterial and antifungal properties, particularly in treating skin conditions and gastrointestinal issues.

5. Nepal

- Gastrointestinal issues: The plant is used to treat stomach disorders like dyspepsia and diarrhea.
- Insect repellent: Traditionally, it is used as a natural insect repellent due to its pungent odor.

6. Elsewhere

- Antihelminthic: Seeds and extracts of the plant are used to expel intestinal worms.
- Eye infections: It is used in some traditional settings to treat eye infections and as an eyewash.

CONCLUSION

Cleome chelidonii is a valuable medicinal plant with diverse traditional uses. Its anti-inflammatory, antimicrobial, and antipyretic properties make it a promising candidate for further pharmacological research. Although used extensively in folk medicine, more rigorous clinical studies are necessary to confirm its therapeutic potential and ensure its safe use in modern healthcare systems.

REFERENCE

1. "Indian Medicinal Plants: A Compendium of 500 Species" - By P.K. Warrier, V.P.K. Nambiar, and C. Ramankutty, 1994; 2.
2. "A Textbook of Ethnopharmacology" - By Sen, S., Chakraborty, R., and De, B., 2010.
3. "Medicinal Plants of the World" - By Ben-Erik van Wyk, Michael Wink, 2004.
4. "Pharmacognosy and Pharmacobiotechnology" - By Ashutosh Kar, 2003.
5. "The Wealth of India: A Dictionary of Indian Raw Materials and Industrial Products" - CSIR Publications - (C), includes information on Cleome species, 1988; 2.
6. "Herbal Medicine: Biomolecular and Clinical Aspects" - By Iqbal Ahmad, Farrukh Aqil, 2006.
7. "Plants of the Gods: Their Sacred, Healing, and Hallucinogenic Powers"- By Richard Evans Schultes, Albert Hofmann, 1992.
8. "Ethnobotany of Medicinal Plants" - By Mahendra Rai, 2012.
9. "Handbook of Medicinal Herbs" - By James A. Duke, 2002.
10. "Medicinal Plants of the World: Chemical Constituents, Traditional and Modern Medicinal Uses" - By Ivan A. Ross, 2003.
11. "The Ayurvedic Pharmacopoeia of India" - Government of India Publications, 1989.
12. "Ethnobotany: Principles and Applications" - By C.M. Cotton, 1997.