International Journal for Multidisciplinary Research (IJFMR)
E-ISSN: 2582-2160 ● Website: www.ijfmr.com ● Email: editor@ijfmr.com

A Review on the Pharmacognostical Characteristics and Medicinal Significance of Cleome Gynandra

Chandan TN[1], Mukthiyar Ahamed[2], Abhishek AB[3], Manohar KM[4], Akshay SN[5]

[1,2,3,4,5]Department of Pharmacognosy, Shantha College of Pharmacy, Peresandra, Chickballapur, Karnataka-562104, India.

ABSTRACT:
Cleome gynandra commonly known as "Shona cabbage" is utilized in various traditional medicine systems to treat numerous ailments and is also incorporated into different culinary practices due to its impressive nutritional and antioxidant benefits. Traditional healers commonly use it to manage diseases such as epilepsy, irritable bowel syndrome, and parasitic infections. The plant is rich in proteins, amino acids and minerals, making it a potentially valuable crop that can be easily cultivated for economic purposes. This review article highlights the medicinal uses of Cleome gynandra, citing its properties as an immunomodulator, antioxidant, anticancer agent, and analgesic. The scientific information was obtained from various sites such as Google scholar, PubMed, Wikipedia, Google, ChatGPT, and other scientific database. This Review will highlight importance of *Cleome gynandra.*

Keywords: *Cleome gynandra,* Morphology, Macroscopy, Cultivation, Antidiabetic activity, Antimicrobial Activity, Analgesic Activity, Anti-ulcer, Anticancer Activity, Antidiarrheal Activity.

INTRODUCTION:

Cleome gynandra is a widely found plant that grows as a weed in barren lands and agricultural fields across India. It is a species of Cleome that is used as a leaf vegetable. It is known by many common names including Shona cabbage, African cabbage, spiderwisp, cat's whiskers and stinkweed. It is an annual wildflower native to Africa but has become widespread in many tropical and sub-tropical parts of the world. *Cleome gynandra L.* a plant often overlooked as a weed, but it holds significant nutritional and medicinal value. Despite its common occurrence in rural landscapes, this plant remains underutilized in modern diets and healthcare practices. As urbanization and changing agricultural practices continue to shift dietary patterns, traditional plants like *Cleome gynandra* are at risk of being forgotten[1].

Taxonomical Classification:
Kingdom: Plantae
Division: Magnoliophyta
Class: Magnoliopsida

Order: Brassicales
Family: Cleomaceae
Genus: Cleome
Species: Cleome gynandra L.

Vernacular names in India
Sanskrit: Pasugandhi,Ajagandha
Assamese: Bhutmulla
Bengali: Hurhuria, Shulte
English: Dog Mustard
Gujarat: Talvani, Dhelitalavan
Hindi: Hulhul, Hurhur, Kavalia
Kannada: Naram bele Soppu, Nayeetulasi
Kashmiri: Gandi Buti
Malayalam: Atunari vela
Marathi: Tilvan, Bhatvan, Mabli, Tilavana, Tilvant
Oriya: Anasorisia, anasorisa, Hulhulia
Punjabi: Bugra
Tamil: Nal valai, Nal velai
Telugu: Vaminta, Vayinta

Nutritional and Medicinal Importance:
Traditionally, *Cleome gynandra L*. has been recognized as a powerhouse of nutrients. It is rich in iron, vitamins A and C, calcium and antioxidants, making it an excellent addition to the diet. Research indicates that consuming *Cleome gynandra* can help improve haemoglobin levels, making it beneficial for human consumption. Apart from its dietary benefits, *Cleome gynandra* is widely used in traditional medicine. It is known to aid digestion, reduce body heat and alleviate joint pain. The leaves, when crushed and applied externally, help in treating wounds, insect bites and skin irritations. A decoction made from the plant is used for fever and inflammation, highlighting its therapeutic potential. Studies also suggest that its bioactive compounds possess antimicrobial and anti-inflammatory properties, which further solidify its value in traditional healthcare.

MORPHOLOGY:
Macroscopy: It is an erect, annual herb up to 250- 600 mm tall; much branched and sometimes becomes woody with age.
Stem: The stem is sticky with glandular hairs and marked with longitudinal parallel lines. Stem is granular, straited, and glandular-pubscent.
Leaves: Leaves are palmately compound, with 3-5 leaflets. The leaf stalk is 20-50 mm long with glandular hairs. The leaflets radiate from the tip of the leaf stalk, are 20-100 x 8-40 mm, smooth or with glands, and taper toward the base and often with scattered multi cellular hairs on the main nerves.
Inflorescence: The inflorescence is a long terminal cluster elongating at fructification up to 40 cm. pedicels are 10-20mm long, glandular hairs.

Flower: The flowers are carried by a stalk of 1 to 2 cm long at the axil of a bract resembling a small subsessile to sessile leaf, tri-lobed or becoming simple to the top of the plant. Asymmetrical flower formed of a calyx of 4 sepals, oval to oblong, 2.5 to 6 mm long, glandular, a corolla of 4 white, petals pink or lilac, spatula shape, tapered base and rounded top, 1.2 cm long and 3 to 5 mm wide. They are all four erected on their back. 6 stamens have the lower half of the filament fused at the base of the style (1 to 2 cm) and the upper half spreading freely, 1.5 to 2 cm long, purple.
Fruit: The fruit is a long tapered fusiform capsule, 10 cm long and 5 mm in diameter, glandular or glabrous, with many seeds.
Seed: Seeds round, discoid, 1.5 mm diameter, brown or black, wrinkled or reticulate tegument.

Plant Distribution:
C. gynandra is typically wellknown herb in southern Africa reaching out from the Limpopo, the North-West, Gauteng, the Northern Cape, and Namibia. Being semicultivated, in the District of Eastern Cape, has most likely broadened its distribution. It is most likely a native of Africa and now broadly circulated in tropical and subtropical areas all through the world.

Cultivation:
1. *Cleome gynandra* is normally not a cultivated crop. Leaves are in most cases harvested from the plant found as naturally growing weed. However, some studies on the most suitable cultivation techniques have been conducted.
2. Cleome gynandra requires deep, well drained fertile soils. It grows well on loose soils, with high humus content and with pH ranging from 5.5 to 7.
3. In cultivation, propagation of the plant is done by seed sowing. Given the small seed size, the depth of sowing and the preparation of the seedbed are important factors. Seeds can be dispersed unevenly by broadcasting or shallowly drilled in rows spaced around 30 cm apart and around 1 cm deep.
4. Generous and frequent nitrogen-based fertilizers can be applied to delay flowering, prolong vegetative growth and increase number and dimensions of the leaves.
5. To result in a good yield, *C. gynandra* needs adequate soil water content throughout the whole vegetative growing period. Frequent and controlled irrigation is desirable and must be determined depending on soil water retention properties.
6. Harvesting can be done in two distinct ways. The first one consists in complete uprooting of the whole plant and successive separation of the leaves from the stem. Alternatively, multiple harvesting can be done by cutting the higher part of the plant and collecting the upper leaves. This second strategy helps to increase lateral leaves growth and to delay flowering, extending the vegetative period[3].

Pharmacological Activities:
Anticancer Activity:
Anticancer activity of methanolic extract of *C. gynandra* was assessed against Ehrlich Ascites Carcinoma cell line at the doses of 400 and 200 mg/kg body weight intraperitoneally. The outcome indicated significant decline in tumour volume, viable cell count, tumour weight, and raised the life expectancy of tumour-bearing mice when compared with normal control mice. Haemoglobin, red blood

cell, white blood cell, and lymphocyte count returned to the normal level in treated mice. Result reveals the extract has potent dose-dependent anticancer activity[4].

Antidiabetic Activity:

Anti-diabetic of *Cleome gynandra* plant extract in alloxan-induced diabetic rats. The effects of orally administered ethanolic extract of *Cleome gynandra* on serum glucose profile activity were examined in diabetic control and *Cleome gynandra* treated diabetic rats. While the activity of the blood glucose profile, in the serum were assessed. The drugs were administered over a period of 7 days treatment.

Antidiarrheal Activity:

The effect of a methanol extract of the entire plant *Cleome gynandra L.* for its antidiarrheal potential against some of the experimental models of diarrhea in rats. CVME showed significant inhibitory activity against castor-oil induced diarrhea and PGE2- induced enteropooling in rats. The extract also showed a significant reduction in gastrointestinal motility in the charcoal meal test in rats. The results obtained establish the efficacy and substantiate the folklore claim as an anti- diarrheal agent[5].

Anti-ulcer:

The ethanol extract of *Cleome gynandra* was investigated for its anti-ulcer. Anti-ulcer activity was evaluated by various model like Aspirin-induced gastric ulcer in rats, Ethanol induced ulcer in rats, Gastric Secretion study in pylorus ligation in rats. The ethanol extract of Cleome gynandra Linn. Leaf extract at 300 mg/kg body weight. It was found to produce significant anti-ulcer activity in all the models compared to vehicle control animals. Pylorus ligation showed significant reduction in gastric volume, free acidity and ulcer index as compared to control. It also showed 55.76% ulcer protection index in ethanol induced ulcer and 61.01% ulcer protection index in aspirin induced model[6].

Antimicrobial Activity:

Antimicrobial activity of methanolic extracts of plants was screened by disc diffusion assay against four bacteria and four fungal cultures. Streptomycin (10 g/disc) and nystatin (10 g/disc) are used as standards for bacteria and fungi respectively. Minimum inhibitory concentration (MIC) of the extracts was evaluated through micro broth dilution method. The antimicrobial potency of plant extracts was assessed by their zone of inhibition and activity index values. Total activity of extracts was evaluated to quantitatively compare the activity of two plants. Methanolic extract of *Cleome gynandra* showed maximum antibacterial activity against Staphylococcus aureus (IZ- 22 ± 0.22 mm, AI-0.917, MIC- 0.039 mg/mL, MBC- 0.039 mg/mL). Maximum antifungal potential was shown by C. chelidonii against Candida albicans (IZ- 25 ± 0.92 mm, AI-1.000, MIC- 0.039 mg/mL, MFC0.039 mg/mL). Both the extracts exhibited good antimicrobial activity with low range of MIC[7].

Analgesic Activity:

The ethanol extract of *Cleome gynandra Linn,* was investigated for its analgesic activity. The Ethanol extract showed significant analgesic activity (50.00% protection) at 300 mg/kg body weight dose level comparable to the reference standard indomethacin (69.50% Protection) at 10 mg/kg body weight on oral administration in mice[6].

CONCLUSION:

The plant *Cleome gynandra* widely used in traditional medicine to treat conditions including food poisoning, rheumatism, inflammation, bacterial infection, and pain-related conditions. The plant is rich in vitamins, particularly vitamin C and beta-carotene, as well as protein. The plant extract has been widely studied for their various pharmacological activities like Anti-oxidant activity, Anti-inflammatory activity, Anti-diabetic activity, Anticancer activity. The plant is preclinically evaluated to some extent.

References:

1. Sagar, S. P. P., Sridhara, M. R., Raghavendra, V. C., Yashaswini, R., Sanjay, M. and Sinchana, B. V. 2025. Cleome gynandra: A Marvellous Plant in the Front Yard. Vigyan Varta 6(4): 114-117.
2. Mishra SS, Moharana SK and Dash MR: Review on Cleome gynandra. International Journal of Research in Pharmacy and Chemistry 2011; 1(3): 681-9.
3. Shilla O, Dinssa FF, Omondi EO, Winkelmann T and Abukutsa-Onyango MO: Cleome gynandra L. origin, taxonomy and morphology: A review. African Journal of Agricultural Research 2019; 14(32): 1568-83.
4. Adhikari PP and Paul SB: Medicinally important plant Cleome gynandra: a phytochemical and pharmacological explanation. Asian Journal of Pharmaceutical and Clinical Research 2018; 11(1): 21-9.
5. Devi BP, Boominathan R and Mandal SC: Evaluation of anti-diarrheal activity of Cleome viscosa L. extract in rats. Phytomedicine 2002; 9(8): 739-42.
6. Sivakumar KK, Rajasekaran A, Ponnilavarasan I, Somasundaram A and Sivasakthi R: Antiulcer and analgesic activity of the ethanol extract of Cleome gynandra Linn Leaves. Research Journal of Pharmacy and Technology 2010; 3(3): 766-9.
7. Sridhar N, Kiran BV, Sasidhar DT and Kanthal LK: Invitro antimicrobial screening of methanolic extracts of Cleome chelidonii and Cleome gynandra. Bangladesh Journal of Pharmacology 2014; 9(2): 161-6.