

A REVIEW ON CALOTROPIS GIGANTEA USED IN TREATMENT OF INFLAMMATION

Vineet Dubey*, Rabiullah

Pharmacy College Azamgarh, Itaura, Chandeshwar, Azamgarh- 276128, Utter Pradesh, India.

Article Received: 11 February 2026 | Article Revised: 03 March 2026 | Article Accepted: 24 March 2026

*Corresponding Author: Vineet Dubey

Pharmacy College Azamgarh, Itaura, Chandeshwar, Azamgarh- 276128, Utter Pradesh, India.

How to cite this Article: Vineet Dubey, Rabiullah (2026) A REVIEW ON CALOTROPIS GIGANTEA USED IN TREATMENT OF INFLAMMATION. World Journal of Pharmaceutical Science and Research, 5(4), 30-35.



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ABSTRACT

Calotropis gigantea plant has a family Asclepiadaceae commonly and sub family Apocynaceae known as Madar in Hindi. It is a perennial herb with a very long history of use in traditional medicines. *Calotropis gigantea* is a hoary, laticiferous shrub, which is also known as “the milkweed”. *Calotropis* is used as a traditional medicinal plant in whole world. *Calotropis gigantea* plant contain chemical constituents in which cardenolides, flavonoids, terpenes, pregnanes and nonprotein amino acid and more in various concentration. The root bark contains α -amyrin, β -amyrin, taraxasterol and its ψ -isomer taraxasteryl isovalerate, taraxasteryl acetate, gigantol, giganteol, isogiganteol, β -sitosterol and wax. The root also shows Nootropic activity in methanolic extract. The latex, leaves, flowers and bark are used as caustic, acrid, expectorant, to remove body hairs, anthelmintics and also used in leprosy, ulceration, cough, scabies ring worm of the scalp, piles, explosion on the body, asthma, enlargement of spleen or liver, edema and in painful joint swellings. Also, evaluate possible anxiogenic effect, sedative action and anxiolytic potential of crude ethanolic extract of *Calotropis gigantea* leaf. Methanolic extract of *Calotropis gigantea* root used as memory increasing activity. This review gives an idea about its pharmacological activity and phytochemistry.

KEYWORDS: *Calotropis gigantea*, Gigantin, Pharmacological activity, Phytochemistry, Anti-Inflammation.

1. INTRODUCTION

Natural world has gifted us with number of herbs having mystical dragging properties that are used widely in many ailments. The utilization of herbs and medicinal plants as first medicines is a universal phenomenon. Now a day, as much as 80% of the world's population are totally depends on traditional medicine as a primary health care need. Ayurveda is an important system of healing that originated in India from thousands of year ago. Herbal blend or

formulations combine to give the benefits of multiple herbs, which is generally produce a synergistic action while decreases the potential toxic effects of a single herb. Herbs provide unique qualities that are very restricted in conventional medicine, mainly anti-cancer, anti-viral as well as immune regulation properties. Herbs are the excellent alternatives to the antibiotics in the treatment of various infectious diseases, antibacterial effects and various antifungal and antiviral actions. Various herbal formulations serve as detoxification agents, antioxidants and anti-cancer therapies. The current work objectives are to investigate indigenous plants used as protective against cognitive dysfunction in our country.^[1] We here reported our opinion related to cognitive dysfunction activities of the plant *Calotropis gigantean*.^[2]



a) CALOTROPIS GIGANTEA PLANT NAME IN DIFFERENT LANGUAGE

- Hindi: Gauri akavana, aka,
- English: Madar
- Sanskrit: Svetarka
- Malayalam: Vella Erukku

b) AYURVEDIC PROPERTIES

- Rasa : Katu, Tikta
- Guna: Lakhu, Rooksha, Teekshna, Sara
- Virya: Ushna

c) CLASSIFICATION OF CALOTROPIS GIGANTEA:

- Kingdom: Plantae
- Sub-kingdom: Tracheobionta
- Super division: Spermatophyta
- Division: Magnoliophyta
- Class: Magnoliopsida
- Subclass: Asteridae
- Order: Gentianales
- Family: Asclepiadaceae
- Genus: *Calotropis*
- Species: *gigantea*

2. DISTRIBUTION

Calotropis gigantea is a large shrub growing upto 4 m (13 ft) tall. It has clusters of waxy flowers that are white or lavender in colour. Stamens are held by the small elegant crown that are arising from the centre of the flowers having five pointed petals. The aestivation found in plant is valvate that is sepals or petals in a whorl are just touch one another at margin, without overlapping. The plant has oval, light green leaves as well as milky stem. The latex of *Calotropis gigantea* contains cardiac glycosides, fatty acids and calcium oxalate in different concentration.^[3]

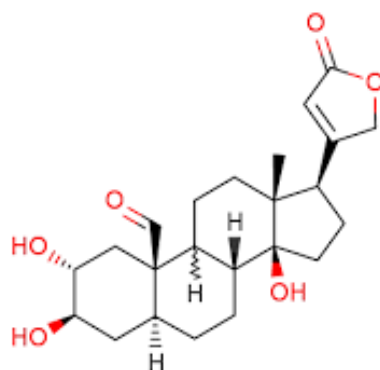
3. GEOGRAPHICAL SOURCE

Calotropis gigantea is a whole plant, which is found all over the India, which grows upto an altitude of 900m and it is found in Andaman. Also, found in dry waste places commonly called as mudar in English. It occurs throughout India from Punjab and Rajasthan in the north to Kanniya Kumari in the south, extending to West Bengal and Assam in the East.^[4] *Calotropis gigantea* is a common wasteland weed. The commonly known as giant milkweed. This plant was native from Bangladesh, Burma, China, India, Indonesia, Malaysia, Pakistan, Philippines, Thailand and Sri Lanka. This plant is consistently available in India. It used for many treatment purposes in all traditional medicinal system from ancient time.^[5]

4. CHEMICAL CONSTITUENT

The root bark contains chemical constituent α -amyrin, β -amyrin, taraxasterol and its ψ -isomer taraxasteryl isovalerate, taraxasteryl acetate, isogiganteol, β -sitosterol, gigantol, giganteol, and also wax. Root parts contain cardiac glycosides, seven oxypregnane-oligoglycosides, calotroposides A to G. Latex contains akundarin, 0.45% uscharin, 0.15% calactin, 0.15% calotoxin, α β -calotropeol, β - amyryl. Latex consist of glutathione or proteolytic enzyme. In 1980, Sinha and pal had isolated the crystals and studied the properties of Calotropins D1, D2 from *Calotropis gigantea*. The new oligoglycosides and oxypregnane called as *Calotropis* A and B have been isolated from the *Calotropis gigantea* root. *Calotropis gigantea* parts of plant contain following constituent in which 23.38% ash, water-soluble extractive 33.38% acid insoluble ash 5.08%, and alcohol soluble extractive 6.66%.^[6-10]

4.2- Structure of calotropis gigantean



Structure of Calotropinin

5. PHARMACOLOGICAL ACTION

a. Neuro pharmacological Activity

Predictable Phytoconstituents of *Calotropis gigantea* (L.). The present study has been envisaged to examine *Calotropis gigantea* (L.) Dryand for Neuropharmacological activities. The powder of the plant was extracted in a Soxhlet

apparatus successively by using solvents in order of increasing polarity- petroleum ether (60-80°C), chloroform, and methanol. Ethyl acetate portion was producing by partitioning methanol extract and ethyl acetate.^[11]

b. Antibacterial Activity

Calotropis gigantea is an ordinary wasteland weed and identified for different medicinal properties. The aspire of the present study was to screen leaves of *Calotropis gigantea* for the antimicrobial activity beside clinical isolates of bacteria. The aqueous extract was studied and used for activity against *S. aureus*, *E. coli*, *P. aeruginosa*, *B. cereus*, *M. luteus* and *K. pneumoniae*. In vitro antimicrobial action was performing by well diffusion method. The extract showed significant effect on tested organisms. The extract showed maximal zone of inhibition beside *E. colibacteria*.^[12]

c. Cytotoxic Activity

Evaluated various concentrations of ethanolic extract of the roots of *Calotropis gigantea* Linn were using for the cytotoxic action by Brine shrimp lethality bioassay or *Allium cepa* root meristem models. The ethanolic root extract of *Calotropis gigantea* exhibits potent cytotoxic property analogous to the quality drug. Hence, this may be utilized for the progress of novel anticancer drug leads.^[13]

d. Antitumor Activity

Evaluation of the possible antitumor effect of methanolic extract of root bark of *Calotropis gigantea* as well as its petroleum ether, chloroform soluble fractions performed against Ehrlich ascites carcinoma in Swiss albino mice. The effects of methanolic extract, petroleum ether and chloroform on the growth of Ehrlich ascites carcinoma and life span of Ehrlich ascites carcinoma bearing mice was studied. In that estimation of Haematological profile and also biochemical parameters. Methanol extract of root bark of *Calotropis gigantea* and its chloroform soluble fraction shows significant antitumor activity. *In vivo* study was showing a significant reduction in the viable tumour cell count and a significant enhancement of life span in the both methanol and chloroform extracts treated group compared to untreated one.^[14]

e. Hepatoprotective Activity

Evaluated Hepatoprotective action of alcoholic extract of *Calotropis gigantea* root bark. The suspension of alcoholic extract of plant *Calotropis gigantea* root bark in 0.6% carboxyl methylcellulose. Alcoholic extract root bark of the plant *Calotropis gigantea* exhibited a significant guard effect by normalizing the levels of aspartate amino transferase, alkaline phosphatase alanine amino transferase, which were significantly greater than before in rats by treatment with D-galactose amine.^[15]

f. Anti-Diarrhoeal Activity

The anti-diarrhoeal action of hydro alcoholic extract of all aerial part of *Calotropis gigantea* was studied beside castor oil-induced-diarrhea replica in rats. The gastrointestinal transport rate was spoken as the percentage of the longest space traversed by the charcoal alienated by the complete length of the small intestine. The weight and volume of intestinal satisfied produced by castor oil were studied by enter pooling method type. Like atropine there were important reductions in fecal output and incidence of droppings when the plant extracts were administer intraperitoneally compared with castor oil cure the rats. All doses of the plant extract also significantly slow down the castor oil induced enter pooling and intestinal abolish. Significantly inhibited weight and volume of intestinal satisfied. The antidiarrheal

action of *Calotropis gigantea* extract against castor oil-produced diarrhea model attests to its effectiveness in a various range of diarrhoeal steps.^[16]

g. Anti-Inflammation

Anti-inflammatory refers to any drug, substance or mechanism that reduces inflammation by lessening the redness, swelling, fever, or pain and loss of function which are part of bodies inflammatory response. Anti-inflammatory drugs are agents that inhibit action or production of inflammatory mediators such as cytokines, histamines and prostaglandins. These drugs reduce pain by inhibiting mechanisms of inflammation, as opposed to opioids, which affect the central nervous system to block pain.^[19]

6. ACTIVITY ON PATHOGENIC MICROORGANISMS

The aqueous, ethanol or ethanol extracts of *Calotropis gigantea* leaves, apical buds and flowers were ready to used study the effect of *Calotropis gigantea* extracts on growth and continued survival dynamics of Escherichia coli, Staphylococcus aureus, Candida albicans and Xanthomonas campestris. Microbial enlargement and survival dynamic profiles in the presence of solvent extracts in potage cultures were obtained and in most of the cases, the flowers and apical buds extract have also exposed the maximal growth reduction in adding to the leaves, but in some cases, growth was quick and accelerated than the control growth curves. *Calotropis gigantea* containing active metabolites such as protease inhibitors, 18, 20-epoxy-cardenolides, constitutive α -amylase inhibitors, lectins, antho-cyanins, mudarin, calactin, calotropin, non-protein amino acids, etc. may be the ones accountable for the obtained growth and continued existence dynamics in microbial broth culture. Over all the study has provided the potential of *Calotropis gigantea* as a foundation for biopesticides and future antibiotics.^[17]

7. THERAPEUTIC USES

The root bark of *Calotropis gigantea* appears as Ipecac in its action and it is substitute for it. In low doses, the root bark is diaphoretic and expectorant. It can act as a mild stimulant and given with carminatives in dyspepsia. It is also useful in leprosy and eczema. The powder form of root bark was gives for relief in diarrhea and dysentery. It is also used in cough, asthma and febrifuge. In the homeopathic system of medicine, it is accounted to be useful in the elephantiasis, lupus and chronic rheumatism. The ethanolic (50%) extract of root show anti-cancer activity.^[18]

8. CONCLUSION

The *Calotropis gigantea* is commonly distributed in our country belongs to Family Asclepiadaceae, commonly called as Madar in Hindi. It is a perennial herb with a very long history of use in traditional medicines. This review has listening carefully on the Pharmacological activity and phytochemical study of this plant. Pharmacological activity includes Neuropharmacological activity, Antibacterial activity Antidiarrheal activity, Anticonvulsant and Central nervous system activity, Procoagulant activity, Wound healing activity, Hepatoprotective activity, Cytotoxic activity, Antitumor activity etc. Herbs are an excellent alternative to antibiotics in the treatment of infectious diseases, with wider antibacterial effects and also various antifungal and antiviral actions. Some herbal formulations used as detoxification agents, antioxidants, and anti-cancer therapies. Herbs imparts many distinctive qualities, which limits in conventional medication such as anti-viral, anti-cancer and immune regulatory properties.

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