

## Studies on *Calotropis Gingantea*

Ch. Samareswar<sup>1</sup>, Pathan Karishma<sup>2</sup>, S. Jaya sree<sup>3</sup>, G. Pujitha<sup>4</sup>, Mrs. N. Deepa Ramani  
Professor, Department of Pharmacognosy

### Abstract :

Since the dawn of civilization, man has respected plants and these plants have been a source of genetically preserved resources used in many different ways such as food, fiber, fuel, fertilizer, and febrifuge. One of them is the *Calotropis gingantea* plant. *Calotropis gingantea* of Asclepiadaceae has been long-used in folk medicines. This perennial herb, yielding a variety of chemical substance of cardiac glycosides, flavanoids, terpenoids, alkaloids, tannins and resins, it's vegetative characteristic, ecology and distribution along with its phytochemistry were examined and *calotropis gingantea* economic benefit also. The plant has been used to treat a number of illness, such as leprosy, ulcers, tumours, and piles. Analgesic activity, Anti pyretic activity, pregnancy prevention, CNS activity, Anti-inflammatory activity, procoagulant activity, Anti-diarrheal activity, free radical scavenging activity, Anti microbial activity, Anti-tumour, Anti fungal, Antitussive, and Anti feedant activity are reported on pharmacological activities

**Key words :** *Calotropis gingantea*, pharmacological activity, phto chemistry, Milk weed, sweta Arka, Giant milk weed, CNS activity, Anti diarrheal activity, potential herb, crown flower.

### Introduction:

***Calotropis gigantea***, commonly known as the "giant milkweed" or "swallow-wort," is a perennial shrub in the family Apocynaceae. It is native to tropical and subtropical regions of Africa and Asia but has spread to other parts of the world due to its adaptability. The plant is well-known for its large, leathery leaves and beautiful, large, waxy flowers that are typically purple or white.

*Calotropis gigantea* thrives in arid and semi-arid climates and is often found in waste places, roadsides, and disturbed areas. It is particularly hardy and can grow in poor soil conditions, which makes it a common sight in regions with harsh environments. The plant is also noted for its milky latex, which exudes from cut stems and leaves. This latex contains compounds that can be toxic to both humans and animals if consumed in large quantities, but it has been used in traditional medicine for various purposes, such as treating wounds, infections, and certain types of fevers.

The plant has economic significance in some areas, where its fiber is used to make ropes, mats, and other products. Additionally, *Calotropis gigantea* is known for its ecological role in providing nectar to various pollinators, including bees and butterflies.

its many uses, *Calotropis gigantea* can be considered an invasive species in some regions, as it can spread rapidly and outcompete native plants. Therefore, its cultivation and management are carefully monitored in certain areas.

### Description of the plant :

**Kingdom :** Plantae

- Subkingdom : Tracheobionta
- Class : Dicotyledones
- Subclass : Asteridae
- Order : Gentianales

- Family : Apocynaceae
- Sub family : Asclepidiaceae
- Genus : Calotropis
- Species : Calotropis gigantea

### PHYTO CHEMICAL ACTIVITY OF PLANT *CALOTROPIS GINGANTEA*

S.NO	Activity	Plant part	year
1.	Gastric cancer	roots	2008
2.	Vasodilation effect	latex	2009
3.	Diabetes mellitus, Bronchial asthma, rheumatoid arthritis, and nervous disorders	Leaf and flower	2009
4.	Anti-inflammatory	Whole plant	2009
5.	Anthelmintic	latex	2009
6.	Anti tumor activity	flower	2009
7.	Anti histamanic	flowers	2010
8.	Cytotoxicity	Whole plant	2010
9.	Antimicrobial activity	leaves	2011
10.	Diabetes , Antidiabetic	Leaves and flowers	2011
11.	Antibacterial activity	leaves	2011

#### Biological source: -

Calotropis grows wild throughout the country up to 900 meters (msl) and is drought-tolerant and salt-tolerant to a reasonable extent. It thrives in disturbed sandy soils with a mean annual rainfall of 300–400

mm. It quickly establishes as a weed along deteriorated roadways, lagoon edges, and in overgrazed native grasslands by its wind and animal spread seeds. In the case of preference for forsaken agriculture areas, these locations frequently dominate the landscape. Particularly in areas characterized by disturbed sandy soils and limited rainfall, it is believed to indicate over cultivation. Calotropis gigantea tends to thrive in habitats where competition is minimal.

The plant of this species can be found in areas with excessively drained soil where yearly precipitation can reach up to 2000 mm and in arid habitats where rainfall is restricted to 150 to 1000 mm. It can also be found in typical habitats including roadside sand dunes, seashore dunes, and heavily populated urban areas. At an elevation of up to 1000 meters above sea level, *C. gigantea* is also known there. As it is relatively easy to cultivate, propagate and could even flourish under xerophytic conditions the plant is at times planted ornamental, specially in dry or coastal places.

*C. gigantea* is originally native in Southern Asia and Indo-China, also Madagascar, Arabian Peninsula, West Africa, North and East Africa, Macronesia, and south Asia, Australia, Central America, North America, South America and the West Indies all have the plant as a native species. Today, several countries, of which include nations in Mexico, Central and South America, the Pacific Islands, Australia, and the Caribbean, embrace and grow the plant.

#### Features :

- The plant thrives in a variety of soil types and climatic environments.
- It does not require cultivation practices.
- It is one of the few plants that grazing animals do not eat.

- Particularly where overgrazing has eliminated competition from natural grasses, it thrives on poor soils.
- Consequently, it is found in tropical and the world sub tropical regions, including everywhere in India.

### **Therapeutic uses:-**

- The juice of the plant was used in the antihelminthic and leucoderma, tumours, ascites, and disorder of the abdomen.
- The leaves are used to treat wounds and paralysed or painful joints and swellings.
- The milk is laxative, purgative, bitter and treats piles.
- The root bark is diaphoretic and treats syphilis and asthma.

### **Traditional use of Calotropis gigantea:-**

#### **1. In Ayurveda:-**

The leaves are used to treat **paralysis, swellings, and sporadic fevers, asthma, catarrh, anorexia, helminthic infections, inflammations and fever.**

The **root bark** is utilised for **ascities, intestinal worms, helminth infections, and skin infections.**

#### **2. In Siddha:-**

- The leaves are used for the treatment of **poisonous snake bites, periodic fever, ulcers.**
- The roots are thoroughly crushed and applied by vigorously rubbing over the bite region.
- The treatment of bronchial asthma with flowers.

#### **3. In Unani:-**

- The root bark powder used in the Unani system for getting relief to dysentery and diarrhoea.
- The root of the plant is carminative and useful in indigestion.

### **Chemical constituents :-**

- Studies on Calotropis phytochemistry have been a variety of different chemicals including Cardenolide, triterpenoids, alkaloids, resins and anthocyanins and proteolytic enzyme in the latex.
- Multiflorenol, cyclisadol, and terpenes are found in flowers.

#### **1. Leaves:-**

In the primary compounds are found in the leaves are Amyrin, amyirin acetate, urosolic acid, calotropin, cardenolides, calotropagenin.



**Latex:-**

The latex contains calotropin, calotoxin, calactin, trypsin, uscharin, voruscharin, uzarigenin, syriogenin and proceroside .



**2. Flower:-**

In the flowers containing polysaccharides containing D-arabinose, glucose, Glucosamine and L- rhamnose as well as flavanoids, sterol, calatoxin, queretin-3-ratinoside, calactin, calotropagenin, and calatropin.



**3. Bark:-**

Triterpenes, a novel nord terpenyl ester called calotropterpenyl ester two unidentified pentacyclic triterpenoids called calotropursenyl acetate and calotropfriedelenyl acetate, akundarol isovalerate, mundarol isovalerate, quercetin-3-rutinoside are all present in the root bark of calotropis gingantea.



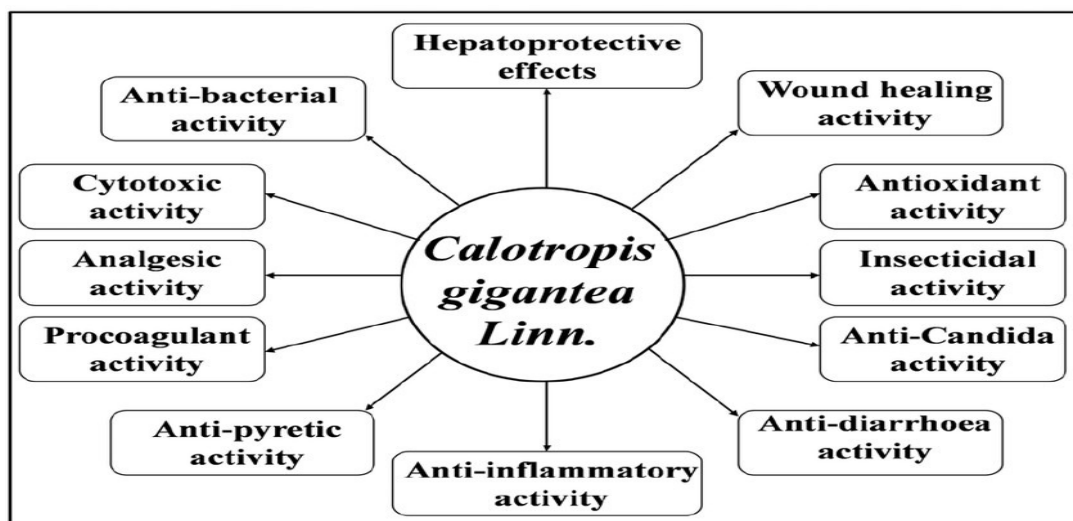
#### **Toxicity:-**



The plant has been shown to be harmful, and grazing animals avoid eating it. The tribal people have made poison arrows for use in hunting with the latex from the plant. The latex is extremely harmful to human eyes, causing toxicity that results in vision loss and photophobia.

Calotropis gigantea is thought to be even more dangerous than cobra venom and is the more toxic of the two. Both of these plants are members of the Asclepiadaceae family and exhibit similar chemical and physiological responses.

Uscharin, calotoxin, calactin, calotropin, and calatropin are the toxic principles. Due to its irritating, neurotoxic, and anticholinergic effects, milk can be poisonous and present in a number of lethal ways. An extremely poisonous substance, calatropin, is present in serum at 3% concentrations.

**Pharmacological profile:-****1. Antidiarrheal activity of calotropis gigantea :-**

Calotropis gigantea aerial part hydroalcoholic extract was tested against a rat model of castor oil induced diarrhoea for its anti-diarrheal effects.

The percentage of the longest distance the charcoal travelled divided by the entire length of the small intestine was used to calculate the gastrointestinal transit rate. Using the enteropooling method, the weight and volume of intestinal content induced by castor oil were measured.

All doses of 200 and 400 mg/kg body weight, the extract showed a significant decrease in faecal production and dropping frequency (interpretive dose). The weight and volume of intestinal content were significantly inhibited by the extract.

**2. CNS activity of calotropis gigantea:-**

Oral administration of an alcoholic extract of the peeled roots of calotropis gigantea was studied for CNS activity at 250 and 500 mg/kg body weight. Both the Eddy's hot plate method and acetic acid- induced writhings showed considerable analgesic effects.

Both the onset and severity of pentylenetetrazole-induced were delayed, indicating significant anticonvulsant efficacy. Rats are given the extract more than in the open arm of the EPM. Demonstrating the extract's anti-anxiety properties. The activity of the locomotor system decreased. The motor coordination fall off period was also shortened. Due to the extract's sedative effect, it was shown the pentobarbitone- induced sleep was potentiated. No deaths were reported up to the dose of 1g/kg. These findings demonstrate the extract's analgesic, anticonvulsant, anxiolytic, and sedative effects.

**3. Analgesic activity of calotropis gigantea:-**

Calotropis gigantea flower alcohol extract was taken orally and tested for analgesic efficacy in mice using chemical and thermal models. At dosage of 250 and 500 mg/kg. Respectively, in the acetic acid- induced writhing test, an inhibition of 20.97% and 43.0% in the number of writhes was seen.

The paw licking period was prolonged in the hot plate approach. The analgesic impact was noticed 30 minutes after the dose was administered. And it peaked 90 minutes later. This study

assessed the analgesic potential of dry latex from, *calotropis gigantea* compared to an oral dose of aspirin (100mg/kg) the impact of DL at a dose of 415 mg/kg against acetic acid writhing was more pronounced. In the tail-flick model, DL(830 mg/kg) caused negligible analgesia that was comparable to aspirin.

#### **Need of the study/ Scope of the work:-**

**1. Anti-bacterial activity:-** The leave extract of *calotropis gigantea* were screened for its anti-bacterial and phytochemical activity.

**2. Anti tumor activity:-** The methanol extract of *calotropis gigantea* root bark and its chloroform soluble fraction possesses significant anti tumor activity.

**3. Cytotoxic activity:-** *Calotropis gigantea* and investigate preferential cytotoxicity of the insect extract, if any, on human cancer cell lines. Comparative chemical characterization by HPTLC, UV and IR studies revealed the presence cardenolides in both the extracts and biotransformation of some of the ingested cardenolides in the insect extract.

The ethanolic root extract of *calotropis gigantea* exhibits potent cytotoxic property comparable to that of standard drug. Therefore, this might be utilized for the development of novel anti cancer drug leads.

#### **Conclusion:-**

Studies on ethnomedicine have drawn a lot of interest recently since they highlight the many unknown and under utilised medicine benefits, particularly those originated from plants. Pharmacological analysis of *calotropis gigantea* demonstrated its therapeutic potential and established it as a valuable medicinal plant with a number of therapeutic qualities. The creation of contemporary pharmaceuticals from *calotropis gigantea* can be highlighted for the control of numerous disorders. As pharmacologists are eager to generate novel medications from natural sources. For the protection of *calotropis gigantea* and the creation of products for its better economic and medicinal application, a comprehensive research and development effort should be made.

#### **References:-**

1. Sureshkumar P, Chezian A, Senthil Raja P and Sathiyapriya J; Computational selections of terpenes present in the plant *Calotropis gigantea* as mosquito larvicides by blocking the sterol carrying protein. *Bangladesh J Pharmacol*, 2012,7;1-5,(sajp).
2. Gamble J S ; Flora of the Presidency of Madras , Vol 1,2,3, botanical survey of India , Calcutta ,1935,(sajp).
3. Singh , U.,A.M. wadhvani, and B.m. Johri,1996. Dictionary of Economic Plants of India. Indian Council of Agricultural Research, NewDelhi, p , 38-39,Rastogi,Ram, 1991.
4. Gamble JS; Flora of the presidency of Madras , Vol – 1,2,3, Botanical survey of India, Calcutta,1935.
5. Vaidya A: *Pharm Res. India ( Pharma Pulse – Suppl)*,1998; 44-45.
6. Haslam EJ and Nat: *Prod.* 59, 1996;205-215.
7. Yelne MB, Sharma PC, Dennis TJ, Database on medicinal plants used in ayurveda, central council for research in ayurveda and siddha, NewDelhi; Vol. 2,69-73(2000).
8. Chitme HR , Chandra R, Kaushik S, Studies on anti-dairrhoeal activity of *Calotropis*.
9. Sharma AP and Tripathi BD; Assessment of atmospheric PHAs profile through *Calotropis gigantea* R.Br. leaves in the vicinity of an Indian coal-fired power plant , *Environ Monit*

Assess, 2009,149;477-482.

10. Gamble J S., flora of the presidency of madras, vol.1,2,3 botanical survey of india, Calcutta,1935.
11. Ahmed KK, rana AC, disit VK. Calotropis species (Ascelpediaceae) : A comprehensive review. Pharmacogn Mag 2005.,1:48-52.
12. Parrotta GA. Healing plants of peninsular india. Wallingford, UK and New York:CAB International 2001.p.944.
13. Smith NM. Weeds of the wet-dry tropics of Australia-A field guide, evaron center NT 2002, 112:28-9.
14. Oudhia P,kolhe SS and tripathi RS, legume Res., 1997, 20(2):133-136.
15. Smith NM; Weeds of the wet/ dry tropics of Australia – a field guide, environment centre NT, 2002: 112.
16. Sharma AP and Tripathi BD; assessment of atmospheric PAHs profile through Calotropis gingantea R.Br. Leaves in the vicinity of an Indian coal – fired.
17. Parrotta JA Healing plants of peninsular india. Walling ford, UK and Newyork: CAB International;2001.p. 945.
18. Kirtikar KR and basu BD : Indian medicinal plants, volume 3, 1995, National book Distributors, Dehradun 1607 – 1609.
19. Anonymous : “ The wealth of india”, Volume 3, Publications and informations directorate, CSIR, Delhi 1998; 78.
20. AI- Yahya MA, AI-Meshal IA Mossa JS, AI Badr AA, Tarig M. Saudi plants : A Phytochemical and biological approach. Riyadh : King Saud University Press, Page 31-34 (1990).