



## “Review on : *CALOTROPIS GIGANTEAN*”

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**Abstract:** Calotropis gigantean ( crown flower ) commonly called as Madar, Rui, and aak is a milkweed available in india, Bangladesh and Shrilanka, China. Calotropis gigantean is weed plant commonly known as giant milk weed the plant is belonging to Apocynaceae family which include latex bearing plant. Calotropis gigantea is known as various medicinal properties in Ayurveda system and use to cure a variety of disease. Plant is reported for analgesic activity, antimicrobial activity, antioxidant activity, anti-pyretic activity, insecticidal activity, cytotoxicity activity, hepatoprotective activity, pregnancy interceptive properties, purgative properties, procoagulant activity and wound healing activity. The plant mainly contain phenolic, terpenoids and flavonoids. It was observed that the methanolic extract of leaves show the effective absorption ultraviolet light at 200nm to 400nm by using UV visible spectrophotometer. This could be helpful for the formulation of anti UV dermatological application.

**Keyword :** Calotropis gigantean, madar, Flavonoids, rui, aak, Anti UV, Etc.

### 1. INTRODUCTION

In many places of the world, including india from ancient times to the current age , plant, animals, and other natural items have had a significant impact on human culture and civilization. Since the dawn of civilization , people have revered plants , which are now protected as genetic resources and used for food, fibre, fuel, fertilizer, and a variety of purposes.[1] in antiquated ayurvedic medication the plant Calotropis gigantea is known as "Sweta Arka" and Caotropis procera.[2] The systematic

position, vernacular names, vegetative characters of the plant are given in the following Tables.

<b>Kingdom</b>	Plante
<b>Order</b>	Gentianales
<b>Family</b>	Asclepiadaceae
<b>Sub-family</b>	Asclepiadoideae
<b>Genus</b>	Calotropis
<b>Species</b>	Gigantea

The plant grows very well in variety of solid and different environmental condition it does not require cultivation practices. It is one of the few plant not consumed by grazing animal.

It thrives on poor solid particularly where overgrazing has removed competition from native grasses.

Sometimes this plant is the only survivor in some areas where nothing else grows. It is drought tolerant and the pioneer vegetation in dessert soil.

Presence of latex extensively branched root system and thick leaves with waxy coverage are the xerophytic adaptation. Hence it is distributed in tropical and subtropical area of the world and throughout India.

In the description of plant in Unani Syastim Of Medicine Dioscorides (78A.D.) has mentioned Calytropis gigantean in his noteworthy book “kitabul- Hashaish”.[3] it is thorny tree with broad leaf and at the site of flowers and stem it oozes milk which is called as “sukr” which is also obtained from different part of plant. The wood is fragile, delicate and leaves are soft. In some part of the world the milk is used in leather cleaning.[4] In Makhzan-al-Advia.

There are three varieties of Madar:

a) White flowers, large leaves, and much milky juice. It is found near towns and the habitations of man.

b) Smaller with small leaves, the flowers are white externally lilac within

c) Smaller plant, with pale yellowish green flowers.[5]



### **Vernacular Names[6]:**

- 1.Common names: Giant Milkweed, Crown Flower, Swallon Wort
- 2.Hindi: Safed aak, Aak,Alarkh, Madar, Sveta Arka,Akanda, Bara Akand.
- 3.Gujarati: Aakando.
- 4.English: Crown Flower, Giant Indian Milkweed,Bowstring hemp, crownplant, madar
- 5.Malaysia: Remiga, rembega, kemengu.
- 6.Indonesia:Bidhuri (Sundanese, madurese), sidaguri9Javanese), Rubik(Aceh).
- 7.Philippines:Kapal-kapal(Tagalog)
- 8.Laos: Kok may,dok kap,dok hok.
- 9.Thailand: Po thuean, paan thuean (northern) ,rak (central)
- 10.Vietnam: B[oot]ng B[oot]ng, I[as]hen, nam T[it]B[at]
- 11.French: Faux arbre de soie, mercure vegetal.

### 3 Pharmacology activities

#### 3.1 Analgesic activity

The alcoholic extract of the flowers of *Calotropis gigantea* was reported for analgesic activity in chemical and thermal models in mice. The analgesic activity was performed by acetic acid induced writhing test and hot plate method. Oral dose of ethanolic extract of *C. gigantea* flower produced a significant decrease in the number of writhings and delay in paw licking time.[7] The CNS activity of alcoholic extract of peeled roots of *C. gigantea* was tested in albino rats. Analgesic activity was observed in Eddy's hot plate method and acetic acid induced writhings. Oral dose of the extract significantly delayed the paw licking time and the numbers of writhings were greatly reduced.[8]

#### 3.2 Anti viral activity

(+)-pinoresinol 4-O-[6-O-vanilloyl] is a new lignin glycoside isolated from the latex of *Calotropis gigantea*-β-D-glucopyranoside (1), as well as two known phenolic compounds, 6-O-vanilloyltachioside (2) and 6-O-vanilloylisotachioside (3), and one authentic compound, (+) pinoresinol 4-O-β-D-glucopyranoside, were screened for A/PR/8/34 (H1N1) inhibitory activity in MDCK cells using the cytopathic effect. The CPE inhibition assay was used to test its in vitro inhibitory activity against a panel of human and avian influenza viruses. It had an inhibitory effect on both subtypes A and B of human influenza viruses. Furthermore, a plaque reduction assay demonstrated its activity against human influenza viruses

subtype A. Compound 1 exerts its antiviral activity at the early stages of viral replication according to the time course suggested by the assay. Compound 1 effectively inhibited influenza virus-induced activation of the NF-κB pathway in a dose-dependent manner, but had no effect on virus-induced activation of the Raf/MEK/ERK pathway, according to a mechanistic analysis. Further research revealed that 1 effectively prevented nuclear translocation of the transcription factor NF-κB caused by the influenza virus, as well as nuclear export of viral ribonucleoproteins.[9]

#### 3.3 Antimicrobial activity:

Aqueous, methanol, ethanol and petroleum ether extracts of the leaves of *Calotropis gigantea* were reported to possess anticandida activity against clinical isolate of *Candida albicans*, *Calotropis gigantea*, *C. tropicalis* and *C. krusei*. [10] The aqueous extract of leaves of *C. gigantea* was reported to possess antibacterial activity against *Staphylococcus aureus*, *Escherichia coli*, *Bacillus cereus*, *Pseudomonas aeruginosa*, *Micrococcus luteus* and *Klebsella pneumonia*. [11] The aq. Extract of the latex of *C. gigantea* was reported to exhibit significantly inhibitory effect on *S. aureus*, *B. cereus*, *E. coli* and *C. krusei*. [12]

Antifungal activity of *C. gigantea* was reported against plant pathogenic fungi like *Fusarium mangiferae*, that causes serious threat in mango cultivation. [13]. Alam et al. (2008) reported the antibacterial activity of methanol extract from the root bark of *Calotropis gigantea* and its petroleum ether, chloroform and ethyl acetate fraction. Both of methanol extract and its chloroform fraction showed activity against *Sarcina lutea*, *B. megaterium* and *P. aeruginosa*. Petroleum ether

fraction showed activity against *B. subtilis* and *Shigella sonnei*, where as ethyl acetate fraction showed activity against *P.Aaeruginosa* and *E.coli*[14].

### 3.4 Anticancer Activity:

*Calotropis gigantea* produces specialized secondary metabolites known as cardenolides, which have anticancer and antimalarial properties. GM Hoopes, in his research, produced a high-quality de novo assembly for *C. gigantea*, representing 157,284, 427 Bp with a N50 scaffold size of 805, 959 BP, with quality assessments suggesting a near complete representation of the genomic space. To help in the annotation and construction of a gene expression atlas, transcriptome data in the form of RNA-sequencing libraries from a developmental tissue series was created. 18 197 high-confidence genes were annotated using an ab initio and evidence-driven gene annotation pipeline.[15] Treatment with anhydrosophoradiol-3-acetate (A3A) isolated from the flower of *calotropis gigantea* decreased the viable tumor cell and body weight gain, altered hematological (Hb, RBC and WBC) and biochemical parameters more or less to normal level there by increasing the life span of Ehrlich's ascites carcinoma bearing mice. Results of this study conclude that in vivo, the A3A was effective in inhibiting the growth of EAC with improving in cancer induced complication.[16].

### 3.5 Antioxidant:

Antioxidant play important role by prevent the formation of reactive oxygen species by reducing hydroperoxides and scavenging free radicals. Antioxidant activity may be due to compound such as flavonoids, isoflavones, flavones, vitamin C, and

E and beta carotene. In phenolic antioxidant activity due to their redox potential which allow them to act as hydrogen donors, singlet oxygen quenchers, and metal chelators. Methanol extract of *Calotropis gigantea* was found to highest antioxidant potential in comparison to other extracts. Methanol extract of *C. gigantea* showed the maximum anti bacterial activity against the tested bacterial strains. FTIR analysis of plants extracts indicates the presence of phenolic compounds, alkanes, carboxylic acid, aldehydes, aliphatic and aromatic amines, allene, sulfoxides, phenyl ester nitro compound and imines. GC-MS analysis of *calotropis*. Procera aq. Extract showed the presence of R-limonene, mannosamine, tridecane, 1-bromo, 2-propenoic acid, tridecyl ester, pentriacontane and 1-hexacosene as major phytochemicals. *C. gigantea* methanol extract indicated the presence of hentriacontane, eicosane, 3,3-dimethylnonadecane, pentacosane and colocoltone as major phytochemicals [17]. The different fraction of methanolic extract of leaf of *C. gigantea* was tested for antioxidant activity using 1,1 Diphenyl-2-picryl hydrazyl radicals by yogi et al (2011). The extract of *calotropis gigantea* exhibited that fraction F3 of chromatographic elutes of methanolic extract having IC<sub>50</sub> 82 + 5.23 mg/ml showed potent antioxidant activity comparable to standard ascorbic acid (IC<sub>50</sub> 69.13 + 4.08 mg/ml). This study suggests that leaves of *calotropis gigantea* have bioactive compounds for a new antioxidant drug development greater capacity to scavenge DPPD radical where as leaf extract showed moderate free radical scavenging activity.[18,19]

### 3.6 Wound Healing activity:

Wistar albino rats of either sex weighing 180-200 g were topically treated with extract formulated in ointment using simple ointment BP as a base. In an excision wound model, a 5% (w/w) ointment was used once a day. Incision and dead space wound healing models were treated with ethanolic extract of *Calotropis gigantea* at doses of 100, 200, and 400 mg/kg. A 5% regular classes. On full epithelization, the percentage wound closure; epithelization duration, hydroxyproline content, and scar area were assessed. The percentage wound contraction was increased when *Calotropis gigantea* was added topically to an excision wound model. Scar area and epithelization time were decreased. In incision wound and dead space wound breaking strength of wounds and hydroxyproline was increased. The size of the scar and the time it took for it to heal were both reduced. The breaking strength of wound and hydroxyproline were increased in incision wound and dead space wounds.[20]. Using excision and incision wound models, *calotropis gigantea* latex demonstrated wound healing activity in albino rats. When compared to controls, latex-treated animal had an 83.42% reduction in wound area. The norm was 1% w/w framycetin sulphate cream. When opposed to controls, wound treated with the extract epithelized faster. The breaking power of granulomas increased significantly ( $p < 0.001$ ) [21].

### 3.7 Anti-diarrhoeal activity:

The hydroalcoholic (50:50) extract of aerial part of *C. gigantea* was studied for anti-diarrhoeal activity against castor oil-induced diarrhea model in rats. The extract exhibited significant reductions in fecal output and frequency of droppings at the doses of 200 and 400 mg/kg body

weight. The extract also showed significant inhibition in weight and volume of intestinal content.[22]

### 3.8 Anti-inflammatory

Ethanol extract of *C. gigantea* was reported for the anti-inflammatory activity against carrageenan-induced paw edema in Wistar albino rats. The oral administration of 400 mg/kg of *C. gigantea* showed significant anti-inflammatory activity, the activity was found more than that of 100 mg/kg of Ibuprofen.[23]

### 3.9 Vasodilation Effect:

Effect of latex from *calotropis gigantea* in the green frog *R. hexadactyla* showed a significant increase in cardiac output. Evidence suggests the prime action of latex on the cardiovascular system involves changes in the cation ( $\text{Ca}^{2+}$ ,  $\text{Na}^{+}$ ) permeability, with consequent excitation of  $\text{Ca}^{2+}$  channel in the heart muscle and an increase in coronary flow. Therefore, dilatation property is likely responsible for the pharmacologic action of the latex[24].

### 3.10 Other uses includes

Asthma, Abortifacient, Analgesic And Antinociceptive activity, Antifertility and Antifertility And Emmenagogue,[25] Anti-inflammatory Activity, Anthelmintic Activity,[26] Anti Cancer Activity, Anti Dote For Scorpion Stings And Insect Bites, Anti Tumor Activity,[27] Anti-Diarrheal And Anti Dysentery Activities, Antimicrobial Activity,[28] Antiviral activity, Anxiety And Pain CNS Activity,[29] Cold, Expectorant, Cytostatic Activity,[30] Cytotoxic activity,[31] Dyspepsia, Eczema,[32]

Elephantiasis,[33] Epilepsy, Expectorant,[34] Fever, Fibrinolytic Activities,[35] Free Radical Scavenging Activity, Healing The Ulcers And Blotches, (Goat) Motility Of Mature Haemonchus Contortus Of Goat Origin, Indigestion, Kesarayer Disease, Leprosy, Liver Injuries As Well As On Oxidative Stress, Hepatoprotective,[36] Mental Disorders, Molluscicidal Activity, Whole Plant, Migraine, Nasal Ulcer,[37] Laxative, Rheumatoid Arthritis,[38] Bronchial Asthma, Diabetes Mellitus, Nervous Disorders, Piles, Pregnancy Interceptive Activity, Purgative, Removing Anemia, Rheumatism, Ringworm Of The Scalp[39], Secondary Syphilis, Gonorrhoea, Ascites, Helminthiasis, And Jaundice,[40] Skin Diseases, Spleen Disorder, Swelling And Inflammation In Sprain TB And Leprosy, Uterus Stimulant, Vermicidal Activity, Camel Diseases Treatment, Worms, Wounds And Ulcers, Arrow Poison, Latex, Biocidal Activity Latex, Biogas And Substitute For Petroleum Products, [41]Whole Plant, Brewing And To Curdle Milk The Bark And Latex, Cleansing Water Leaves And Its Saps, Energy Plantation,[42]Whole Plant, Fibers Bark, And The Silky Hairs From Its Seeds, Fodder Young Pods, Senescing Leaves And Flowers, Fungicidal,

Insecticidal Properties, Pest Repellent Twigs And Leaves, Etc.[43]

## Conclusion

The plant *Calotropis gigantea* is a plant with many curative principles and other economic values with the following features: a perennial shrub, distributed up to 900m elevation in the tropical and subtropical areas, growing in all types of solid and environmental condition, requiring no cultivation practices. As a hydrocarbon rice plant this plant needs more investigation on the aspect of energy conversion. The quality and quantity of the active principle which are important for many ailments are subjected to many factors such as climate, soil, etc. In this way standardization of the phytochemicals by these factors are very important to establish the uses of the plant more effectively.

In conclusion, the present manuscript may be useful to supplement information with regard to its identification and in carrying out further research of its use in the treatment of various diseases.

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