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## Review Article

### CALOTROPIS GIGANTEA A REVIEW PAPER

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#### ABSTRACT

Calotropis gigantea is used as a traditional medicinal plants. Calotropis is reported to exhibit mosquito controlling properties against some variety of mosquitoes. This review to provide a detailed study of Taxonomic rank, Vernacular names, Origin, Geographical and Morphological distribution, Propagation and Planting, Phytochemicals, Medicinal values and other uses of the plant.

#### Key Words:

Calotropis gigantea, Traditional,  
Taxonomic rank, Propagation,  
Phytochemicals.

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#### INTRODUCTION

*Calotropis gigantea* (crown flower) is a species of *Calotropis* native to Cambodia, Indonesia, Malaysia, the Philippines, Thailand, Sri Lanka, India, China, Pakistan, Nepal, **Booc Booc** in Somalia and tropical Africa. (Bingtao Li 2015 ). This plant plays host to a variety of insect and butterflies. It is the host plant for Hawaii's non-migratory monarch butterflies.( Butterfly Society of Hawaii.org). *Calotropis* is an example of entomophily pollination (pollination by insects) and pollination is achieved with the help of bees. Since ancient times, plants have been a variable source of drugs; mantends to ignore the importance of herbal medicine.(Sofowora A. 1982). *Calotropis gigantea* is a well known medicinal herb commonly known as *Madar* has been used in Unani, Ayurveda, and Siddha system of medicine for years.(Singh U, Dictionary of Economic Plants of India New Delhi:I.) All parts of this plant are used as medicine in the indigenous system of Ayurvedic medicine (Warrier, P.K., *et al.*,1994).It is commonly known as milk weed (or) crown flower weed. calotropis gigantean is latex bearing plants and releases the latex after a tissue injury. This milk weed plant gained importance in recent years as a potential pesticidal source against insect pests. ( Meshram, P.B. 1995). Plant latex is a mixture of alkaloids, tannins, gum, sugars, starch, resins and proteins. (Abraham KI, *et al.*,1979). This plant was widely used by all sections of the society directly as folk remedies or indirectly as pharmaceutical

preparation of modern medicine. (Bhagwati U.,2003). Indian medicinal plants describe the use of this plant in the treatment of number of ailments including anorexia, asthma, cold and cough. Roasted leaves is useful in painful joints or swellings.(Chatterjee A, 1995), (Vaidyaratnam PS. 2002) (The Wealth of India,1998). *C. gigantea* is reported to exhibit mosquito controlling properties against *Culex gelidus* and *Culex tritaeniorhynchus* mosquitoes which serve as vectors for Japanese encephalitis. The aqueous extract of the *C. gigantea* leaves demonstrated significant larvicidal, repellent and ovicidal activity (Kumar G 2012). This review to provide a detailed study of Taxonomic rank, Vernacular names, Origin, Geographical and Morphological distribution, Propagation and Planting, Phytochemicals, Medicinal values and other uses of the plant.

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Fig 1 calotropis gigantea

#### Taxonomic rank

<b>Kingdom</b>	: Plantae
<b>(unranked)</b>	: Angiosperms
<b>(unranked)</b>	: Eudicots
<b>(unranked)</b>	: Asterids
<b>Order</b>	: Gentianales
<b>Family</b>	: Apocynaceae
<b>Sub Family</b>	: <i>Asclepiadoideae</i>
<b>Genus</b>	: <i>Calotropis</i>
<b>Species</b>	: <i>C.gigantea</i>

#### Vernacular Names

##### India

(Sanskrit) Arka, Ganarupa, Mandara, Vasuka, Svetapushpa, Sadapushpa, Alarka, Pratapass, (Hindi) Aak, Madar, Kannada Ekka, (Tamil and Malayalam) Erukku, (Telugu) Jilledi Puvvu

##### Malaysia

Remiga, rembega, kemengu.

##### English

Crown flower, giant Indian milkweed.

##### Indonesia

Bidhuri (Sundanese, Madurese), sidaguri (Javanese), rubik (Aceh)

##### Philippines

Kapal-kapal (Tagalog).

##### Laos

Kok may, dok kap, dok hak.

#### Thailand

Po thuean, paan thuean (northern), rak(central).

#### Vietnam

B[oot]ng b[oot]ng, l[as] hen, nam t[it]b[at].

#### French

Faux arbre de soie, mercure vegetal

#### Origin and Geographical Distribution

*Calotropis gigantea* is native to continental Asia and South-East Asia and has been introduced in the Pacific Islands, Australia, Central and northern South America and Africa etc. It is a fast growing perennial plant and distributed in tropical and subtropical area of the world and throughout India. The plant grows very well in a variety of soils and different environmental conditions. *Calotropis* is drought resistant, salt tolerant to a relatively high degree, grows wild up to 900 meters (msl) throughout the country (Sharma AP *et al.* 2009) and prefers disturbed sandy soils with mean annual rainfall. It does not require cultivation practices which is one of the few plants not consumed by grazing animals. (Oudhia P *et al.*1997).

#### Morphology and Distribution

*Calotropis procera* and *Calotropis gigantea* Linn. Both the species closely resemble each other in structure and find similar uses (Kirtikar *et al.*, 1994). *Calotropis gigantea* Linn is a glabrous or hoary, laticiferous shrubs or small trees, about 3-4 m tall commonly known as the swallow-wort or milkweed. The leaves are broadly elliptical to oblong-obovate in shape, with the size of 9-20 cm x 6-12.5 cm but sub sessile. The cymes are 5-12.5 cm in diameter. The inflorescence stalk is between 5-12 cm long, the stalk of an individual flower is 2.5-4 cm long. Sepal lobes are broadly egg shaped with a size of 4-6 mm x 2-3 mm. Petal is 2.5-4 cm in diameter. It has clusters of waxy flowers that are either white or lavender in color. Each flower consists of five pointed petals and a small, elegant "crown" rising from the centre, which holds the stamens. Flowers are almost throughout the year but most commonly from November to March in central India (Jagtab V.A., 2010). The plant has oval, light green leaves and milky stem (Carol *et al.*, 2012).

#### Propagation and Planting

*Calotropis gigantea* can be propagated by seed or stem cuttings. The seeds are dispersed by wind and water and primarily pollinated by bees, butterflies and wasps. It can also be multiplied by tissue culture methods such as cell suspension cultures. Natural regeneration is very common. Vegetative propagation through stem and root cuttings is very useful in large scale multiplication of the superior genotypes.

#### Phyto Chemicals of C.G

Chemical investigation of this plant has shown the presence of cardiac glycosides, saponins, flavonoids, steroids, terpenoids (Seniya, C., *et al.*, 2011), Cardenolide calotropin (Kupchan SM., 1964),  $\alpha$ -amyirin,  $\beta$ -amyirin, taraxasterol,  $\beta$ - sitosterol,  $\alpha$ -amyirin methylbutazone,  $\beta$ - amyirin methylbutazone,  $\alpha$ -amyirin acetate,  $\beta$ -amyirin acetate, taraxasteryl acetate, lupeol acetate B, gigantursenyl acetate A, gigantursenyl acetate B (Habib RM., *et al.* 2007), (Sens.S., *et al.*,1992) flavonol glycoside,

akundarol, uscharidin, calotropin, frugoside, calotroposides A to G (Crout DHG, *et al.*, 1963) are responsible for many of its activities. calactin, calotoxin, calotropagenin, proceroside, syriogenine, uscharidin, uscharin, uzarigenin and voruscharin (Brischweiler F, *et al.*, 1969), (Singh B, *et al.*, 1972), (Lardon A, *et al.*, 1970) Flavonoids, triterpenoids (Pal G, *et al.*, 1980), alkaloids, glycosides, saponins, terpenes, enzymes, alcohol, resin, fatty acids and esters of calotropeols (Seiber JN, *et al.* 1982), cardiac glycosides, calotopin, uscharin, calotoxin, calactin, uscharidin and gigantin. protease calotropin DI and DII and calotropin FI and FII (Dhivya *et al.*, 2013). volatile long chain fatty acids, glycosides and proteases (Kitagawa I, *et al.*, 1992) have been isolated from the various parts of the plant *Calotropis gigantea*.

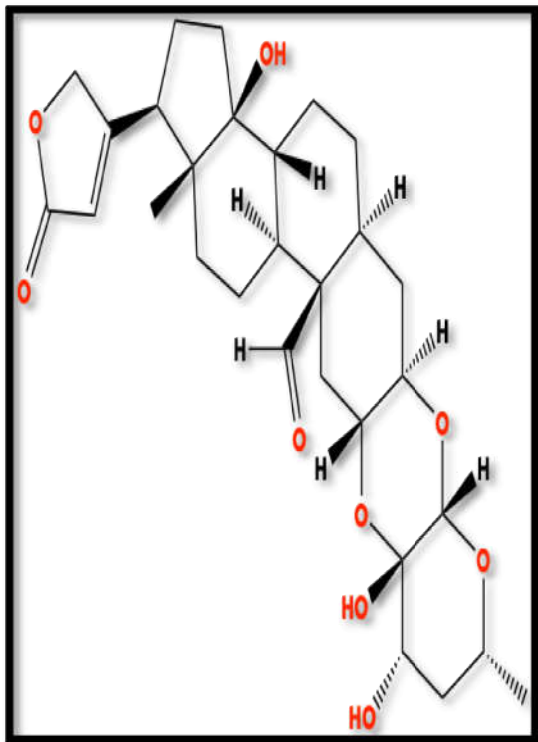


Fig 2 Calotropin

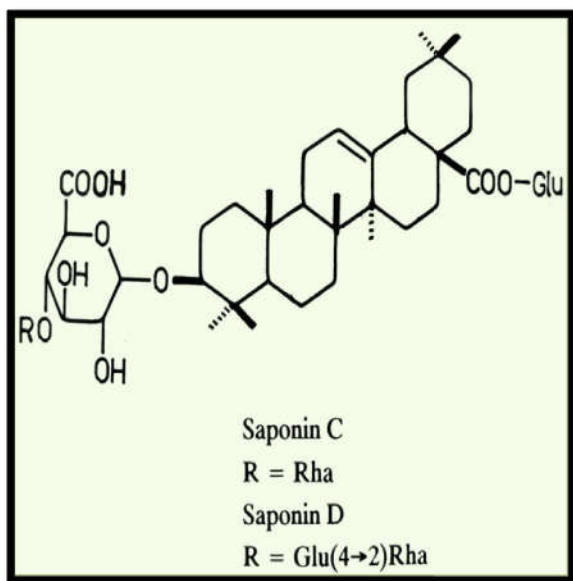


Fig 3 Saponin

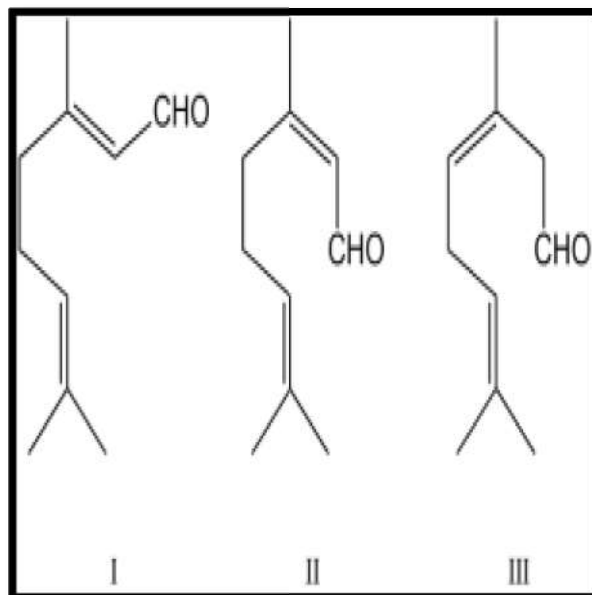


Fig 4 Terpenoids

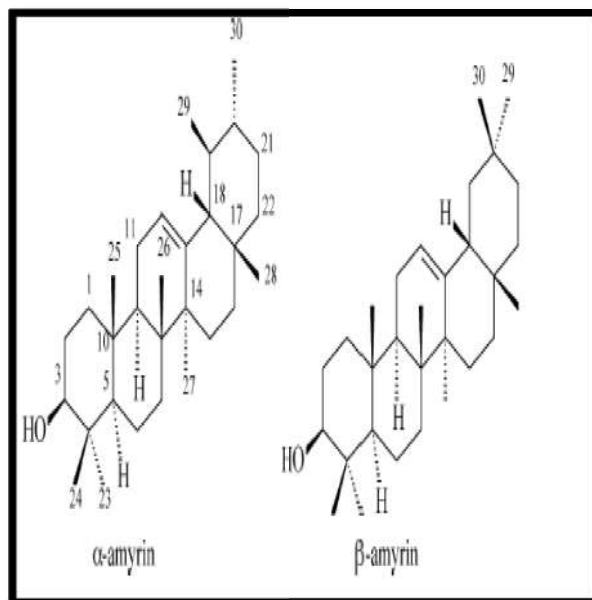


Fig 5  $\alpha$ -amyrin and  $\beta$ -amyrin

### Medicinal Value

*Calotropis* is used as a traditional medicinal plant with unique properties. The plants are widely used in the Ayurveda, Unani and Afghan medicines to treat several diseases, namely tumors, leucoderma, ulcer, piles, leprosy, dysentery, asthma, spleen and liver. (Kiritikar K, 1987), (Bairagi SM, *et al.*, 2014). Different parts of the plant are used for the treatment of several diseases such as stem for skin disease, intestinal worms, leprosy, leucoderma; the roots are used for the treatment of leprosy, asthma, cough, elephantiasis, rheumatism and diarrhea; latex and leaves are used for swelling and joint pain; oil massage can be used for paralyzed part; juice of *Calotropis* was used for purgation. (Evans WC, 2005). The flowers are bitter, digestive, astringent, stomachic, anthelmintic, and tonic (Agharkar 1991; Warriar *et al.* 1996). The fruit pulp is considered abortive (plantnet-project.org). *Calotropis* is also a reputed Homoeopathic drug (Ghosh 1988; Ferrington 1990). The milk obtained from the leaves and barks are useful in treating corn on skin permanently. Medicinal plants are used widely for the

encouragement of primary health care needs of the people existing in the rural areas (Kamboj, 2000). The traditional medicines were derived from the medicinal plants, minerals and other organic matters. But the herbal drugs are obtained from the medicinal plants alone (Sath SD, 2004). Today, traditional medical practice has been recognized by the world health organization (WHO) as a building block of primary healthcare. But it emphasizes the fact that safety should be the overriding criterion in the selection of herbal remedies for use in healthcare (Patil, S *et al.*, 2012).

#### **Side Effect of *Calotropis Gigantea***

In large doses, the drug causes nausea, vomiting and diarrhea. Prolonged higher doses cause headache, burning in micturition and leucorrhoea (Jagtab V.A, United State Department of Agriculture).

#### **Other Uses**

Each part of the plant contains distinct properties and is used for different purposes. *Calotropis gigantea* is sometimes used as fuel wood, but it is of poor quality. Which is reported to exhibit mosquito controlling properties against some variety of mosquitoes (Kumar G 2012). In Indo-China, charcoal from the wood was used in gun powder and fireworks. The leaves can be used for mulching, green manuring of rice fields and for binding sandy soil (plantnet-project.org). In Vietnam, *Calotropis gigantea* is planted as a hedge plant. In India, Thailand, the Philippines and Hawaii the long-lasting flowers of *Calotropis gigantea* are used in various floral arrangements in temples and in rosaries. It is also widely planted as an ornamental. In Indonesia its flowers are called *widuri*. According to *Shivpuran* (Hindu religion) the madar flower/crown flower is very much liked by Lord Shiva, therefore the crown flower and its garland are offered to Lord Shiva for peace, prosperity and stability in society. (freepressjournal). The Crown flower is also one of the major parts of the nine astrological trees (*Navagrah* tree). *Calotropis* yields a durable fiber commercially known as bowstring of India useful for ropes, carpets, fishing nets, and sewing thread. Floss, obtained from seeds, is used as stuffing. Crown flower cotton can also be used to make a pillow. *Calotropis* has been cultivated in South America and on the Caribbean Islands for the production of fibre. The Hawaiian Queen Liliuokalani, who considered them a symbol of royalty and wore them strung into leis.

#### **CONCLUSION**

*Calotropis gigantea* is generally distributed throughout India, which is used as a traditional medicine, Fuel, Ornamental, Fibre, Auxiliary plant, mosquito controlling etc. phytochemicals present in leaves of *calotropis gigantea* indicates their potential as a sources of principles that may supply novel medicines. Furthermore, isolation, purification and standardized of the phytochemicals found present will make studies more interesting.

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