ABSTRACT

Calotropis gigantea is a class of calotropis belonging to the family Apocynaceae. C. Gigantea is resident in Cambodia, Indonesia, Malaysia, the Philippines, Thailand, Sri Lanka, India, China, Pakistan, Nepal, BocBooc in Somalia and tropical Africa. This herb produced large amount of latex thus includes in latex bearing plants generally known as giant milk weed. C. Gigantean is known for a multiplicity of pharmacological properties in ancient medicinal system and utilizes to cure a various disease. From few decades, it is broadly studied for its pharmacological as well as medicinal properties by highly developed scientific techniques and various medicinal active compounds obtained from the different parts of the plant and this are analysed pharmacologically. The plant is reported for its various activities like: analgesic, antimicrobial, antioxidant, anti-pyretic, insecticidal, cytotoxicity, hepatoprotective, pregnancy interceptive properties, pro-coagulant activity and wound healing. Antivenom activity, CNS activity. The therapeutic properties of calotropis gigantean plant signify it as an important source of therapeutic compound. This study is combined information about the ethnobotany, pharmacology, phytochemistry and natural medicinal activities of the C. gigantea.

Keywords: Calotropis gigantea, Antimicrobial activity, Cytotoxicity, Ethnobotany, Phytochemistry.

INTRODUCTION

History:

Calotropis gigantea is an aive plant of India, China and Malaysia and distributed in the following countries: Afghanistan, Algeria, Antigua and Barbuda, Argentina, Australia Burkina Faso, Antilles, Arab Jamahiriya Bahamas, Barbados, Bolivia, Brazil, Cameroon, Chad, Cote d’Ivoire, Colombia, Cuba, Democratic Republic of Congo, Dominica, Dominican Republic, Egypt, Eritrea, Ethiopia, Ecuador, French Guinea, Grenada, Guadeloupe, Guatemala, Guyana Paraguay Haití, Gambia, Ghana, Honduras, India, Iran, Iraq, Israel, Jamaica, Kenya, Kuwait, Lebanon, Libyan, Martinique, Mexico, Montserrat, Mauritania, Morocco, Mozambique, Myanmar, Mali, Nepal, Niger, Nigeria, Netherlands Nicaragua, Oman, Pakistan, Panama, Peru, Puerto Rico, Saudi Arabia, Senegal, Somalia, Sudan, Syrian Arab Republic, St.Lucia, St Vincent, Surinam, Thailand, Tanzania, Trinidad Uganda, Uruguay, United Arab emirates, Vietnam, Venezuela, Yemen. (1)

Scientific classification: -

Kingdom : Planatae
Subkingdom : Tracheobionta
Superdivision: Spermatophyta  
Division: Magnoliophyta  
Class: Dicotyledones  
Subclass: Asteridae  
Order: Bicarpellatae  
Family: Apocynaceae  
Subfamily: Asclepiadaceae  
Genus: Calotropis  
Species: Calotropis gigantea

**Vernacular Names:**

- **Common names:** Crown Flower, Swallow Wort, Giant Milkweed, Bowstring hemp, crown plant, Crown flower, giant Indian milkweed, madar, remiga, rembega.
- **Hindi:** Aak, Alarkh, Akanda, Bara Akand, Safedaak, Sveta Arka, Madar.
- **Gujarati:** Aakando
- **English:** Bowstring hemp, crown plant, Crown flower, giant Indian milkweed, madar.
- **Malaysia:** kemengu, Remiga, rembega.
- **Indonesia:** Bidhuri, sidaguri, Rubik.

**Morphology and Distribution**

Calotropis gigantea is a minor tree or a shrub, 4–10 m tall. Its stem is straight, about 20 cm in diameter. The leaves are broadly elliptical in shape, with the size of 9–20 cm × 6–12.5 cm but subsessile. The inflorescence stalk is 5–12 cm elongated; the stalk of flower is 2.5–4 cm extended. Sepal lobes are broadly egg-shaped with a size of 4–6 mm × 2–3 mm. The diameter of Petal is 2.5–4 cm. The plant has bunches of waxy flowers that are either buff white or lavender in colour. Each flower contains of five pointed petals and a tiny, stylish "crown" rising from the centre. The plant has elliptical, light green leaves and milky stems. The petal parts are generally triangular 5–8 mm × 10–15 mm; they are cream and pale lavender coloured near the tips. Calotropis is drought resistant shrub, it is naturally grows up to 900 meters all over the country. It is a plant which is not consumed by animals. Herbs and plants have been in use as a source of therapeutically active compounds in old medicinal system since prehistoric time. There is a continuous needed of the growth of new effective antimicrobial drugs because of the coming out of new infectious diseases and drug resistance. The plant opposed to various communicable diseases and to the intense unkindsituation are partly recognized to the presence of hydrolytic enzymes of the latex especially proteases.

**Therapeutic activity**

<table>
<thead>
<tr>
<th>Species/plant parts</th>
<th>Compounds isolated</th>
<th>Therapeutic activity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Root bark</td>
<td>Milky sap extract, β-sitosterol, Sterols Giganticine Stigmasterol,</td>
<td>Anti syphilis, Purgative, anti-worm, insecticidal, antipyretic, contraceptive, anti-oxidant, Anticoccidial, anti-diarrhea, analgesic, anti-tumor, Anti metastatic, anticancer, Pro-coagulant Fibrigenolytic, Cytotoxic and antimicrobial, wound healing, anti-proliferative, Cytotoxic, anti-oxidant Toxic, pesticidal, anti-inflammatory myocardium, stimulatory effect on smooth muscle motility, Analgesic, antiplasmodial, anti proliferative, sedative, antipyretic Analgesic, anti-convulsant, anti arthrits, allergic, larvicial, anti-helminctic, ascarididal, Protective to oxidative stress and renal damage, insecticidal, schizontidal, anti-fungal, insecticidal, anti-oxidant anticancer, insecticidal, proteolytic activity, anti-mycoplasmal, anti-bacterial, Anthelmintic, antimicrobial, Wound healing activity, Asthma, CNS activity, A Novel Insect Antifeedant Non protein Amino Acid, antitumor, cytotoxic, Coagulant, hepatoprotective, ant venom</td>
</tr>
<tr>
<td>Latex of Flower</td>
<td>20-Epoxy-cardenolides Di-(2-ethylhexyl) phthalate Glyceryl mono-oeyetyl-2-phosphate Proceranol 2, Glyceryl-1,2-dicarboxylate-3-phosphate Procerusenyl acetate 1.Methyl myristate, 19-Nor-and18, 19-Nor- and 18,20-Epoxy-cardenolides, 16alpha-hydroxycal acetic acid methyl ester, 15beta-hydroxycardenolides</td>
<td></td>
</tr>
<tr>
<td>Leaves</td>
<td>Di-(2-ethylhexyl) Phthalate Anhydrosporadion-3-acetate</td>
<td></td>
</tr>
<tr>
<td>Flower</td>
<td>Calotropins DI, Calotropins DII</td>
<td></td>
</tr>
<tr>
<td>Dried Latex</td>
<td>Calotropin-F1 andCalotropin-FII 3'-methylbutanoates of α-amyrin, ψ-taraxasterol,</td>
<td></td>
</tr>
<tr>
<td>Roots</td>
<td>Calotropsiesterterpenol, Calotropbenzofuranone, Calotropone, Calotropisesjuiterpenol, Frugoside, Coroglaucigenin, Isorhamnetin-3-O-rutinoside, Isorhamnetin-3-O-Glucopyranoside Taraxasteryl acetate</td>
<td></td>
</tr>
<tr>
<td>Atrial parts</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pharmacological Activity</td>
<td>Part of plant used</td>
<td>Extract</td>
</tr>
<tr>
<td>--------------------------</td>
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</tr>
<tr>
<td>1) Anti diarrheal activity</td>
<td>Aerial parts</td>
<td>anti-diarrheal activity</td>
</tr>
<tr>
<td>2) Antimicrobial a) Anthelmintic</td>
<td>Roots</td>
<td>Aqueous and Alcoholic extract</td>
</tr>
<tr>
<td></td>
<td>Leaves</td>
<td>Aqueous, extracts</td>
</tr>
<tr>
<td></td>
<td>Leaves</td>
<td>aqueous extract</td>
</tr>
<tr>
<td>3) Procoagulant activity</td>
<td>Leaves</td>
<td>Aqueous, petroleum ether methanol, ethanol extract</td>
</tr>
<tr>
<td></td>
<td>Flower</td>
<td>ethyl acetate extract</td>
</tr>
<tr>
<td>4) Anti diabetic activity</td>
<td>root bark</td>
<td>petroleum ether, methanol extract, ethyl acetate and chloroform fractions</td>
</tr>
<tr>
<td></td>
<td>Latex</td>
<td>crude water extract of latex</td>
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<tr>
<td>5) Asthma</td>
<td>roots</td>
<td>methanolic extract</td>
</tr>
<tr>
<td>6) CNS activity</td>
<td>Peeled root</td>
<td>Alcoholic extract</td>
</tr>
<tr>
<td>a) Sedative and anxiolytic effects</td>
<td>Leaves</td>
<td>Alcoholic extract</td>
</tr>
</tbody>
</table>

**Reference**: [16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27]
b) anticonvulsant  
leaves  
various extracts  
MES induced seizures is abolishing HLTE (hind limb tonic extension) which is taken as the end point of the test rats  
anticonvulsant activity shown by extract

7) Hepatoprotective effects  
stems  
Ethanolic extract (50 %)  
Male Wistar albino rats  
extract has a significant effect on liver damageand on oxidative stress, causing in reduced lipid per oxidation and enhanced serum biochemical parameters like AST and ALT.

8) Analgesic activity  
flowers  
alcoholic extract  
thermal models in mice.

9) Pregnancy interective properties  
roots  
Extract by using Different organic solvents  
On the rats it show pregnancy interective effect

10) Antioxidant activity  
Leaves  
hydroalcoholic extract  
in-vitro models like DPPH (1,1-Diphenyl-2-Picryl-Hydrazyl)

11) Antitumor activity  
root bark  
Methanolic extract and it’s chloroform soluble fraction  
Swiss albino mice  
The extract also show 100% efficiency at the amount of 12.5 mg/kgdose when administered in the Days 1-5 and 1-7 post costume schedules.

12) Anti-pyretic activity  
roots  
water: ethanol (50:50) extract  
Typhoid vaccine and yeast induced pyrexia in Albino Swiss rats and rabbits

13) Cytotoxic activity  
Flower  
Crude ethyl acetate extract  
Ehrlich’s as cite carcinoma in mice.

a) Cytotoxic activity  
Roots  
ethanolic extract  
Allium cepa root meristem (ACRM) models  
This might be utilized for the growth of new anticancer drug leads

14) Anti venom activity  
extract  
methanolic extract  
Wistar albino rats, and Swiss albino mice  
From the Existing study confirms the strong anti snake venom effect of methanolic extract of C. gigantea.

15) Free radical scavenging activity  
leaf and latex  
ethanolic extracts  
DPPH radical 1,1-Diphenyl-2-Picryl-Hydrazyl radicals  
The latent extracts C. gigantean exhibited enhanced ability to scavenge DPPH radicals whereas leaf extract exhibited fair free radical scavenging activity.

16) Antitussive activity  
flower  
flower extract  
Albino Wistar rats, guinea pigs and mice  
The result exhibit importantantantifeedant effect beside nephys of the return locust Scistocercagregaria

17) A Novel Insect Antifeedant Non protein Amino Acid

1) Anti Diarrheal Activity: [10, 11]

The anti-diarrheal effect of aerial part of hydroalcoholic (50:50) extract of Calotropis gigantea on test rat induced-diarrhoea model in rats by Chitme H.R. concluded that The aerial part extract having the antidiarrheal activity but for the best results additional studies are necessary to completely know the mechanism of anti-diarrheal action of C. gigantea extract.

2) Antimicrobial Activity[12-19]

The Antibacterial effect of Calotropis gigantea leaf extract by using Well plate method against certain Gram positive (B. subtilis, M. luteus, S. aureus) and Gram negative (K. pneumoniae, P. vulgar and E. coli) bacteria was studied by Argal A result shown that dichloromethane and Ethyl acetate extracts exhibited better and broader spectrum of activity when compared to other extracts.

3) Wound Healing Activity [20-30]

The therapeutic activity of Calotropis gigantea root bark was studied for wound healing effect in rats was examined with the help of excision, incision and dead space wound healing models by Deshamukh P. T. and from the study he concluded that Calotropis gigantean enhanced the wound healing effect in rats.
4) Antidiabetic Activity [23, 24]

Fresh flowers of Calotrops gigantea plant were harvested and gathered early in the morning and macerated with liquid nitrogen and dissolved in PBS (pH 5) buffer to form aqueous fine flowers powder. He studied the activity on human blood sample and concluded that acidic proteases from Calotrops gigantea showed anti-diabetic activity.

5) Asthma [25]

Study has shown that methanolic extract of root tested on Male Wistar rats CGigantaeaproveved potential therapeutic drug for treating asthma owing to its anti-inflammatory, anti-lipoxygenase and antioxidant activity.

6) CNS activity [26-28]

The alcoholic extract of Calotrops gigantea peeled roots possesses sedative, anxiolytic, anti-convulsant and analgesic activity tested by Eddy’s hot plate method on albino rats but constituents responsible for activity are still unknown.

7) Hepatoprotective effects [29]

The hepatoprotective effect of calotrops gigantea stem ethanolic extract of on Wistar albino rats study showed that it the lower lipid peroxidation and enhanced serum biochemical parameters such as ALT and AST.

8) Analgesic activity [30]

The analgesic effect of flower alcoholic extract on thermal models in mice. He concluded that the flower produced significant decrease in the amount of jerk and stay in paw licking time.

9) Pregnancy interceptive properties [31]

The pregnancy interceptive activity of calotrops gigantean root extract was studied on rat to by Srivastava S. R. And from the results he concluded that The root extract exhibited 100% effectiveness at the dose of 12.5 mg/kg when administer in the Days 1-5 and 1-7 post-coitum schedules.

10) Antioxidant activity [30]

The leaves hydrochloric extract studied on in-vitro models like DPPH (1,1-Diphenyl-2-Picryl-Hydrazyl) free radical scavenging effect. The study shows that the antioxidant activity of the calotropsigianateae extract was found to enhance with increasing of the concentration.

11) Antitumor activity [32]

The antitumor activity of the methanolic extract of root bark tested on Swiss albino mice for and concluded that C. gigantea root bark Methanol extract and its chloroform soluble portion possesses significant antitumor activity.

12) Anti-pyretic activity [38]

The Water: ethanol extract of root was studied on yeast and typhoid vaccine induce pyrexia in albino Swiss rat and rabbits and the effect of this study At the dose of 200 and 400 mg/kg body weight/intraperitoneal injection) extract considerably lower the fever and body heat was normalized.

13) Cytotoxic activity [17, 33]

Cytotoxic activity of flower extract in ethyl acetate was studied carcinoma in mice. The extract restores the haematological and biochemical parameters (ALP, blood urea, cholesterol, glucose, triglyceride, SGOT and SGPT) that was changed through tumour sequence, at the dose 200 mg/kg body weight extract show themost excellent activity.

14) Anti venom activity [34]

Calotrops gigantea Methanolic extract was used to study the antivenom effect on Wistar albino rats, and Swiss albino mice and current study confirms the strong anti snake venom effect of methanolic extract of C. gigantea.

15) Free radical scavenging activity [30]

The free radical scavenging activity studied on Leaf ethanolic extract or latex 1,1DiphenylPicrylhydrazyl radicals The latex extracts C. gigantea shows betterability to scavenge DPPH radicals whereas leaf extract showed reasonable free radical scavenging activity.

16) Antitussive activity [38]

Jalivala Y. A. studied the flower extract of Calotrops gigantean for its antitussive effect of by using the method Albino Wistar rats, guinea pigs and mice and concluded that Aqueous extract of Calotrops gigantea has shown important antitussive effect.

17) A Novel Insect Anti feedent Non protein Amino Acid [38]

A nonprotein amino acid, has been isolated from a root bark methanol extract of Calotrops gigantea and its structure recognized by spectroscopic methods. It show a important anti feedent activity next to nymphs of the desert locust Schistocercagregaria.

CONCLUSION

From the above study the obtained results in this work show the diversity of medicinal effects of C. gigantea. The wide-ranging pharmacological outline exposed by Calotrops gigantea plant should be operated by the pharmaceutical industry for the improvement of novel drugs, so the beneficial arsenal for many diseases could be extended benefit to humankind.

REFERENCES


Aarti C. Research article a review on pharmacological and biological properties of Calotropis gigantea.