Review on Calotropis Gigantea Use on Diabetic

Devendra S. Mahale*, Meghana Phulapagar, Tejaswini Gosavi, Vaishali Bharti
Ahinsa Institute of Pharmacy, Dondaicha, Maharashtra, India.
*Corresponding Author
E-mail: devendramahale2306@gmail.com

ABSTRACT
The beginning of civilization, human beings have worshiped plants and such plants are conserved as a genetic resource and used as food, fodder, fibre, fertilizer, fuel, febrifuge and in every other way. Calotropis gigantea is one such plant. In this review the systematic position, vernacular names, vegetative characters, Ecology and distribution, phytochemistry and the economical values of the Calotropis gigantea are discussed. y parts of the world and India, plants, animals and other natural objects have profound influence on culture and civilization of man. Since the beginning of civilization, human beings have worshiped plants and such plants are conserved as a genetic resource and used as food, fodder, fibre, fertilizer, fuel, febrifuge and in every other way, Calotropis gigantea is one such plant

Keyword: - Calotropis gigantea, febrifuge, Diabetic.

INTRODUCTION
The Indian systems of medicine has been a part of the culture and practice of India down the centuries [1]. A medicinal plant is any plant which, in or most of it contains ingredient that can be used for therapeutic determination or which is an ancestor for the mixture of suitable drugs. The plant that possesses therapeutic properties or exert useful pharmacological effects on the animal body are selected as “Medicinal plant” [2, 3]. Calotropis is one among the most sorts after medicinal plant. Calotropis goes to the Asclepiadaceae family. According to International Plant Name Index (IPNI), three species of Calotropis plants have been acknowledged for their therapeutic properties they are: Calotropis gigantea, Calotropis procera and Calotropis acia[4].

Calotropis gigantea
Calotropis gigantea is a plant. It is deficiency resistant, salt-tolerant weed found roadsides, lagoon edges.

It is used to treat rheumatism, gastritis, cold fever, ring worm of scalp, swelling, pain, tumour, piles. Different parts of the plant such as leaves, root, bark, flower and latex shows wound medicinal, anti-microbial, anticandida, anti-nematicide, anti-oxidant, and analgesic activity [5].

Picture no.01: Calotropis Gigantea
**Calotropis procera**

Calotropis procera is also a flower. It is drought resistant and salt-tolerant to a relatively high degree. All the parts of Calotropis procera are in common use in inventive system of medicine.

Different parts of the plant such as latex, leaves, root, bark and wood are used to treat ring worm, guinea worm blisters, scorpion stings, ophthalmic syndrome, emetic, jaundice, toothache, sterility and whooping cough.

They possess a number of biological activities such as proteolytic, antimicrobial, larvicidal, nematocidal, anti-cancer and anti-inflammatory.[6]

**Calotropis acia**

Calotropis acia is an under plants or herb. It is a strong medicinal plant. It is used to induce vomiting, purgation and used in the handling of rheumatism, vitilgo, joint pains, mumps and ear-aches.[7]

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**Table 1: Systematic Position of the Selected Plant** [8]

<table>
<thead>
<tr>
<th>Kingdom</th>
<th>Plantae</th>
</tr>
</thead>
<tbody>
<tr>
<td>Order</td>
<td>Gentianales</td>
</tr>
<tr>
<td>Family</td>
<td>Asclepiadaceae</td>
</tr>
<tr>
<td>Subfamily</td>
<td>Asclepiadoideae</td>
</tr>
<tr>
<td>Genus</td>
<td>Calotropis</td>
</tr>
<tr>
<td>Species</td>
<td>Gigantea</td>
</tr>
</tbody>
</table>

**Table 2: Vernacular Names** [8-9]

<table>
<thead>
<tr>
<th>India</th>
<th>(Sanskrit) Arka,Ganarupa, Mandara, Vasuka, Svetapushpa, Sadapushpa, Alarka, Pratapass, (Hindi) Aak, Madar, (Kannada) Ekka, (Tamil and Malayalam) Erukku, (Telugu) Jilledi Puvvu</th>
</tr>
</thead>
<tbody>
<tr>
<td>Malaysia</td>
<td>Remiga, rembega, kemengu.</td>
</tr>
<tr>
<td>English</td>
<td>Crown flower, giant Indian milkweed.</td>
</tr>
<tr>
<td>Indonesia</td>
<td>Bidhuri (Sundanese, Madurese), sidaguri (Javanese), rubik (Aceh).</td>
</tr>
<tr>
<td>Philippines</td>
<td>Kapal-kapal (Tagalog).</td>
</tr>
<tr>
<td>Laos</td>
<td>Laos Kok may, dok kap, dok hak.</td>
</tr>
<tr>
<td>Thailand</td>
<td>Po thuean, paan thuean (northern), rak (central).</td>
</tr>
<tr>
<td>French</td>
<td>Faux arbre de soie, mercure vegetal.</td>
</tr>
</tbody>
</table>

**Table 3: Vegetative Characters**
Habit | Plant or a small tree up to 2.5 m (max. 6m) height.
---|---
Root | Simple, divided, woody at base and covered with a fissured; corky bark; branches somewhat succulent and densely white tomentose; early glabrescent. All parts of the plant exude white latex when cut or broken.
Leaves | Opposite-decussate, simple, sub stalkless, extipulate; blade-oblong obovate to broadly obovate, 5-30X2.5-15.5 cm, apex shortly and shortly acuminate to apiculate, base cordate, margins entire, succulent, white tomentose when young, later glabrescent and glucose.
Flowers | Bracteate, complete, bisexual, actinomorphic, pentamerous, hypogynous, pedicellate, pedicel 1-3 cm long.
Floral Characteristic’s | Inflorescence: A dense, multiflowered, umbellate, pedicled cymes, arising from the nodes and appearing axillary or incurable.
Calyx | Sepal 5, Polysepalous, 5 lobed, shortly united at the base, glabrescent, quincuncial aestivation.
Corolla | Petals five, gamopetalous, five lobed, twisted aestivation.
Androecium | Stamens five, gynandrous, anther dithecous, coherent.
Gynoecium | Bicarpellary, apocarpus, styles are united at their apex, peltate stigma with five cross stigmatic surfaces. Anthers adnate to the stigma forming a gynostegium.
Fruit | A simple, fleshy, inflated, subglobose to indirectly ovoid follicle up to 10 cm or more in distance.
Seeds | Many, small, flat, obovate, 6X5 mm, compressed with silky white pappus, 3 cm or more long.

Ecology and Distribution

Natural Habitat
Calotropis is deficiency resistant, salt accepting to a relatively high degree, grows wild up to 900 meters (msl) throughout the country [10] and prefers disturbed sandy soils with mean annual rainfall: 300-400 mm. Through its wind and animal spread seeds, it rapidly becomes conventional as a weed along degraded roadsides, inlet limits and in overgrazed native pastures. It has a preference for and is often central in areas of uncontrolled farming specially disturbed sandy soils and low rainfall. It is expected to be an pointer of over farming [11].

The Chief Features
1) The plant produces very well in a variation of soils and different ecological environments
2) It does not need farming observes
3) It is one of the few plants not consumed by shaving animals [12].
4) It booms on poor soils mostly where overgrazing has indifferent opposition from native grasses [13].
5) It is deficiency accepting and the developer undergrowth in return soil [13].
6) Hence, it is circulated in tropical and subtropic area of the world and through India [13].
7) Sometimes this plant is the only fighter in some areas, where unknown new produces [14].
8) Existence of liquid, extensively divided root system and thick leaves with waxy coverage are the xerophytic variations [15].
Geographic Distribution

It is a natural of India, China and Malaysia and circulated in the resulting countries: Afghanistan, Algeria, Burkina Faso, Cameroon, Chad, Cote d’Ivoire, Democratic Republic of Congo, Egypt, Erithrea, Ethiopia, Gambia, Ghana, guinea-Bissau, India, Iran, Iraq, Israel, Kenya, Kuwait, Lebanon, Libyan, Arab Jamahiriya, Mali, Mauritania, morocco, Mozambique, Myanmar, Nepal, Niger, Nigeria, Oman, Pakistan, Saudi Arabia, Senegal, Sierra Leone, Somalia, Sudan, Syrian Arab Republic, Tanzania, Thailand, Uganda, United Arab emirates, Vietnam, Yemen, Republic of Zimbabwe, Exotic: Antigua and Barbuda, Argentina, Australia, Bahamas, Barbados, Bolivia, Brazil, chile, Colombia, Cuba, Dominica, Dominican Republic, Ecuador, French Guina, Grenada, Guadeloupe, Guatemala, Guyana, Haiti, Honduras, Jamaica, Martinique, Mexico, Montserrat, Netherlands Antilles, Nicaragua, Panama, Paraguay, Peru, Puerto Rico, St Kitts and Nevis, St Lucia, St Vincent, and the Grenadines, Surinam, Trinidad and Tobago, Uruguay, Venezuela and Virgin Islands (US)[15].

Propagation and Management

The seeds easily float in the air and natural regeneration is very communal. Vegetative circulation through branch and source cuttings is very suitable in large measure growth of the more genotypes. Calotropis has been urbane in South America and on the Caribbean Islands for the invention of fibres at a spacing of 1-1.5m. When educated annually yields of up to 500kg/ha are predictable. A single return per period is better to a double or triple produce; a single produce would result in a net saving of liveliness input both on the form and in the dispensation plant. It is well suitable for thorough energy farming in dry or semi-arid regions where frost is not a warning issue [15].

Phytochemistry of Calotropis

The preceding employees have informed many phytochemical constituents in the several parts of Calotropis gigantea specifically in the leaves. Uscharin, gigantin, calcium oxalate, alpha and beta-calotropeol, beta-amyrin., fatty acids (both saturated and unsaturated), hydrocarbons, acetates and the benzoates, a mixture of tetracyclic triterpene mixtures, terols, giganteol and giganteol are also found to be present[16,17,18] Cardenolide calotropin[19], α-amyrin, β-amyrin, taraxasterol, β-sitosterol, α-amyrin methylbutazone, βamyrin methylbutazone, α-amyrin acetate, β-amyrin acetate, taraxasteryl acetate, lupeol acetate B, gigantursenyl acetate A, gigantursenyl acetate B[20,21], flavonol glycoside, akundarol, uscharidin, calotropin, frugoside, calotroposides A to G[22] are responsible for many of its activities. The following cardenolides are also described in the literature: calactin, calotoxin, calotropagenin, proceroside, syriogenine, uscharidin, uscharin, uzarigenin and voruscharin[23,24,25]. Other mixes found are benzoisolineolon and benzoyllineolone[26], Flavonoids [27]. Triterpenoids [28], alkaloids, steroids, glycosides, saponins, terpenes, enzymes, alcohol, resin, fatty acids and esters of calotropeols[29], volatile long chain fatty acids, glycosides and proteases[30] have been isolated from the various parts of the plant Calotropis gigantea. The laticifer fluid of Calotropis [31], and found to have strong proteolytic activity, having the enzyme cysteine proteinase and aspartic proteinase. Due to the presence of these components, the plants are resistant to phytopathogens and insects mainly in leaves where the latex circulates abundantly. The milky latex of the plant is rich in lupeol, calotropin, calotoxins and uscharidin. Sharma and Sharma et al., screened the major phytochemicals viz. alkaloids, carbohydrates, glycosides, phenolic compounds/tannins, proteins and amino acids, flavonoids, saponins, sterols, acid compounds, resins in flower, bud, root of Calotropis (Table 4).
Table 4: Phytochemical Components in Calotropis

<table>
<thead>
<tr>
<th>Sl. No.</th>
<th>Class of Compounds</th>
<th>Plant Part</th>
<th>Tests Performed</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Flower</td>
<td>Bud</td>
</tr>
<tr>
<td>1.</td>
<td>Alkaloids</td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td>2.</td>
<td>Carbohydrates</td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td>3.</td>
<td>Glycosides</td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td>4.</td>
<td>Phenolic compounds/tannins</td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td>5.</td>
<td>Proteins and amino acids</td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td>6.</td>
<td>Flavanoids</td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td>7.</td>
<td>Saponins</td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td>8.</td>
<td>Sterols</td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>9.</td>
<td>Acid compounds</td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>10.</td>
<td>Resins</td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>11.</td>
<td>Peroxides</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>12.</td>
<td>Polyuronoids</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>

**Medicinal Properties**
Different parts of the plant have immense possible to medication countless diseases and conditions (Table 5). It is used in several polyherbal arrangements\[^{32,33}\] There are more than hundred actions defined in point by Duke\[^{34}\]. Calotropis is used alone and sometimes with other plants to cure change of human and animal’s diseases.

Table 5: Medicinal Properties

<table>
<thead>
<tr>
<th>S.No.</th>
<th>Medicinal Properties</th>
<th>References</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Anti-Diabetics</td>
<td>35</td>
</tr>
<tr>
<td>2</td>
<td>Asthma</td>
<td>36,37</td>
</tr>
<tr>
<td>3</td>
<td>Anti-Inflammatory Activity</td>
<td>38,39</td>
</tr>
<tr>
<td>4</td>
<td>Swelling and inflammation in sprain</td>
<td>40</td>
</tr>
<tr>
<td>5</td>
<td>Skin Disease</td>
<td>41,42,43,44</td>
</tr>
</tbody>
</table>

**MATERIALS AND METHODS**\[^{45}\]

**Collection and Identification of Plant Material**
Calotropis gigantea white, plants were together in the month of February - March from the estate of Siva Temple, Thiruvisanallur, Thanjavur India and the plant was known by Dr. N. Ramakrishnan, Sub Professor and Head, Branch of Botany, Government Arts College (Autonomous), Bharathidasan University, Trichirappalli, Tamilnadu, India. A voucher specimen (GACB0T-107) was placed in the investigate laboratory, Botany for future reference. The together fresh flower resources were washed properly and dried in the shade. Dried plant physical was subjected to reduction to coarse crushed and stored in airtight container for added use.
Preparation of Plant Extract

The flowers (500 g) of *Calotropis gigantea* white were extracted three times with 95% methanol (4 X 500 mL) at room temperature (30 ± 2 °C). Following separation, the combined methanol extract was evaporated to waterlessness under reduced pressure to give a crude extract. The crude methanol extract was suspended in hot water (1000 mL) and that was subjected to column chromatography over Silica gel using chloroform and ethyl acetate, and the solvent recovered by simple distillation. Evaporation of the solvent under reduced pressure gave the crude extract CHCl3 (39.0 g) and EtOAc (28.0 g) respectively. Each extract was dissolved in extracted water before its management to the diabetic rats. This was arranged by dissolving 2 g of plant extract in 25 mL 2% Tween-80/purified water and normal saline in a falcon tube in a hot water bath with strong shaking. The dose of each extract was calculated according to body weight before management to the diabetic rats.

Acute Toxicity Studies

The resultant extracts were subjected to acute oral toxicity studies as per studied OECD Association of Commercial Co-operation and Progress rules (OECD No. 425). The *C. gigantea* white flower extracts were devoid of any toxicity up to 2000 mg/kg body weight in albino rats (200-220 g) of either gender for a only oral dose observed for 12 days. The best surroundings for trials were decided on the basis of pilot trials carried out using three animals per group. For further trials, a group of at minimum six animals was used for separate dealing. Based on investigative studies, antidiabetic activity was considered using the methanol, chloroform, and ethyl acetate extracts separately. The control group conventional only the vehicle. The groups were practical humanity and behavioural changes during 48 h.

Evaluation of Anti-diabetic Activity

Before starting the test, animals were divided according to their body weight. The animals were vaccinated intraperitoneally with recently prepared alloxan monohydrate at a absorption of 100 mg/kg in normal saline solution (0.9 w/v% NaCl), appears to be the easiest, most reliable practical method of inducing diabetes mellitus. A bulk equal to 1 ml of the stock resolution was given intraperitoneally after which the blood glucose levels were measured at systematic recesses (i.e., all 6 h) four times daily for three days using digital demo glucometer (One touch - Johnson & Johnson Ltd.). Alloxan management resulted in significant promotion of glucose level and decrease in body weight. Diabetes was complete by the elevated blood glucose levels determined at 72 h. Primary blood sample was taken before the oral administration of the average drug glibenclamide, test extracts at a dose of 300 mg/kg of *C. gigantea* white. The blood glucose level test was done on the normal, diabetic, and treated diabetic rats were measured at 0, 4, 8 and 12 days after oral management of glibenclamide and plant abstracts.

Biochemical Analysis

After blood glucose estimate on day 12, whole blood samples were drawn from the tail vein during the course of the trial. At the end of the investigational period (12 days), the rats were under with chloroform next a 12 - hour fast. Blood trials were drawn by cardiac puncture into plain tubes. The blood samples were centrifugated at 3500 rpm for 20 minutes using a refrigerated filter at 4°C (Remi Laboratory Instruments, Mumbai, India). The serum collected was stored at -20°C until required. Serum albumin was determined using the bromocresol (BCG) green method with an Autopak kit. The total protein present in serum was estimated by the Biuret method9 using an Autopak kit. Serum was separated and analyzed for serum cholesterol,10 serum HDL,11 serum LDL,12 serum creatinine,13 serum urea,14 levels of
hemoglobin using the ion exchange resin method15 with kits purchased from Diotek India Ltd, Mumbai, India, were estimated. To the animals, standard drug glibenclamide tablets (10 mg / kg orally) and the test extracts (250 & 500 mg / kg orally) were directed by dissolving in 2% Tween - 80 / distilled water and normal saline individually.

Statistical Analysis
All the values of body weight, fasting blood sugar, and biochemical estimates were expressed as mean ± average error of mean (SEM) and analysed for ANOVA and post hoc Dunnet’s t-test. Changes between groups were measured important at P < 0.05 points

CONCLUSION
Carbohydrate, fats and protein metabolism. As part of the pathogenesis of type 2 diabetes; skeletal muscle, liver, glucose and adipose tissue become resistant to the hormonal effect of insulin, which in turn lead to decreased insulin- Dibetic is the world’s largest endocrine disease with deranged mediated glucose disposal, hepatic glucose overproduction and a marked increase in lipolysis. There are an estimated 143 million people in the world with diabetes mellitus and this number will probably double by the year 2030. Due to the enormous costs of modern treatment for diabetes in developing countries, the use of medicinal plants and their preparation has flourished as an alternative for the control and prevention of the disease.

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