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Preliminary phytochemical analysis of fresh and dried flowers of *Calotropis gigantea (l.)* from Sulur, Coimbatore district and Tamilnadu, India

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ABSTRACT

Calotropis gigantea (L.) is a weed plant commonly known as giant milk weed. The aqueous extract of dry *C.gigantea* flower revealed positive results for alkaloid, glycosides, tannins, carbohydrate, phytosterols, flavonoids, protein and amino acids and negative observations for phenol and saponin. The methanol extract of dry *C.gigantea* flower displayed positive for alkaloids, carbohydrate, saponins, phenol, protein and amino acids, whereas glycosides, phytosterols, tannins and flavonoids. The fresh flower extract indicated positive alkaloid, carbohydrates, phytosterols, phenolics, tannin, flavanoids, proteins and amino acids. There was no indication for glycosides and saponin, whereas methanol extract shows positive tests for alkaloids, carbohydrates, glycosides, tannin, flavanoids, proteins and amino acids but negative observation for phytosterols and saponin in the phytochemical screening.

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Introduction

From pre-historic times to the modern era in many parts of the world and in India, plants, animals and other natural objects have quality influence on culture and civilization of humans (Sureshkumar *et al,* 2012). The latex containing *Calotropis gigantea* (L.) R. Br. belongs to the family Asclepiadaceae is known for its traditional medicinal properties used to cure different disease. In ancient ayurvedic medicine *C.gigantea* is known as "Sweta Arka" and *C.procera* as "Raktha Arka". Both plants are often similar in their botanical aspects and also have similar pharmacological effects (Gamble, 1935). Phytochemical analysis suggests that the plant would be useful for various ailments due to the presence of different secondary metabolites (Katre and Kunjalwar, 2015) and are conserved as a genetic resources used as food, fodder, fiber, fertilizer, fuel, and febrifuge.

Among herbs *C.gigantea* is a drought resistant, salt tolerant to a relatively high degree, grows upto 900 meters throughout the country and disturbed in sandy soils with mean annual rainfall 300-400 mm (Sharma and Tripathi, 2009). Dispersion of seeds are through wind and animals which quickly becomes established as a weed along degraded roadsides, lagoons edges and in overgrazed native pastures and often dominanting in areas of abandoned cultivation (Gamble, 1935)**.** The plant is a native of India, China and Malasia and distributed into throughout the world and many Islands (Gamble, 1935).

The seeds freely float in the air and natural regeneration is very common. Vegetative propagation through stem and root cuttings is very useful in large scale multiplication of the superior genotypes. *Calotropis* has been cultivated in South American and on the Carribean Islands for the production of fibres at a spacing of 1-1.5m. The annual yields upto 500 kg/ha are expected. A single harvest per season is preferable to a double or triple harvest. This is well suited for intensive energy farming in arid or semi-arid regions where frost is not a limiting factor (Gambe, 1935).

The previous workers have reported many phytochemical constituents are present in the various parts of *Calotropis gigantea* especially in the leaves. Usharin, gigantin, calcium oxalate, alpha and beta-calotropeol, beta-amyrin, fatty acids, hydrocarbons, acetates and the benzoates, a mixtures of tetracyclic triterpene compounds, sterols, giganteol and gigantea are present (Murti and Seshadri, 1945a), Cardenolide calotropin (Kupchan *et al*, 1964), alpha-amyrin, beta-amyrin taraxasterol, beta-sitosterol,alpha-amyrin methylbutazone, alpha-amyrin methylbutazone, alpha-amyrin acetate, beta-amyrin acetate, taraxasteryl acetate A, giganturseny1 acetate B (Sen *et al*, 1992; Habib *et al*, 2007), flavonol glycoside, akundarol, Uscharidin, Calotropin, frugoside, calotroposides A to G (Crout *et al,*1963) are responsible for many of its activities. The following cardenolides are also described in the literature: calactin, calotoxin, calotropagenin, proceroside, syriognin and voruscharin (Brischweiler *et al*, 1969; Lardon *et al*, 1970; Singh and Rastogi, 1972). Other compounds found are benzoylisolineolon and benzoyllineolone (Chandler, 1968). Flavanoids (Crout *et al,*1963), triterpenoids (Pal and Sinha *et al,* 1980), alkaloids, steroids, glycosides,

saponins, terpenes, enzymes, alcohol, resin, fatty acids and esters of calotropis (Seiber *et al,*1982), volatile long chain fatty acids, glycosides and proteases (Kitagawa *et al,*1992) have been isolated from the various parts of this plant. The various parts of the plant have been reported to possess a number of biological activities such as proteolytic, antimicrobial, larvicidal, nemadocidal, anticancer, anti-inflammatory (Basu and Chaudhury, 1991). The flowers possess digestive, tonic properties and the root of the plant is used as a carminative in the treatment of *C.procera* are used by various tribes of central India as a curative agent for jaundice (Kumar and Arya, 2006).

The roots and leaves of *C.gigantea* are used traditionally for treatment of abdominal tumors, boils, syphilis, leprosy, skin diseases, piles, wounds, rheumatism, insect-bites, ulceration and elephantiasis (Ghani, 2003). Powdered flowers of *C.gigantea*, in small doses are useful in the treatment of colds, coughs, asthma, catarrh, indigestion, inflammatory diseases and loss of appetite (Ghani, 2003). *C.gigantea* flowers have stomachic, digestive and analgesic properties (Pathak and Argal, 2007). People in India and Bangladesh used *C.gigantea* flowers as a traditional flock medicine in small pox, muscular pain, convulsions, scabies, and a number of ailments (Mueen *et al*., 2005).

The medicinal value of *C.gigantea* presents chemical substances which produce a definite physiological action on the human body which is the fundamental for traditional therapy (Gamble *et al*, 1935). The bioactive substances include tannins, alkaloids, carbohydrates, terpenoids, steroids and flavonids (Oudhia *et al*, 1997). Root is used for the treatment of lupus, tuberculosis, leprosy and syphilitic ulceration and also contains anti-pyretic activity (Singh and Rastogi, 1972). Leaves and areal parts of the plant are used in the treatment of external swelling and diarrhoea (Lardon *et al*, 1970). Latex contains purgative properties of wound healing activity (Chandler *et al*, 1968). The various parts of the plants used in various polyherbal preparations (WHO, 1992; Tenpe *et al*, 2007).

Materials and methods

Plant material

The plant *C.giganteais* is collected from Sulur, Coimbatore District, Tamilnadu. The plant material was identified and the voucher specimen was deposited in the Department of Botany, Botanical survey of India TNAU, Coimbatore. The fresh flowers were collected and shade dried for extract preparation.

Preparation of leaf extract for phytochemical analysis

The fresh shade dried flower powder was treated with water (2g/20mL) and methanol (2g/20mL), kept at 37°C for 12 h, filtered through muslin cloth and the filtrate was used for the phytochemical analysis using standard protocols (Katre and Kunjalwar, 2015) to detect the bioactive compounds.

Result and discussion

Phytochemical analysis

The aqueous extract of dry *C.gigantea* flower revealed positive results for alkaloid, glycosides, tannins, carbohydrate, phytosterols, flavonoids, protein and amino acids and

negative observations for phenol and saponin. The methanol extract of dry *C.gigantea* flower displayed positive for alkaloids, carbohydrate, saponins, phenol, protein and amino acids, whereas glycosides, phytosterols, tannins and flavonoids. The aqueous extract of fresh flower indicated positive alkaloid, carbohydrates, phytosterols, phenolics, tannin, flavanoids, proteins and amino acids.

Table 1 Phytochemical analysis for water and methanol extract of dried and fresh flower extract of *Calotropis gigantea* (L.) Dryland

Plant constituents	Water extract (2g/20mL)		Methanol (2g/20mL)	
	Dried	Fresh	Dried	Fresh
Alkaloids	++	++	++	++
Carbohydrates	++	++	++	++
Glycosides	++	-	-	++
Saponins	-	-	++	++
Phytosterols	++	++	-	-
Phenol	++	++	++	-
Tannins	++	++	-	++
Flavanoids	++	++	-	++
Protein & amino acids	++	++	++	++

There was no indication for glycosides and saponin, whereas methanol extract shows positive tests for alkaloids, carbohydrates, glycosides, tannin, flavanoids, proteins and amino acids but negative observation for phytosterols and saponin in the phytochemical screening (Table 1). The obtained results of *C.gigantea* provided a provision for the use of selected plant flowers in traditional medicine and suggest for the further investigation.

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