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Review Article

A Scientific review on *Crateva religiosa*

V.Srinivas *¹, G.Surendra¹, M.Anjana², A.Sai Kiran²,

D.Subba reddy², V.Swathi²

¹ K.C.Reddy college of pharmacy, Satenapalli, Medikonduru, Guntur Dist, A.P, India.

² Nirmala college of pharmacy, Atmakuru, Mangalagiri, Guntur Dist, A.P, India.

ABSTRACT

Sacred garlic pear is the common name for *Crateva Religiosa* belongs to *crateva* genus and *Capparaceae* family. Traditionally it is used to treat many disorders but very few abstracts are proving its scientific evidence. Hence an attempt has been made to collect the information regarding its cultivation requirements, folklore usages pharmacological action with its phytochemical isolates. With this review it was found that even though many folklore usage are present for this divine fruit but very little research was conducted on this species of *Capparaceae* family, hence this review will be helpful for plant researchers to work on this species.

Keywords : *Crateva religiosa* , *Capparaceae* , phytochemical and pharmacological activity.

Introduction

Herbal medicine has been around since the beginning of recorded history. Currently, there is an increasing interest in the use of plant for treatment of illness. The easy accessibility and cheapness of medicinal plants encourage their use but most of the uses are not validated. According to WHO more than 80% of world's population, are thought to depend chiefly on traditional medicine, which is largely of plant origin, for their primary health care needs. In recent years, there is a growing interest in herbal therapy.¹⁴

The *capparaceae* or *capparidaceae*, commonly known as the caper family, are a family of plants in the order *brassicales*. This family contains 33 genera and about 700 species. The largest genera are *capparis* (about 150 species), *maerua* (about 100 species), *boscia* (37 species) and *cadaba* (30 species). *Crateva religiosa* is a flowering tree which belongs to capers family. It is also called as the sacred garlic pear and temple plant. The name *crataeva* is given in the honor of *crataevus*, a greek botanist, who was living in the time of hippocrates and the name *religiosa* indicates its growth near the places of worship. It is native to japan, australia, much of southeast asia and several south pacific islands. It is grown elsewhere for fruit, especially in parts of the african continent. In this present review article, we are providing brief information on *crateva*

religiosa species which belongs to the *capparaceae* family. Out of all the species of *crateva religiosa* was found to have very few scientific evidence in its treatment towards alleviating diseases/ disorders. Hence this review will be helpful for the researchers to carry out further work on this plant.

Folklore uses:¹²

Crataeva religiosa is sweet, pungent, bitter, and astringent in nature. They use the leaves and the bark of the tree for medicinal purposes. *Crataeva religiosa* proves to be the best medicinal herb for various kinds of urinary disorders. This litholytic herb is used to cure people of benign prostate hyperplasia. The various traditional uses of *crataeva religiosa* are Immunity , Restless leg syndrome , Weight Loss , astringent , cholagogue , Strengthens Bones , Urination and Excretion, Lower Risk of Heart Problems , Proper Growth , Antiemetic , antidote in snakebite , improves digestion , increases appetite and biliary secretion , laxative , convulsions , swelling and burning sensation in the soles of feet , vesicant and neurologic pains.

Taxonomical classification¹²:

Kingdom	Plantae (plants)
Subkingdom	Tracheobionta (vascular plants)
Superdivision	Spermatophyta (seed plants)

Division	Magnoliophyta (flowering plants)
Class	Magnoliopsida (dicotyledons)
Subclass	Dilleniidae
Order	Capparales
Family	Capparaceae (caper family)
Genus	<i>Crateva</i> l. (<i>crateva</i>)
Species	<i>Crateva religiosa</i> g. Forst. (sacred garlic pear)

Vernacular names:¹³

The vernacular names of *Crataeva religiosa* are

- English : Sacred barma
- Indonesia: Jaranan (Javanese), barunday (Sundanese), sibaluak (Sumatra)
- Malaysia: kepayan, kemantu, kemantu hitam, dangla
- Philippines: Salingbobog (Tagalog), balai-lamok (Iloko), banugan (Bisaya)
- Cambodia: Tonliëm
- Laos : Kumz
- Thailand: Kum-bok, kum nam
- Vietnam : Bun thieu, bun lo

Synonyms:¹⁵

The synonyms of *Crataeva religiosa* are

- *Crateya brownie* Korth
- *Crateya hansemannii* K Schum
- *Crateya macrocarpa* Kurz
- *Crateya magna*
- *Crateya membranifolia* Miq
- *Crateya religiosa* Ainslie
- *Crateya religiosa* auct Foba
- *Crateya religiosa* Forst
- *Crateya religiosa* . G . Forst
- *Crateya religiosa* var . *Nurvula* (Buch-Ham)
- *Crateya speciosa* Volkens.

Geographical distribution:

Garlic pear scientifically known as *Crataeva religiosa* is considered to have originated from Japan, Australia, much of Southeast Asia and several South

Pacific islands such as China, Japan, India, Sri Lanka, Myanmar, Thailand, Cambodia, Vietnam, Malaysia, Indonesia, Philippines, New Guinea, Australia, Pacific Isles , Borneo, New Guinea and the Solomon Islands. It is grown elsewhere for fruit, especially in parts of the African continent. In India, it is found in Peninsular India, Western India, Gangetic Plains, and Eastern India, up to Tripura and Manipur. It is also found in Sikkim and Andman and Nicobar Island. It is found mostly along the bank of the river and streams and near to temple side.

Morphological characters:

Garlic pear is a moderate sized deciduous tree, 15m (50ft) tall and 9m (30ft) wide. It grows well in sun or partial shade and normally prefers moist, rich, neutral to acid soil

Bark It is grey, and the wood is yellowish-white, turning light-brown when old.

Leaves These are clustered at the ends of branchlets, with a common petiole 5 to 10 centimeters long, at the summit of which are tree leaflets.

Leaflets These are ovate-lanceolate or ovate, 7.5 to 12 centimeters long, 4 to 6 centimeters wide, and pointed at the base, with a rather slender point at the tip

Flower They occur in terminal corymbs, are about 5 centimeters in diameter, greenish-yellow, and the stamens are purplish.

Fruit Garlic pears are rounded or ovoid shaped fruit, and are 3 to 5 centimeters in diameters. The fruit has hard and rough rind and has unpleasant smell and burning taste. The seeds are about 10 centimeters in length, numerous, kidney-shaped, and embedded in a yellow pulp



Fig No 1
Crataeva religiosa tree



Fig no 2
Crataeva.r seedlings



Fig no 3
Crataeva.r fruits



Fig no 4
Crataeva.r fruits



Fig no 5
Crataeva.r leaves

Cultivation details:

- Grows best in a rich, slightly acid soil
- Prefers a position in full sun or light shade
- Established plants are moderately drought tolerant
- The flowers are curiously garlic-scented
- Succeeds in the tropics and subtropics.

Propagation :

- Seed are best sown as soon as it is ripe
- Cuttings of half ripe wood and
- Suckers

Phenology:

- Flowering season : From February to June.
- Fruiting season : From July to January.
- Seeding season : From July to January.
- Leaves falling : During the hot season.

Reproduction and Dispersal :¹⁰

- Sex distribution *Crataeva religiosa* is bisexual (each flower of each individual has both male and female structures).
- Mode of pollination *Crataeva religiosa* is pollinated by a wide variety of insects.

Seed dispersal :

- The seeds of *Crataeva religiosa* are mainly dispersed by birds and mammals.

Pharmacological review:

- Ajali, u, ezealisiji, k.m and onuoha, e.o , have reported that the methanol leaf extract of *Crataeva religiosa* has shown more wound healing effect than that of penicillin . The faces of wound treated with the extract dried faster indicating that the extract had extrawound healing mechanism when compared to that of penicillin. Dried leaves of *Crataeva religiosa* were extracted with methanol using a soxhlet extractor and it was compared with the standard (penicillin). The results obtained that wound healing effect of 50 mg/kg of the extract was superior to that of 50 mg/kg of penicillin. The doses of 50 and 100 mg/kg had nearly the same wound healing effect. This indicated that at 50 mg/kg, the effective dose may have been reached. Tannins and with the extract dried faster when compared with those treated with penicillin showing that the extract had extra-wound healing mechanism.¹
- Latifou Iagnika¹, Eugénie Anago, Menonvè Atindehou¹, Brice Adjahoutonon², Karim Dramane and Ambaliou Sanni have reported that the ethyl acetate extract has exhibited more potent anti-microbial activity than all

the other extracts. Seven extracts from *c. Religiosa* were screened for their antibacterial. The antibacterial activity was evaluated by microtest method using p iodinitrotetrazolium against five microorganisms such as *escherichia coli*, *shigella sonnei*, *staphylococcus aureus*, *pasteurella pestis* and *yersinia enterocolitica*. The minimum inhibitory concentration (mic) and the total activity (ta) were determined. All extracts were effective against tested microorganisms at different levels ($0.31 \leq \text{mic} \leq 10 \text{ mg/ml}$). The screening experiment revealed that ethyl acetate extract was more potent than other extracts with the mic values of 0.62 mg/ml against *e. Coli* and 0.31 mg/ml against *s. Aureus*, *s. Sonei*, *p. Pestis* and *y. Enterocolitica*.²

- C.M. Jaikanth*, K.V. Venkateswaran, S. Selvasubramanian and P.S.L. Sesh have reported that the Aqueous extract at 400 mg/kg bw. Of *Crataeva religiosa* excelled better than the dose of 200 mg/kg bw. In restoring the antioxidant parameters. The main aim of their study is to evaluate the antioxidant potential of aqueous extracts of *Crataeva religiosa* in paracetamol induced hepatotoxicity in rats and also to compare their effects with the standard drug, silymarin. Twenty four female Wistar rats were used for the study. Toxicity was induced on day one in all the animals with an oral acute toxic dose of paracetamol at the rate of 3 g/kg bw. Treatments with standard drug (silymarin at 100 mg/kg bw.) And test drug (aqueous extract of *C. Religiosa* at 200 and 400 mg/kg bw.) Were given from day 2 to day 8. Both the standard and test drugs exhibited a significant effect in restoring the altered antioxidant parameters in the liver. The aqueous extract at 400 mg/kg bw. Excelled better than the dose of 200 mg/kg bw. In restoring the antioxidant parameters.³
- S. Tripathy , m.asha , d.pradhan have reported that the alcoholic extract show more profound anti-inflammatory effect than the aqueous extract. Acute and cronic inflammation was induced by inflammogens like carageenan, histamine ,5ht and formalin. The reduction in the volume displacement of the paw as compare to the control was considered as the anti – inflammatory effect of the extracts the alcoholic and aqueous extracts of the plant

were administered in a dose of 250 and 500 mg/kg to the animals orally one hour before the induction of inflammagens. Both the extracts shown dose dependent decrease in the paw edema in tested animals. In carageenan induced inflammation the extracts shows significant activity ($p < 0.001$) at 6 hours. The extracts are also significantly suppress the inflammation induced by mediators like histamine and 5ht. In chronic inflammation induced by formalin the extracts show significant ($p < 0.05$) activity in the second phase ie after 6th day in a 10 day study. The percentage of yield was found to be 10.3 and 9.6 (%w/w) for ethanol and aqueous extracts respectively. From the above results they concluded that the alcoholic leaf extract has shown more anti-inflammatory effect than aqueous extract.⁵

- Shyamalendu Tripathy, Debashis Pradhan & Bimala Tripathy have reported that the alcoholic extract showed more Antiarthritic effect than aqueous extract. Arthritis was induced by injecting 0.1ml of complete Freund's adjuvant below the plantar aponeurosis of the right hind paw. Treatment with the extracts and standard started on the day of induction of CFA and continue up to 28 days. Upon induction of Freund's adjuvant the level of SGPT, SGOT and ALP rise to 158.4, 56.3 and 486.00 units/ml. Treatment with the *crateva religiosa* extracts significantly rectify the deranged parameters in a dose dependent manner as shown in table. At a dose of 500 mg/kg the alcoholic extracts rectify the levels to 66.3, 24.4 and 226.32 for SGPT, SGOT and ALP respectively whereas the aqueous extracts at same dose level rectify it to 76.2, 30.3 and 256.58. The value of SGPT, SGOT and ALP values are 86.4, 38.6, 332.74 and 76.2, 30.3, 256.58 when they are treated with 250 mg/kg of *crateva religiosa* aqueous extracts. Standard diclofenac though shows significant anti-inflammatory effect they does not have any protective role for these biochemical parameters. Alcoholic extracts found to be more effective than the aqueous extracts.⁷
- Dr.P.Gowsalya has reported that the ethanolic and aqueous fractions are having more Analgesic and Anti-inflammatory activity than petroleum ether and chloroform extracts. The leaves of medicinal plant *crateva religiosa* was extracted in ethanol to

evaluate the peripher-ally acting analgesic potential using acetic acid induced writhing and antidiarrhoeal activity using intestinal motility test both in mice. The crude extract showed significant ($P < 0.01$) analgesic activity at oral doses of 200 and 400mg/kg body weight with an inhibition of writhing 68.4% and 76.3% compared to 67% for the positive control. In the motility test, the crude extract at same oral doses showed 31.16% and 35.31% inhibition of intestinal propulsion of charcoal marker where as positive control group exhibited 36.25% inhibition of propulsion of char-coal through the intestine.⁸

Phytochemical review :

- Patil uday sing hari and Gaikwad Dattatraya have reported that the concentrations of secondary metabolites was found higher in apical stem bark and middle bark than that of mature inner bark. The secondary metabolites are sugars, amylase, amylopectin, starch, crude fibres and proteins, polyphenols, water soluble tannins, total flavonoids, total alkaloids, nitrate and total oxalate. These secondary metabolites are evaluated by various methods in these three bark samples. The results found that except oxalate and total ash the concentrations of other contents was found higher in the apical stem bark and middle bark than that of mature inner bark.⁴
- Wagay n. A has reported various secondary metabolites like steroids, terpenes and sugars. The roots of *crateva religiosa* were extracted successively in three different solvents, chloroform, dichloromethane and 50% ethanol by soxhletion method. Gas chromatography – mass spectrometry (gc-ms) method was used to separate and identify the individual compounds in all the three extracts. It was found that chloroform extract was rich in steroids like campesterol, stigmasterol, sitosterol and phenol (methyl salicylate), in dichloromethane extract many terpenes like (+) camphor, menthol, β -caryophyllene, α -caryophyllene, α -curcumene, β -sesquiphellandrene, α -turmerone, curone, and a cardiac glycoside (strophanthin) etc were present, while as in 50% ethanolic extract a steroid drebyssogenin-f, sugars d-melezitose & lglucose and some fattyacids, esters, hydrocarbons were identified.⁶

- N. A. Khan, s. P. Roth and n.awagay have reported that the water and 50% ethanol extracts showed presence of most phytoconstituents than chloroform and dichloromethane extracts. Stem bark was extracted successively using chloroform, dichloromethane and 50% ethanol as solvents which were analyzed by gas chromatography – mass spectrometry (gc-ms) method to separate and identify the individual compounds in extracts. Antimicrobial activities of all three extracts of understudy part was tested against 4 pathogenic bacterial strains and two fungal strains. The results of antimicrobial activity were compared with the results of standard antibiotics. The physiochemical results determined that percentage of moisture content 6.70 ± 0.59 , ash content 22.18 ± 1.17 , highest extractive values 15.85 ± 0.21 were found in 50% ethanol extracts. All three solvent extracts showed significant activity against bacterial strains while as chloroform extracts were inactive against fungal strains at 10mg/ml concentration. It was found that among all the four tested phytochemicals, the plant showed higher level of flavonoids then alkaloids which are also closely followed by saponins. The content of phenols was in least percentage in the *crateva religiosa* g. Forst stem bark.⁹

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