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Morphology, Phytochemistry, Traditional Uses of Plant *Caesalpinia crista*: A Review



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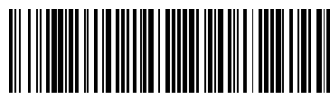
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ABSTRACT

Caesalpinia crista L. is a Fabaceae family medicinal plant (Caesalpinieae). It is a thorny shrub found all throughout the world, but mainly in India, Sri Lanka, and the Andaman Islands. In India, it is particularly common in tropical regions. It is regarded as a key medicine in the Indian traditional plant system for the treatment of a variety of ailments. It is a very useful medicinal plant that is used in traditional medicine since all sections of the plant have therapeutic characteristics. Anti-inflammatory, analgesic, antidiabetic, anthelmintic, immunomodulatory anticonvulsants, anticancer, antifertility, anxiolytic, and antiviral properties have all been identified for the plant. Alkaloids, flavonoids, terpenoids, glycosides, and saponins are found in phytochemical analysis. The goal of this study is to cover all of the existing research on *Caesalpinia crista* L. morphology characteristics, chemical ingredients, and an overview of its numerous Traditional uses.



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INTRODUCTION:

The fundamental and practical ideas of Ayurveda were organized and enunciated about 1500 BC. Ayurveda has its roots in the Vedas, specifically the Atharvaveda, and is associated with Hinduism. The Atharvaveda (one of India's four oldest books of knowledge, wisdom, and culture) contains 114 hymns or formulas for sickness cure. These hymns are where Ayurveda began and evolved. Ayurveda is said to have divine origins in this manner by some. Indian medicine has a long and illustrious history, and it is one of the world's oldest organized medical systems. The holy scriptures are known as the Vedas, particularly the metrical parts of the Atharvaveda, which may date as far back as the 2nd millennium BC, contain its oldest conceptions.

According to a later writer, Dhanvantari received the medical system from Brahma, and Dhanvantari was referred to as the deity of medicine. His prestige was steadily lowered through time until he was credited with being an earthly monarch. "The major vehicle of information transmission during that era was through oral technique," writes the Sushruta Samhita of Sushruta, which appeared around the 1st millennium BC on the work of the physician Sushruta. Sanskrit was utilized, which was the Vedic language of the time (2000-500 BC). A treatise called "Sushruta Samhita" is the most genuine compilation of his teachings and work. There are 184 chapters in all, including descriptions of 1,120 ailments, 700 therapeutic plants, 64 mineral preparations, and 57 animal medicines [1]. Since the start of human civilization, medicinal plants have been an integral element of human society's efforts to battle sickness. [2, 3]

Early man's search for cures to ease pain and suffering led to the usage of various plants, animal products, minerals, and other natural resources, as well as the invention of a range of therapeutic substances. Traditional medicine is gaining popularity again, and there is a growing desire for additional medications derived from plants. The present prevalent notion that "green medicine" is safer and more trustworthy than expensive synthetic medications, many of which have negative side effects, has rekindled interest in plant-derived pharmaceuticals. [4]

PLANT PROFILE

Caesalpinia is a genus comprising 200 shrubs, trees, and climbers, most of which have spines, hooks, or thorns [5]. Caesalpinia comprises 381 species, 163 of which are approved names,

according to The Plant List (2013). *Caesalpinia* species are found in the tropics and subtropics all over the world, notably in America and Asia, but also in Australia, Polynesia, Madagascar, and Africa [6]. In China, there are 17 different species of the genus. [7]

Caesalpinia crista (Fabaceae) is a prickly shrub or woody vine that may grow up to 10 meters in length and is also known as Sagargoti (Marathi). The rachis is loaded with thick, sharp, recurved spines, and the leaves are bi-pinnate, typically almost 1 m long. The leaflets are likewise arranged in ten pairs and are rectangular, 2 to 5 cm long, and hairy. Flowers are yellow, 1 cm long, and borne in axillary, simple, or paniced racemes. The fruits are rectangular 5 to 7 cm long pods with one or two seeds that are swollen and coated with thin spines. The seeds are big, ovoid or spherical, hairy, greyish, and gleaming. [8]

TAXONOMICAL CLASSIFICATION

- Kingdom: Plantae
- Phylum: Magnoliophyta
- Class: Angiospermae
- Order: Fabales
- Family: Caesalpiniaceae
- Genus: *Caesalpinia*
- Species: *crista*



VERNACULAR NAMES

- Hindi: KatukRanja, Karanjava
- English: Teri pods, Fever nut
- Sanskrit: Karanja, Kantaki, Kuberakshi, Latakaranj, Prakirya, Putrakaranj
- Marathi: Sagargoti, Gajra, kanchak
- Bengali: Lata Karancha
- Gujarati: Kanchaki, Kankachia
- Tamil: Kalarkodi, Kalichikai

- Kannad: Gujugu, Gaduggu
- Telugu: Guchepikka Kachkai, Gachakaya[9]

BOTANICAL DESCRIPTION

Leaves: The plant has big bipinnate leaves with 2-3 pairs of leaflets. The leaves are ovate or elliptic in form, with a shiny top surface and a dull under surface. Stipules are a pair of reduced pinnae 6-8 pair 5-7.5 cm long, with a pair of hook stipulary spines at the back. Leaves are 30-60 cm long, petioles are prickly; stipules are a pair of reduced pinnae 6-8 pair 5-7.5 cm long, with a pair of hook stipulary spines at the back. Leaflets contain 6-9 pairs, measure 2-3.8 by 1.3-2.2 cm, are membranous, elliptic-oblong, obtuse, glabrous above and puberulent beneath, and are membranous, elliptic-oblong, obtuse, glabrous above, and puberulent underneath. [10]



Figure 1: Leaves of Plant *Caesalpinia crista*

Seeds: Seeds are black, ovoid to reniform, flat, and beaked. Seeds are 1-2 in number, oblong in form, and 1.3 cm in length. [10]



Figure 2: Seeds of Plant *Caesalpinia crista*

Pods: The pods are 5cm long, greenish-brown to dark brown to black in color, and normally contain only one seed. Pods are stalked and oblong, measuring 5-7.5 by 4.5cm, with wiry prickles on the faces. [11]



Figure 3: Pods of plant *Caesalpinia crista*

Bark: The bark is black, and the branchlets are glossy and equipped with recurved prickles. (10).



Figure 4: Bark of Plant *Caesalpinia crista*

Flowers: Flowers are golden and fragrant, with axillary and terminal racemes inflorescence forming a 20-40 cm long panicle. Flowers are dense (typically spicate) long peduncled terminal supraaxillary racemes 15-25cm long; pedicels extremely small in the bud, elongating to 5 mm; calyx 6-8 mm long; fulvous-hair lobes obovate, oblong, and obtuse. The petals are golden and oblanceolate. [10]



Figure 5: Flowers of Plant *Caesalpinia crista*

Fruits –They resemble an inflated pod with wiry prickles and hard spines. [12, 13, 14]



Figure 6: Fruits of plant *Caesalpinia crista*

Table 1: Morphological Characters of Plant *Caesalpinia crista*

S. No.	<i>Caesalpinia Crista</i>	Characters
1	Plant Type	Shrub
	Foliage	Evergreen
	Plant Height	Medium (10-20m)
	Plant feature	Forest, ornamental, hillside, Spiny.
	Plant Utilities	Flower and Garden, Commercial and Medicinal Plant.
	Season	Perennial
2	Stem	Hard Wooded
3	Leaf Type	Bipinnately Compound, Elliptical, Ovate
	Leaf Arrangement	Alternate
	Leaf Colour	Green
	Leaf Surface	Glossy
4	Fruit	Inflated pod, covered with wiry prickles, armed with rigid spines
5	Roots	Deep roots, Taproots
6	Seed	Dry and rounded
7	Odour	Characteristic
8	Taste	Bitter

PHYTOCHEMISTRY:

According to the literature, the whole plant contains a variety of compounds such as sitosterol, steroidal saponins, hydrocarbons, fatty acids, caesalpins, phytosterols, bonducin, flavonoids, isoflavones, caesane, caesalpinianone and 6-O-methylcaesalpinianone, hematoxylin, stereochoenol-A, 6-O-acetylloganic acid, 4-O-acetylloganic acid, 2-O- β -D-glucosyloxy-4-methoxybenzenepropanoic acid, diterpenoids, neocaesalpin-H, cordylane-A, caesalpinin-B, bonducellpin-E, caesalpinolide-A, derivatives of amino acids and phenolic compound [15,16,17,18].

Leaves: It contains pinitol glucose and calcium, bonducin, Cysteric acid [19].

Root: It contains cassanefurano-diterpene, caesalpinin, caesaldekarins F and G, caesaldekarin A, Bonducellpins A, B, C, and D, steroidal saponin like Diosgenin [20].

Bark: It contains 6-o-methylcaesalpinianone, caesalpinianone, hematoxylool, 6-o-acetylloganic acid, 4-o-acetylloganic acid, and 2-o-glucosyloxy-4-methoxybenzenepropanoic acid [21].

Stem contains peltogynoids, pulcherrimin, 6-methoxypulcherrimin, 8-methoxybonducellin, 2, 6-dimethoxybenzoquinone, 2', 4, 4'-trihydroxychalcone and 2', 4-dihydroxy 4'-methoxy chalcone [22].

Seed: It contains Natin, Bonducin (Bonducellin), Steroidal saponins, 14-Voucapanepentol derivative, Caesalpin (1-ketone 6, 7-diacetylcassane), vinaticole, caesalpin-F, myristic acid, vouncapen and cassaic acids, caesalpin-Y, Caesalpins-E, phytosterinin, α -caesalpinin 4-o-methyl myoinositol hydrate, cassanefuranoditerpenoidhomoisoflavone-bonducillin, as bonducellpin E, F and G, amino acids like aspartic acid, lysine, leucine, glycine, L-alanine, histidine, isoleucine, arginine, threonine, phenylalanine, cysteine, valine, citrulline, tyrosine, glutamic acid, serine, proline, tryptophan, methionine, r-ethylidene glutamic acid, r-ethyl glutamic acid and r-methylene glutamic acid, [23, 24].

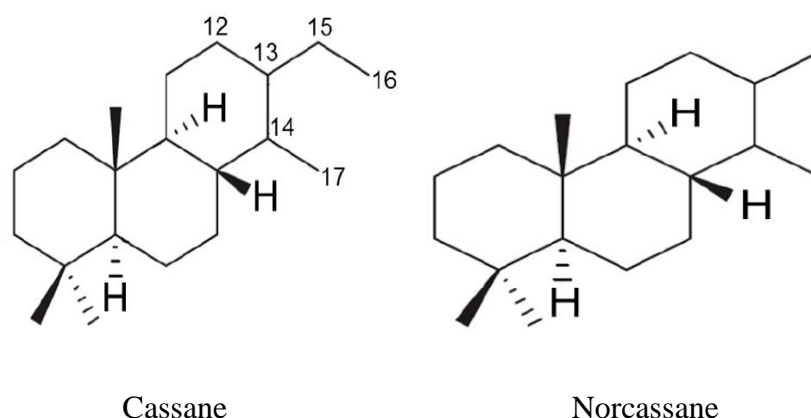


Figure 7: Chemical constituents of plant

TRADITIONAL USES [10, 11]

C. cristais beneficial to plants in reducing cognitive difficulties, according to research findings. Plant components were used in traditional applications.

Leaves: The finely powdered leaves are used as a uterine tonic after giving birth. The juice of the leaves is anthelmintic and may be used to treat elephantiasis and smallpox, and the boiled leaves can be gargled for a sore throat. The juice of the leaves or the powder of the roasted seeds is used with Palasa, Amra, and Haridra to treat worm infestations. The leaves evacuate Vata and relieve constipation when cooked in ghee, making them effective in piles. It's an old bitter tonic. Coughs and asthma can both be treated with it. The tender leaves (fresh juice) are given in conjunction with honey to prevent mucous discharges. The leaves' oil is useful as a nervine tonic. Because it considerably lowers Vata Dosha, it is the best treatment for flatulence-related stomach pain. Malaria therapy is also possible using marica and latakaranja powders. For splenic enlargement induced by malaria, Latakarnja is an excellent choice.

Root: The root is a diuretic, therefore it can help with bladder stones. A decoction of the root is suggested in the case of a fever. For its great health benefits, a root decoction has been used to treat rheumatism, backache, and tonic.

Stem and fruit: The stem and roasted fruits are used to help with eye problems. Fruit is reported to contain tannins and flavonoids. In the Hawaiian Islands, the pulp of the pods is used as a laxative, blood cleanser, and congestion reliever. The fruit is used to cure urinary discharges, piles, leucorrhoea, and wounds, and as an aphrodisiac and anthelmintic. Indolent ulcers benefit from the oil of the fruit.

Wood: Brazilin, a natural food coloring ingredient, is found in wood. The heartwood is bitter, astringent, constipating, pleasant, sedative, and hemostatic, according to Ayurveda. It helps with skin problems, convulsions, menorrhagia, diarrhea, wounds, burning sensations, diabetes, ulcers, epilepsy, dysentery, leucorrhoea, and hemorrhages, among other things.

Bark: The bark has been used as an anthelmintic, a febrifuge, and to treat inflammation topically. The root bark is used to treat tumors and remove the placenta.

Seeds: Liver diseases are said to be cured by mixing powdered seeds with sugar and goat's milk. Intermittent fever, asthma, and colic are treated with the Kernels. The oil from conserved seeds has been found to have antimicrobial properties, but the oil from fresh seeds does not. Sprouts are beneficial in the treatment of cancer. The seed is hot and dry; it is styptic, antiperiodic, and anthelmintic, and it prevents communicable infections by curing inflammations. It is used to treat colic, malaria, hydrocele, skin problems, and leprosy.

Flower: The bitter flower treats Kapha and Vata, while the ash is used to treat ascites.



Table 2: Pharmacological Studies of *C.crista* [25]

S. No.	Plant Part	Extract	Activity
1	Seed	Ethanol	Antioxidant Analgesic/ Anti-Inflammatory
	Seed	Ethanol	Antioxidant
	Seed	Ethanol, Aqueous	Antipyretic
	Seed	Ethanol, Aqueous	Anti-inflammatory /Analgesic/ Antipyretic
	Seed	Ethanol	Antidiabetic
	Seed	Alcohol	Sperm effect
	Seed	Various extract	Antifilarial
	Seed	---	Anxiolytic
	Seed	Methanol	Antitumor
	Seed	---	Adaptogenic
	Seed	Alcohol	Wound healing
	Seed	Alcohol	Antiestrogenic
	Seed	Ethanol	Antifertility
	Seed	Aqueous	Immunomodulatory
2	Leaves	Ethanol	Hepatotoxicity and Nephrotoxicity
	Leaves	Methanol	Anti-carcinogenic
	Leaves	Aqueous	Anti-Amyloidogenic / Alzheimer's disease
	Leaves	Methanol, Chloroform	Antioxidant
	Leaves	Various extract	Anti-viral
3	Bark	Aqueous	Anthelmintic

CONCLUSION:

Modern health care facilities with expensive drugs are still out of reach for the rural section in a developing country. As a result, it's critical to check into herbal medicine possibilities. As a result, ethnomedical studies have gotten a lot of interest since they reveal a lot of recognized and undiscovered medical qualities, mainly of plant origin, that need to be studied using current scientific methods such as phytochemical analysis, pharmacological screening, and clinical investigations. As stated in this review, *C. crista* has a number of key pharmacological properties. Furthermore, further pre-clinical and clinical investigations, as

well as the implementation of stronger quality control systems, are required to fully understand this plant's untapped potential.

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