

TRADITIONAL USES, MEDICINAL AND PHYTOPHARMACOLOGICAL PROPERTIES OF CAESALPINIA CRISTA LINN - AN OVERVIEW

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ABSTRACT

Caesalpinia Crista of family Fabaceae is a moderately size deciduous tree, growing wild throughout the deciduous forest of India. It is popular in indigenous system of medicine like Ayurveda, Siddha, Unani and Homoeopathy. In the traditional system of medicine various plant parts such as leaves, stem, root, seed and oils are used as anthelmintic, febrifugal, periodic, tonic, and vesicant. They are used to treat colic, convulsions, leprosy, and palsy. The oil from the seeds is said to soften the skin and remove pimples. The bark is antiperiodic, rubefacient and to counteract toothache.

The present review is therefore, an effort to give a detailed survey of the literature on its Phytopharmacological and medicinal properties and traditional uses.

Keywords: Phytopharmacological, Fabaceae, febrifugal, rubefacient, collyrium.

INTRODUCTION

Medicinal plants continue to be an important therapeutic aid for alleviating the ailments of human kind. The search for eternal health and longevity and for remedies to relieve pain and discomfort drove early man to explore his immediate natural surroundings and led to the use of many plants, animal products, and minerals, etc. and the development of a variety of therapeutic agents. Today, there is a renewed interest in traditional medicine and an increasing demand for more drugs from plant sources. This revival of interest in plant-derived drugs is mainly due to the current widespread belief that "green medicine" is safe and more dependable than the costly synthetic drugs, many of which have adverse side effects.

Description¹

Caesalpinia Crista of family Fabaceae is a prickly shrub or woody vine reaching a length

of 10 m or more also known as Sagargoti (Marathi). Leaves are bi-pinnate, often nearly 1 m long, with the rachis armed with stout, sharp, recurved spines. The leaflets also number 10 pairs and are oblong, 2 to 5 cm long and somewhat hairy. The Flowers are yellow, borne in axillary, simple or paniced raceme and about 1 cm long. The fruits are pods, oblong 5 to 7 cm in length, inflated and covered with slender spines and contain one or two seeds. The seeds are large, somewhat rounded or ovoid, hairy, grey and shiny.

Uses^{2,3}

The famous utility in Satpuda region among the Adivasi people is anthelmintic. The other mentioned utility of different parts like seeds are sometimes used in necklaces are considered febrifugal, periodic, tonic, and vesicant. They are used to treat colic, convulsions, leprosy, and palsy. The oil from the seeds is said to soften the skin and remove

pimples. The bark is antiperiodic, rubefacient and plant to counteract toothache. A leaf decoction is as collyrium.

The different parts such as Leaves, seed, root, bark is also used in Colic fever, intermittent fever, malaria, menstrual complaints, pneumonia, skin diseases, swelling, tonic, pulmonary tuberculosis and as a uterine stimulant, to cleanse the uterus. It also alleviates the fever, edema and abdominal pain during this period.

SYNONYMS

Caesalpinia paniculata, Caesalpinia paniculata, Guilandina paniculata,

Guilandina semina Lour.

VERNACULAR NAMES⁴

English name: Teri pods, Fever nut.

Hindi: Katuk Ranja, Karanjava.

Marathi: Sagargoti, Gajra, kanchak.

Sanskrit: Putrakaranj.

Gujarati: Kanchaki, Kankachia.

Bengali: Lata Karancha.

Kannad: Gujugu, Gaduggu.

Tamil: Kalarkodi, Kalichikai.

Telugu: Guchepikka Kachkai, Gachakaya.

Konkani: Vakeri.



Fig.1: Flowers of *C. crista*



Fig.2: Fruits of *C. crista*

TAXANOMY

Caesalpinia crista falls under the scientific classification as follows

Scientific classification

Kingdom: Plantae

Phylum: Magnoliophyta

Class: Angiospermae

Order: Fabales

Family: Fabaceae

Genus: Caesalpinia

Species: *Caesalpinia crista*.

HABIT AND HABITAT⁴

The plant grows all over India especially in sea coast and in many forests and hills. It is frequently found around the marshy land, plain land. The Plant is a prickly shrub or woody vine reaching a length of 10 m.in height.

Table 1: Morphological and General Characters

Plant Type	Shrub
Foliage	Evergreen
Roots	Deep roots, Tap roots
Type of stem	Hard Wooded
Leaf Type	Bipinnately Compound, Elliptical, Ovate
Leaf Arrangement	Alternate
Leaf Colour	Green
Leaf Surface	Glossy
Odour	Characteristic
Taste	Bitter
Plant Height	Medium (10-20m)
Actual Height	Maximum: 15 Meter
Plant feature	Forest, hill side, ornamental, sea side plant, Spiny.
Plant Utilities	Flower and Garden, Industrial, Commercial and Medicinal Plant.
Season	Perennial

PHYTOCONSTITUENTS PRESENT

The preliminary phytochemical investigation showed the presence of carbohydrates, alkaloids, Glycosides, tannins, flavonoids & Coumarins.

TRADITIONAL/AYURVEDIC UTILITIES ⁴

Caesalpinia crista is used in vast range of diseases. It is the best panacea for abdominal pain due to flatulence, as it effectively alleviates the vata dosha. The powder of its roasted seeds with ghee mitigates the condition and relieves the pain. During postpartum period, the abdominal pain is eliminated with the roasted seed powder, asafoetida, ghee and little amount of salt. The seeds powder, given with milk, controls the diarrhea. The skin of the seed being astringent is beneficial as a medicament for diarrhea, dysentery and colitis. In worm infestations, the juice of its leaves or powder of its roasted seeds is given along with palasa, amra and haridra.

Latakaranja (combination of its roasted seeds powder and pippali (1:1) with honey) is the best medication for malarial fever. The combination of its roasted seeds powder, pippali (1:1) is given with honey, approximately 0.5 gm., three times a day for 3-4 days duration. Another combination recommended for malaria is the powders of marica and latakaranja (Sakra vati). The splenic enlargement due to malaria, responds well to latakarnja. The leaves fried in ghee, eliminate vata and relieve constipation, hence valuable in piles.

The seeds are stimulant to the uterus, improve the menstrual discharge in oligomenorrhea and reduce the pain in lower abdominal region. The skin of the seed is extremely beneficial in the treatment of leucorrhea. The seeds also render contraceptive activity. Latakaranja is used as a bitter tonic. It is also a useful remedy for cough and asthma, as it alleviates the kapha dosha. For this purpose, the tender leaves (fresh juice) are given along with the honey to ward off the mucous secretions. The oil prepared from the leaves, is a valuable nervine tonic.

PHYTOCHEMICAL PROPERTIES⁵

The literature has revealed that seeds and leaves of plant contain around fourteen compounds. The isolated compounds are cassane-and norcassane-type diterpenes. The

stem part and root part constituents two novel peltogynoids, pulcherrimin and 6-methoxypulcherrimin, one novel homoisoflavonoid, 8-methoxybonducellin, and the known compounds bonducellin, 2, 6-dimethoxybenzoquinone, 2', 4', 4'-trihydroxychalcone and 2', 4-dihydroxy-4'-methoxychalcone.

From the methanolic extract of seed kernels of Caesalpinia crista from Myanmar, five new cassane-type diterpenes, caesalpinins MA-ME (1-5), and three new norcassane-type diterpenes, norcaesalpinin MA-MC (6-8), have been isolated, together with 12 known cassane-type diterpenes, 14(17)-dehydrocaesalmin F, caesaldekarin e, caesalmin B, caesalmin C, caesalmin E, 2-acetoxy-3-deacetoxycaesaldekarine, 2-acetoxycaesaldekarine, caesalpinin C, 7-acetoxybonducellin C, caesalpinin E, norcaesalpinin B, and 6-acetoxy-3-deacetoxycaesaldekarine.

PHARMACOLOGICAL PROPERTIES

1. Anthelmintic activity⁶

The bark extract of Caesalpinia crista (L.) were evaluated for anthelmintic activity using adult earthworms, which exhibited a spontaneous motility (paralysis) With 50 mg/ml of aqueous extract the effects were compared with 3% piperazine citrate. There was no final recovery in the case of worms treated with aqueous extract in contrast to piperazine citrate, the worms recovered completely within 5 hrs. This result shows the anthelmintic nature of the extract.

Anthelmintic activity of Caesalpinia crista (L.) against trichostrongylid nematodes of sheep, study showed C. crista possess anthelmintic activity in vitro and in vivo, supporting its traditional use in Pakistan.

2. Antimalarial activity⁷

Most of the plant from Caesalpinia species shows antimalarial activity. The isolated diterpenes such as 44 cassane- and norcassane-type diterpenes. Most of the tested diterpenes showed antimalarial activity, norcaesalpinin E showed the most potent activity, more than the drug chloroquine.

3. Antioxidant activity⁸

Study showed the methanolic extract of Caesalpinia crista has potent antioxidant activity and ROS scavenging activity as well as

iron chelating property. (2) Ethyl acetate extract showed a maximum of 49% free radical scavenging activity at the end of 1 hr.

4. Antidiabetic / Hypoglycemic^{9,10}

Most of the plant from *Caesalpinia* species shows Antidiabetic and Hypoglycemic activity. The ethanolic extract (250mg/kg/day) lowered blood glucose level within 2 weeks in the alloxan diabetic albino rats confirming its hypoglycemic activity. β -sistosterol isolated from the stem bark was found to possess potent hypoglycemic activity when compared to other isolated compounds.

(1) The seed kernel of *Caesalpinia bonducella* has significant antidiabetic and hypoglycemic effects. Activity may be partly due to a positive effect on glycogen synthesis in the liver, skeletal muscle and heart muscle due to an insulin-like action of its constituents and partly due to stimulatory action on insulin release.

(2) The ethanolic and aqueous extracts showed significant blood sugar lowering effect of *C. bonducella*.

(3) The aqueous extract of *C. bonducella* seed shell showed very significant blood sugar lowering in glucose loaded STZ and alloxan diabetic models.

5. Antifilarial¹¹

The *Caesalpinia bonducella* seed kernel extract and fractions showed microfilaricidal, macrofilaricidal and female-sterilizing efficacy against *L. sigmodontin* and microfilaricidal and female-sterilizing efficacy against *B. malayi* in animal models, suggesting a potential for its use in new antifilarial drug development.

6. Anxiolytic Activity¹²

The seed extract of *C. bonducella* showed a significant and dose dependant anxiolytic activity.

7. Antitumor / Antioxidant Activity¹³

Study of methanol extract of *Caesalpinia bonducella* showed significant antitumor and antioxidant activity in Erlich ascites carcinoma (EAC)-bearing mice.

8. Analgesic Activity:¹⁴

The flower extract of *Caesalpinia bonducella* showed significant antinociceptive effect in the inflammatory phase of formalin-induced pain and acetic- induced peritoneal pain.

9. Analgesic / Antipyretic / Anti-Inflammatory¹⁵

The seed oil of *Caesalpinia bonducella* could be a potential source of an anti-inflammatory, antipyretic and analgesic agent.

10. Immunomodulatory¹⁶

The aqueous extract of *Caesalpinia bonducella* seeds on cell mediated and humoral components of the immune system in rats produced an increase in hemagglutinating antibody titer and a change in delayed-type hypersensitivity suggesting that the extract could be a promising immunostimulatory agent.

11. Anti-Amyloidogenic / Alzheimer's disease¹⁷

Caesalpinia crista leaf aqueous extract has anti-amyloidogenic potential. Study showed aqueous extract of *C. crista* could inhibit the Abeta (42) aggregation

From monomers and oligomers and able to disintegrate the preformed fibrils.

12. Nootropic / Memory Enhancer¹⁸

Dried seed kernels of *Caesalpinia crista* extract have a potential as a learning and memory enhancer. Results suggest *C. crista* can be beneficial in improving cognition in disorders like dementia and other neurodegenerative disorders.

CONCLUSION

The present study shows the Phytopharmacological properties of various bioactive compounds present in the plant. The leaves, seed kernels, seed oil, flowers and fruits are used in India for the treatment of various diseases. The different extracts of *Caesalpinia crista* shows anthelmintic activity, anti-amyloidogenic activity, immunomodulatory, analgesic, antipyretic, anti-inflammatory, antitumor, antioxidant activity, antidiabetic and hypoglycemic activity, and also used as nootropic or memory enhancer.

The pharmacognostic parameters, which are being reported, could be useful in the identification and standardization of a crude drug. The data produced in the present investigation is also helpful in the preparation of the crude drug's monograph and inclusion in various pharmacopoeias. However, more Clinical and Pathological studies should be

conducted to investigate the active potentials of bioactive compounds present in this plant.

REFERENCES

1. Arya Vaidya Sala. Indian medicinal plants, a compendium of 500 species. Madras: Orient Longman Ltd.; 2002;5 :261 – 262.
2. Marie D'souza. Tribal Medicine; Social center, Ahmednagar, India, 1st Edition, 1998;300.
3. Sarota Cheenprach et al, Helvetica Chemica Acta. Switzerland: 2006 ;89(5): 1062 -1066.
4. Nadkarni AK and Nadkarni KR. Indian Materia Medica, Popular Prakashan, Bombay, 1976;1: 226 - 229.
5. Mc Pherson DD. Diss Abstr. Int. 1988; 48(8):2330.
6. Abdul Jabbar, Muhammad Arfan Zaman, Zafar Iqbal, Muhammad Yaseen and Asim Shamim. Anthelmintic Activity of *Chenopodium album* (L.) and *Caesalpinia Crista* (L.) Against trichostrongylid nematodes of sheep, Journal of Ethnopharmacology. 2007;114(1): 86-91.
7. Surya Kant Kalauni, Suresh Awale and Yasuhiro Tezuka. Antimalarial Activity of Cassane and Norcassane Type Diterpenes from *Caesalpinia Crista* And their Structure Activity Relationship, Biological and Pharmaceutical Bulletin. 2006;29(5):1050 -1052.
8. Sourav Mandal. Assessment of the Antioxidant and Reactive oxygen Species Scavenging Activity of Methanolic Extract of *Caesalpinia crista* Leaf, Evidence based Compl. And Alt Medicine. 10:1093, 072.
9. Gayatri Sarma. Hypoglycemic Action of Seed Kernel of *Caesalpinia Bonducella* Fleming in Normal and Alloxan Induced Diabetic Albino Rats, Internet Journal of Pharmacology. 2009;6(2).
10. Sudeep Parameshwar, Srinivasan KK and Mallikarjuna Rao C. Oral Antidiabetic Activities of Different Extracts of *Caesalpinia Bonducella* Seed Kernels, Summary Pharmaceutical Biology. 2002;40(8):590-595.
11. Gaur RL. Antifilarial activity of *Caesalpinia Bonducella* against Experimental Filarial infections. Indian J Med Res. 2008;128: 65-70.
12. Venkat Rao N. Anxiolytic Activity of Seed Extract of *Caesalpinia Bonducella* (Roxb) In Laboratory animals, Internet Journal of Pharmacology, 2008.
13. Malaya Gupta. Antitumor Activity and Antioxidant Status of *Caesalpinia Bonducella* against Ehrlich Ascites Carcinoma in Swiss Albino Mice, Journal of Pharmacological Sciences. 2004;94(2):177-184.
14. Aruna Devi R. Analgesic Activity of *Caesalpinia Bonducella* Flower Extract, Summary Pharmaceutical Biology. 2008; 46(10-11): 668-672.
15. Shukla Shruti. Studies on Anti-inflammatory, Antipyretic and Analgesic Properties of *Caesalpinia Bonducella* F. Seed Oil in Experimental Animal Models, Food and Chemical toxicology. 2010;48(1): 61-64.
16. Shukla Shruti. In Vivo Immunomodulatory Activities of Aqueous Extract of *Caesalpinia Bonducella* Seed, Pharmaceutical Biology (Formerly International Journal of Pharmacognosy). 2010;48(2):227-230.
17. Ramesh BN, Indi SS and Rao KSJ. Anti-amyloidogenic Property of Leaf Aqueous Extract of *Caesalpinia Crista*, Neuroscience Letters 3/2010, DOI:10.1016/j.neulet.2010.03.062.
18. Sunil N Kshirsagar. Nootropic Activity of Dried Seed Kernels of *Caesalpinia Crista* Linn against Scopolamine Induced Amnesia in Mice, International Journal of PharmTech Research, 2011; 3(1):104-109.