



**PHARMACOGNOSTIC, PHYTOCHEMICAL AND PHARMACOLOGICAL REVIEW ON
KHADIRA ACCORDING TO ANCIENT AND CONTEMPORARY SCIENCES**

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ABSTRACT

Ayurvedic medicines mainly obtained from plants, which offer diversified medicinal properties. Utilizing these botanical resources for treating various ailments dates back to ancient times. In this regards many herbs are yet to be explore to establish their properties and therapeutic efficacy. In this regards Khadira or Cutch tree (*Acacia catechu*) considered as an important plant that already studied extensively. However there is need to discuss some important aspect of this plant so that researchers of field can get benefited. This evergreen tropical tree possesses anti-diabetic, antimicrobial, antidiarrheal, anti-inflammatory and antipyretic, etc. activities. Ancient texts such as Sushrut Samhita, Charaka Samhita and Nighantu Granthas described Ayurvedic properties and therapeutic uses of this plant. Present article explained various aspect of this plant as per Nighantu.

KEYWORDS: Ayurveda, Khadira, Cutch, Nighantu, *Acacia catechu*.

INTRODUCTION

The involvement of Ayurvedic medicine into our healthcare system has gained prime importance since natural medicines utilized in both ways traditionally as well as in modern scientific research. Ayurvedic medicines play a crucial role in promoting health and preventing illnesses. In Ayurveda, numerous herbs are enlisted for treating various ailments and plant *Acacia catechu* is one of them which also known as the cutch tree and belonging to the *Fabaceae* family. Cutch tree described as *Khadira* in Ayurveda, it holds significance in both rituals and medicinal applications. The heartwood of *Khadira* is renowned for its strength and is

employed as a wedge in the manufacturing of chariots. *Khadira* served dual purposes, being utilized as firewood and in the construction of vessels and containers. Studies reveal the presence of diverse flavonoids, phenolic and alkaloids compounds in plant, these compounds enrich the medicinal potential of plant. The essence derived from the heartwood is applied externally, akin to a precious stone. Ayurveda *Samhita* mentioned its use in treating *Kilasa* and *Vişaroga*. Ayurvedic texts highlight *Khadira* twig as an excellent toothbrush due to its *Kaşaya* taste. Table 1 depicted some botanical description about the plant.^[1-5]

Table 1: Botanical descriptions and synonyms of plant *Khadira*.

Kingdom	<i>Plantae</i>
Division	<i>Equisetopsida</i>
Order	<i>Fabales</i>
Family	<i>Fabaceae</i>
Genus	<i>Acacia</i>
Vernacular Names	<i>Khair, Khayar, Kachu, Khadira, Kadiramu, Kathu, Khaira and Chanbekaath</i>

Description according to Vedic Period

In the *Vedas* this medicinal substance is referred to as *Khadira*, during the *Vedic* era, it found widespread use for various purposes as *Kriminashana*, *Bala*, *Veerya* and *Bhuthi Manibandhan*. It was considered as a potent anti-bacterial remedy since *Niryas* derived from this substance recognized for its anti-bacterial properties. The *Ashwatha* growing on the *Khadira* is considered a highly potent medicinal remedy as described in ancient text. *Rigveda* also mentioned the utilization of *Khadira* as *Manibadhan* for *Graha dosha* and its positive effects on *Savitha*, *Bhrihaspathi*, *Varuna* and *Chandrama* for *Graha Nivaran*.^[4-6]

The Ayurvedic property of plant is depicted in **Figure 1**.

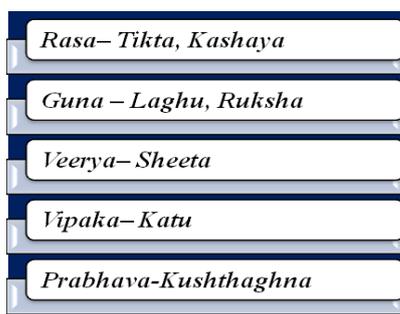


Figure 1: General properties of *Khadira* plant.

Different Species of Plant

- *Samhitas* referred *Khadira* and *Kadara* for *A. catechu* and *A. suma Buch*, respectively.
- *Dhanvantari Nighantu* described two varieties *Khadira* and *Somavalka*.
- *Raja Nighantu* described five varieties; *Somavalka*, *Khadira*, *Tamrakantaka*, *Arimeda* and *VitKhadira*.
- *Nighantu Ratnakaram* gives term *Valli Khadira* for Cutch tree.

Description according to Samhita Period

❖ *Charaka Samhita*

Khadira was mentioned in the *Kushthagha* and *Kashaya Kskandhagana*; used primarily for skin disorders, especially for *Kushtha*, and as *Vranaropanadravyas* in the treatment of *Vranas*. *Charaka Samhita* outlines the use of this plant for various conditions, including managing *Raktapitta* and *Prameha*, etc.

❖ *Chakrapani*

Chakrapani described the versatile uses of *Khadira*, such as relieving *Swarbheda*, also recommended for oral diseases, described for both external and internal skin diseases, as a *Shodhana* for inflamed parts and in decoction form for the management of ulcers.

❖ *Sushruta*

Khadira described in the *Salsaradilgana* by *Sushruta* due to its effectiveness against *Kushtha*, *Meha* and *Pandu*. *Sushruta* lists therapeutic uses of *Khadira* as a *Rasayana*, remedy for *Prameha*, *Raktapitta*, as *Krimihara* for

treating *Kushtha* and *Vranas*, also described used in *Shwasa* and *Kasa* due to its *Kaphara* property.^[6-8]

Important formulations

- *Khadiraristha*
- *Amritastaka*
- *Astangadasangalanha*
- *Kusthakalamla rasa*
- *Krimivinasana rasa*
- *Palosabijadichurna*
- *Jatyadigrita*
- *Kasisadigrita*

Pharmacognostic, Phytochemical and Pharmacological Descriptions

It is a thorny deciduous tree of medium size, reaching heights between 3 to 15 meters. The stem is straight and grayish-brown, while the bark ranges from dark grey to dark grayish-brown, exfoliating in narrow strips of brown and red on the inside. The leaves are bipinnately compound, featuring 9-30 pairs of pinnae and a pubescent glandular rachis. The leaflets, numbering 16-50 pairs, are oblong-linear, measuring 2-6 mm long.

The flowers, actinomorphic to zygomorphic, are 5-10 cm long, sessile, pentamerous, and range from creamy whitish to pale yellow. The campanulate calyx is 1-1.5 mm in length, and the corolla measures 2.5-3 mm. Stamens are numerous, far exerted from the corolla, featuring white to yellowish-white filaments. The flowers are bisexual, possessing a single superior carpel. The pod is a one-chambered legume, glabrous, oblong, 3-10 seeded, straight, flat, and brown, with a triangular beak at the apex, appearing shiny and narrowed at the base.

The heartwood is light red, transitioning to brownish-red and eventually nearly black with age. It is attached to whitish sapwood. The fracture is hard, with a characteristic odor, and the taste is astringent. The gummy extract from the wood, known as *katha* or *cutch*, is mostly a shining black or brownish mass, hard and brittle, breaking easily. Fractured surfaces exhibit a brownish color but lack gloss, featuring small cavities. When ground, it produces a dull brown, fine, odorless powder with a strong astringent taste.

Plant mainly contains B-sitosterol, pinene, cineol, linolenic, linolic, oleic, myristic, stearic acids, copaene, cyperotundone, sesquiterpenes, cyperolone, aureusidin, sesquiterpenicketoalcohols, kobusone, oleanolic acid, isokobusone, sitosterol, sesquiterpenes, cyperene and β -selineine, etc.^[8-11]

Therapeutic Properties and Uses

- *Doshaghata: Kaphapittashamaka*
- *Rogaghata: Atisara, Prameha, Kushtha, Kaphajakasa and Raktapitta*
- *Karma: Stambhana, Shonitasthapana, Ruchivardhaka and Kandughna*

As mentioned above the plant is useful in *Atisara*, *Kushtha* and *Raktapitta*, etc. due to its *Stambhana*, *Ruchivardhaka*, *Kandughna* and *Kaphapittashamaka* properties. The bark is employed in the treatment of conjunctivitis and melancholia. The heartwood possesses astringent, depurative, anthelmintic, antidyenteric, antiseptic, haemostatic, anti-inflammatory and antipyretic properties. It is considered useful in addressing conditions such as cough, leprosy, skin diseases, anorexia, diarrhea, leucoderma, wounds, haemoptysis, hemorrhages, anemia, diabetes and fever. In cases of toothache and loss of voice, a small piece of catechu, along with cinnamon and nutmeg, is applied.

- ❖ The *Acacia catechu* demonstrated noteworthy antioxidant activity; these attributes are attributed, in part, to the presence of phenolic and flavonoid compounds within the extract.
- ❖ The plant also displayed antidiarrheal activity; the tannin content in the extract is believed to be responsible for its astringent properties, contributing to its antidiarrheal effects.
- ❖ The antipyretic effect of *Acacia catechu* is attributed to the presence of flavonoid compounds, with certain flavonoids acting as predominant inhibitors of cyclooxygenase or lipooxygenase.
- ❖ Plant exhibits hypoglycemic activity, potentially due to the presence of flavonoids acting as insulin secretagogues.
- ❖ The heartwood of plant possesses hepato-protective properties. The hepatoprotective activity is linked to the presence of bioflavonoids.^[12-14]

CONCLUSION

Ancient and modern texts revealed medicinal properties of *Khadira* in various conditions including diabetes, worm manifestation, skin disorders, ulcers and liver disorders, etc. It is characterized by *Tikta* and *Kshaya* in *Rasa*, *Laghu* and *Ruksha* in *Guna*, *Sheeta* in *virya*, *Katu* in *vipaka* and *Kapha-pitta shamak* properties. Notable chemical constituents found in plant which include Kaempferol, Rutin, Catechin, Ferulic acid, saponins, tannins and Caffeic acid, etc. Various components of the plant have found applications in traditional medicine systems, harnessing its anti-diabetic, antidiarrheal, antipyretic, antibacterial, hepatoprotective and anti-inflammatory activities. Ancient texts also described various species which includes *Khadira* and *Kadara* (*Samhitas*), *Khadira* and *Somavalka* (*Dhanvantari Nighantu*), *Somavalka*, *Khadira*, *Tamrakanṭaka*, *Arimeda* and *VitKhadira* (*Raja Nighanṭu*). *Khadiraristha*, *Amritastaka*, *Astangadasangalanha*, *Kusthakalamla rasa*, *Krimivinasana rasa*, *Jatyadigrita* and *Kasisadigrita* are major formulations of *Khadira* described in ancient Ayurveda texts.

REFERENCES

1. Dr. Chunekar K.C., Singh T.B., Glossary of Vegetable Drugs in Brihatrayi, Chaukhamba Amarabharati Prakashan, 1972; 513.
2. Dr. Sastry J.L.N, Illustrated DravyagunaVijnana, Study of the Essential Medicinal Plants in Ayurveda, vol-2, Chaukhambha, Orientalia, reprint, 2014; 205-208.
3. Anitha Magesh, Lakshmi T. Preliminary phytochemical analysis of *Acacia catechu* Willd Heartwood extract. Research J. Pharm. and Tech, 2012; 5(11): 1393-1395.
4. Sharma P.V, Dravyaguna Vijnana, text book Vol-2 Reprint edition, Varanasi, India, Chaukhamba Academy, 2011; 159.
5. Dr. Gyanendra Pandey; Madana Pal Nighantu, Chaukhambaorientalia, Varanasi, edition, Abhayadi Varga, 2012; 193.
6. Ram, Sukha & Sharma, Ritu & Kotecha, Mita & Joshi, Krutika. Preliminary Pharmacognosy Evaluation of The Bark of *Acacia Catechu* (Wild.). International Research Journal of Ayurveda & Yoga. 04. 10.47223/IRJAY.2021.4420, 2021.
7. Acharya P.V. Sharma, Dr. Guruprasad Sharma; KaidevaNighantu, Chaukhamba Orientalia; Varanasi; Aushadhadi Varga, 130.
8. Muhammad Anis Hashmat, Rabia Hussain; A review on *Acacia catechu* Willd; Interdisciplinary Journal Of Contemporary Research In Business, 2013; 5: 1.
9. Jyoti, Vandana Garg. Evaluation of physicochemical parameters of *Acacia catechu* Willd. Research Journal of Pharmacy and Technology, 2022; 15(10): 4485-9.
10. Dr. Chunekar K.C., Singh T.B., Glossary of Vegetable Drugs in Brihatrayi, 1972, Chaukhamba Amarabharati Prakashan, 111.
11. Sushruta. Susurta Samhita, Sutra Sthana. Susrutvimarshni Hindi commentary by Anantaram Sharma SubharatiPrakashana, Varanasi, 2004.
12. V. Sharma and G. P. Sharma, "Dhanvantari Nighantu," Chaukhambha Orientalia, Varanasi, Dhanavantari Nighantu, Chaturthavarga, 2008; 121-122.
13. K.C. Chunekar; Bhavaprakash Nighantu, CVhaukhamba Bharati Academy, Reprint, 2018; 518.
14. Kumari M, Radha, Kumar M, Zhang B, Amarowicz R, Puri S, Pundir A, Rathour S, Kumari N, Chandran D, Dey A, Sharma N, Rajalingam S, Mohankumar P, Sandhu S, Pant N, Ravichandran RP, Subramani M, Pandi K, Muthukumar M, Zengin G, Mekhemar M, Lorenzo JM. *Acacia catechu* (L.f.) Willd.: A Review on Bioactive Compounds and Their Health Promoting Functionalities. Plants (Basel), 2022 Nov 14; 11(22): 3091.