

A COMPREHENSIVE REVIEW OF *CEDRUS DEODARA* (ROXB.) LOUD. WITH SPECIAL REFERENCE TO NIGHANTUS

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ABSTRACT

Medicinal plants play an important role in the health care of human beings. *Devadaru (Cedrus deodara (Roxb.) Loud.)* is an evergreen tree having strong, oily, aromatic wood and light yellowish-brown to brown in colour white heartwood. The parts of Devadaru that are used for medicinal purposes are- heartwood, oil, leaf, bark and resin. In this present study heartwood of Devdaru was used. It consists of various chemical constituents like Dihydromyricetin, cedrine, centdarol, naringenin, B-sitosterol, stigmasterol, camphesterol, deodorin and cedrin oxide etc. Its main properties are presence of Tikta Rasa, Laghu, Snigdha Gunas, Ushna Virya and Katu Vipaka. It has Kapha-vata shamak, Dipan, Pachan, Medohara, Vedanasthapan, Sothahara, Lekhan, Swedajanan properties. Many pharmacological activities of

Cedrus deodara have been reported in-vivo and in-vitro. Various parts of this plant bear anti-inflammatory, immuno modulatory, antispasmodic, anticancer, anti-apoptotic, anti-bacterial as well as other activities. It is rich in tannins, flavonoids and various alkaloids which gives it immense medicinal value. It has been mentioned in various Samhitas like- Charak Samhita, Susruta Samhita and in various Nighantus like Bhavaprakash Nighantu, Saligram Nighantu, Raj Nighantu etc for various medicinal uses.

KEYWORDS: Samhitas, Nighantus, Anti-inflammatory, Anti-bacterial, Anti-cancer.

INTRODUCTION

Herbal medications are becoming increasingly popular with the impression that they cause fewer side effects in comparison with synthetic drugs.^[1] The World Health Organization (WHO) has introduced traditional medicine as therapeutic remedies used historically in different societies. Chinese, Roman, Greek, Egyptian, Indian, and Syrian texts comprise the documents that indicate therapeutic remedies have been used for about 5000 years.^[2,3] Even now, most of the world population, especially rural people, use herbal medicine for their common ailments due to the lack of financial resources and poor health facilities.^[4] Herbal medicines are considered safe because they are “natural”. Devdaru is a large evergreen tree upto 80 m high and girth about 15 m, with spreading branches and attractive dark green foliage. It is distributed widely in North West Himalayas from Kashmir to eastwards in Jammu and Kashmir, Himachal Pradesh. Its leaves, bark, oil has immense medicinal values and has been used for centuries by traditional healers. The different part of this plant has Anti-inflammatory, Anti-cancer, immune-modulatory properties.

Taxonomic Classification^[5]

- **Kingdom:** Plantae
- **Subkingdom:** Viridiplantae
- **Infrakingdom:** Streptophyta
- **Superdivision:** Embryophyta
- **Division:** Tracheophyta
- **Subdivision:** Spermatophytina
- **Class:** Pinopsida
- **Subclass:** Pinidae
- **Order:** Pinales
- **Family:** Pinaceae
- **Genus:** Cedrus
- **Species:** Cedrus deodara (Roxb. ex D. Don) g. Don- Deodara cedar.

Classical Names

Putidaru, Putikastha, Sakrapadap, Paribhadrak, Putidaru, Bhadradaru, Surabhuruha, Devakastha, Daru, Suradaru.

Vernacular Name^[6]

- **Sanskrit:** Bhadradaru, Surabhuruha, Amaradaru, Devakastha, Daru, Suradaru, Amarataru
- **Assamese:** Shajar Tuljeen
- **Bengali:** Devdaroo
- **English:** Deodar, Himalayan Cedar
- **Gujrati:** Devdar, Teliyo Devdar
- **Hindi:** Devdar, Devdaroo
- **Kannada:** Deevdar
- **Malayalam:** Devtaram
- **Marathi:** Devdar, Telya Dedaroo
- **Punjabi:** Diyar, Dewdar
- **Tamil:** Devdaroo
- **Telugu:** Devdari Chettu, Devdaree
- **Urdu:** Deodar

Namrupa Vijnana^[7]

✓ पीतद्रुः - पीतश्चासो द्रुश्चेति । पीयते चक्षुषाऽयम् इति ।

Heartwood is yellow in colour. Its beauty is soothing to the eye.

✓ पूतिकाष्ठः-पूतेः पावनस्य काष्ठम् इति ।

The heartwood is holy, diminishes foul smell.

✓ शक्रपादपः- शक्रस्य इन्द्रस्य पादपः वृक्षः इति ।

It is the tree of Indra.

✓ पारिभद्रकः-परिनिष्ठाप्राप्त भद्रम् अस्य पारिभद्रः । पारि निष्ठाप्राप्तं भद्रमस्येति ।

Consumption of Devdaru helps in overall well-being of the person.

✓ भद्रदारुः- भद्रं दारु इति ।

Its wood is superior.

✓ दुकिलिमः- द्रो स्कन्धे किलिमं निर्यासोऽस्य इति ।

It secretes resins.

✓ किलिमः- किलति क्रीडति लघुत्वात् ।

The wood is very light.

- ✓ पीतदारु- पीतं च तदारु च इति, पीतं दारुऽस्येति वा ।

Its wood is yellow in colour.

- ✓ देवदारुः- देवानां दारु इति; दारुणां वा देवः इति;

It signifies the God. It is superior.

- ✓ दारुः - दारयति विबन्धादि रोगान् इति

It is very usefull in constipation.

- ✓ पूतिकाष्ठः-पूति उग्रगन्धं काष्ठम् अस्य इति ।

Its wood has pungent smell.

Literature Review

A) Samhita kala

In **Charaka Samhita** totally 75 references were found in 31 different Adhyayas of 5 different Sthanas. In Sutra Sthana 3, Vimana Sthana 1, Sarir sthan 1, Chikitsa Sthana 54, and in Siddhi Sthana 16 references were mentioned.

In **Sushruta Samhita** total 37 references are scattered in 31 Adhyayas of 5 Sthanas. In Sutra Sthana 5, Chikitsa Sthana 9, Kalpa Sthana 1, Sarir Sthan 1, Uttarantra 21 references are quoted.

In **Asthanga Hridaya** total 37 numbers of references are divided into 22 different Adhyayas of 4 different Sthanas. Maximum 23 references are found in Chikitsasthana, followed by 9 in Uttarantra, 3 in Kalpasthana and Sutrasthana states 2 references.^[8]

Table no. 1:- Categorization of Devdaru in Samhitas.

Drug	Varga/Gana in Charak Samhita	Varga/Gana in Sushruta Samhita
Devdaru	<ul style="list-style-type: none"> ❖ Stanyasodhan mahakasaya ❖ Anuvasanapaga mahakasaya ❖ Katukaskandha 	<ul style="list-style-type: none"> ❖ Vatasamsaman

B) Nighantu kala

Table no. 2: Categorization of Devdaru in Nighantus.

SR.NO.	TEXT	VARGA / GANA
1.	Bhavaprakash nighantu	❖ Karpuradi varga
2.	Madanpal nighantu	❖ Abhayadi varga
3.	Kaidev nighantu	❖ Ausadhi varga

4.	Saligram nighantu	❖ Karpuradi varga
5.	Raj nighantu	❖ Chandanadi varga
6.	Priya nighantu	❖ Haritakyadi varga
7.	Dhavantari nighantu	❖ Guduchyadi varga
8.	Nighantu adarsha	❖ Devadarvadi varga

Table No. 3:- Showing synonyms as per different Nighantus.

Sr. No	Synonyms	DN	RN	MPN	BPN	KN	SN	PN	NA
1.	Bhadradaru	+	-	+	+	+	+	-	+
2.	Daru	+	-	-	+	+	-	-	-
3.	Drukilima	-	-	-	+	-	-	-	-
4.	Indradaru	-	-	-	+	-	-	-	-
5.	Kilima	+	-	-	+	+	-	-	+
6.	Mastadaru	-	-	-	+	-	-	-	-
7.	Surabhuhah	-	-	-	+	-	-	-	-
8.	Surahava	+	-	+	-	+	+	-	+
9.	Suradruma	-	-	+	-	+	-	-	-
10.	Bhadrakastha	-	+	+	-	+	-	-	-
11.	Snehavriksha	-	-	+	-	-	-	-	-
12.	Krimila	-	-	+	-	-	-	-	-
13.	Sakradaru	-	-	+	-	-	-	-	-
14.	Devakastha	+	+	-	-	+	+	-	-
15.	Sakadru	-	-	-	-	+	-	-	-
16.	Surdaru	+	-	-	-	-	+	-	+
17.	Drukilam	-	-	-	-	-	+	-	-
18.	Pitadrum	-	-	-	-	-	+	-	+
19.	Bhadravata	-	-	-	-	-	+	-	-
20.	Devdaru	-	-	-	-	-	+	-	+
21.	Asnigdhadaru	-	+	-	-	-	-	-	-
22.	Putikastham	+	+	-	-	-	-	-	+
23.	Sukastham	-	+	-	-	-	-	-	-
24.	Kasthadaru	-	+	-	-	-	-	-	-
25.	Indravriksha	+	-	-	-	-	-	-	-
26.	Mahadaru	+	-	-	-	-	-	-	-
27.	Snehavidhha	+	-	-	-	-	-	-	-
28.	Amaradaru	+	-	-	-	-	-	-	-
29.	Sudaru	+	-	-	-	-	-	-	-
30.	Surkastha	-	-	-	-	-	-	-	+

“+” denotes same name was mentioned in various Nighantu. “-” denotes this name was not mentioned.

(DN- Dhanvantari Nighantu, MPN- Madanpal Nighantu, RN- Raj Nighantu, KN- Kaiyadev Nighantu, BPN-Bhav Prakash Nighantu, SN- Saligram Nighantu, NA- Nighantu Adarsh, PN- Priyo Nighantu).

Summarising the Synonyms mentioned by the various Nighantukaras it can be concluded that Dhanvantari nighantu 12, Raj nighantu 6 synonyms, Madanpal nighantu 7, Bhavprakash 7, Kaidev nighantu 8, Shaligram nighantu 8, Priya nighantu 2, Nighantu adarsha 8 synonyms are mentioned. Most number of Synonyms was mentioned by “Dhanvantari nighantu”.

Table No. 4: Showing Rasa, Guna, Virya and Vipaka of Devdaru according to Various Nighantus.

RASAPANCHAK		TEXT							
		DN	RN	MPN	BPN	KN	SN	PN	NA
RASA	MADHUR	-	-	-	-	-	-	-	-
	AMLA	-	-	-	-	-	-	-	-
	LAVAN	-	-	-	-	-	-	-	-
	KATU	-	-	+	+	+	-	-	-
	TIKTA	+	+	+	-	+	+	+	+
	KASAYA	-	-	-	-	-	-	-	-
GUNA	SINGDHA	+	-	+	+	+	-	-	+
	USHNA	+	+	-	-	-	+	+	+
	LAGHU	-	-	+	+	+	-	+	-
	RUKSHA	-	+	-	-	-	+	-	-
VIPAK	KATU	-	-	+	+	+	-	-	+
VIRYA	USHNA	-	-	+	+	+	-	-	+

“+” denotes same Rasa, Guna, Virya & Vipak was mentioned in various Nighantu. “-” denotes this Rasa, Guna, Virya & Vipak was not mentioned.

(DN- Dhanvantari Nighantu, MPN- Madanpal Nighantu, RN- Raj Nighantu, KN- Kaiyadev Nighantu, BPN-Bhav Prakash Nighantu, SN- Saligram Nighantu, PN- Priyo Nighantu, NA- Nighantu Adarsha.)

Summarising the Rasapanchak mentioned by the various Nighantukaras it can be concluded that Devdaru has Katu, Tikta rasa, Laghu, Ruksha, Snigdha, Ushna gunas, Ushna virya and Katu Vipaka.

Botanical Description

Devdaru is a large evergreen handsome tree upto 80 m high and girth about 15 m, with spreading branches and attractive dark green foliage.

Leaves- needles like, 2.5-4 cm long, 3-sided, clustered at the end of short branchlets.

Wood- strong, oily, aromatic;

Heartwood- light yellowish-brown to brown in colour; sap wood white.

Male and female cones on the same tree; male cones numerous, 5-12 cm, erect, solitary, cylindrical at the end of leaf-bearing branchlets, female cones barrel shaped, borne singly at the tip of dwarf shoots.

Seeds- winged, 6 mm long, pale-brown, wing 2.5 cm across, triangular and rounded.

Flowering and Fruiting: September-November.^[9]



Fig.1



Fig.2



Fig.3



Fig.4



Fig.5

Fig.1- <https://www.peaksandpints.com/tree-dimensional-tacoma-deodar-cedar/>

Fig.2- <https://canr.udel.edu/udbg/?plant=cedrus-deodara>

Fig.3- <https://www.healthbenefitstimes.com/deodar/>

Fig.4-<https://www.amazon.in/Urancia%C2%AE-Deodar-Cedrus-Deodara-Devadaru/dp/B075KKSX55>

Fig.5- <https://dir.indiamart.com/impcat/cedrus-deodara-seed.html>

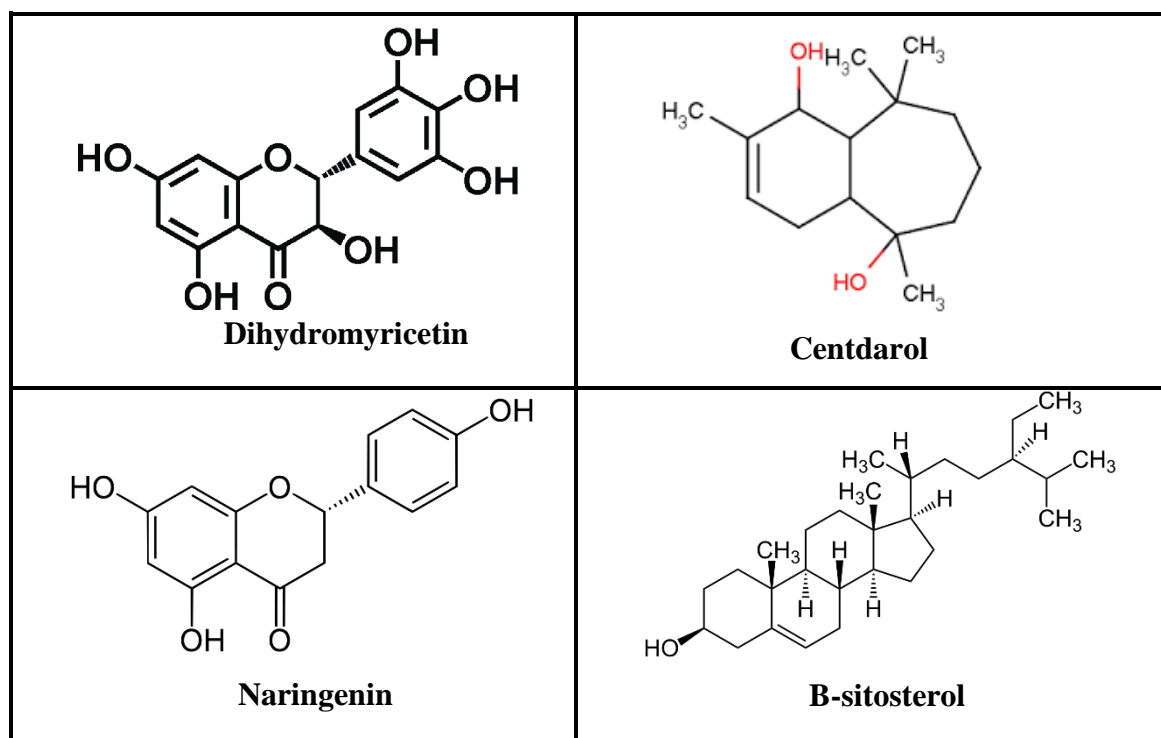
Distribution

Distributed in North West Himalayas from Kashmir to eastwards in Jammu and Kashmir, Himachal Pradesh, Uttaranchal and UP states between 1500-3000 m; especially in Kishan Ganga, Kishtwar, Jhelum valley to Garhwal, Chamba, Jaunsar, Bashahr, Kulu, Tehri-Garhwal, Almora, Ranikhet, Nainital, Chakrata, Mussorie, Simla and other areas. Distributed in Afghanistan and Pakistan.^[9]

Part Used: Heartwood, Oil, Leaf, Bark, Resin.^[9]

Chemical Constituents

Dihydromyricetin, cedrine, centdarol, naringenin, B-sitosterol, stigmasterol, camphesterol, deodorin and cedrin oxide, kaempferol glucoside, polyphenolic lignoids, deoardione, limonenecarboxylic acid, cedeodarin, dihydromyricetin, cedrin oxide, taxifolin, meso-secoisolariciresinol, cedrusinin, himachalol, 10-dehydroepitodomatuc acid, dehydrotodomatuc acid, 7-hydroxytodomatuc acid, limonene-8-carboxylic acid, geronic acid, 4-acetylcyclohex-1-ene-1-carboxylic acid, himadarol, allohimachalol, isocentdarol, centdarol (2B-7Bdihydroxyhimachal-3-ene), cedrusin, tannins.^[9]



Action and uses

1. In ascites, bark of deodar along with Sobhanjan and Apamarga is used with Gomutra.
2. The oil extracted from the fresh juice of Deodar with Chitrak is applied externally on filariasis after mixing it with Gomutra.
3. The decoction of Deodar is beneficial in Hikka and Swasa.
4. The oil collected from Deodar is useful in various skin disorders.
5. Deodar along with Turmeric and Guggulu is applied externally in chronic inflammations.^[10]

Ayurvedic Properties

Rasa: Tikta

Guna: Laghu, Snigdha

Vipak: Katu

Virya: Ushna

Karma: Dosakarma: Kapha-vata shamak.

Sharirakarma: Dipan, Pachan, Krimighna, Anuloman, Medohara, Hridayautejak, Raktaprasadan, Vedanasthapan, Sothahara, Lekhan, Swedajanan, Kusthaghna, Mutrajannan, Stanyasodhan, Garbhasaya sodhan, Hikkanigraha, Pramehaghna.

Vyadhikarma: Adhman, Vivandha, Krimiroga, Medoroga, Sotha, Galaganda, Slipada, Upadamsa, Amavata, Sandhivata, Gridhasi, Shirosula, Charmaroga, Mutrakrichha, Puyameha, Jirna kasa, Pinasa, Hikka, Stanyadosa, Sutika roga.^[11]

Dosage: Powder- 3-6 gm, Oil- 20-40 drops.^[11]

Important Formulations

Devadrumadi churna, Devadarvyadi churna, Indravarunikadi churna, Deepika taila, Bhadradarvyadi taila, Madhyamanarayana taila, Devadarvyadi kwatha, Pathyadi kwatha, Devadarvyarishta, Dashamularishta, Khadirarishta, Devadarvyadi lepa, Mritasanjeevani sura, Karpuradyarka, Mandurvataka, Devadarvadi kalpa, Devadrumadi yoga, Stanyashodhana kashaya, Hemamudgara rasa.^[9]

Pharmacological Activities

Some important pharmacological activities with references

Many pharmacological activities of *Cedrus deodara* have been reported in-vivo and in-vitro. Various parts of this plant bear anti-inflammatory, immuno modulatory, antispasmodic, anticancer, anti-apoptotic, anti-bacterial as well as other activities.

◆ Anti-inflammatory activity

The oil extract of wood was used for its oral anti-inflammatory activity. The extract showed significant result in induced rat paw oedema process. The oil extract (Volatile) was also studied for its anti-inflammatory activity by the process of induced arthritis. The extract showed significant result here too (Winter *et al.*, 1962; Newbould, 1963).

◆ Analgesic activity

The oil of wood of *Cedrus deodara* was studied for its analgesic potential by acetic acid induced writhing response and hot plate reaction time model in mice. Aspirin and morphine were used as reference control for study. Wood oil of *Cedrus deodara* showed significant analgesic activity in both levels of study (Shinde *et al.*, 1991).

◆ Immunomodulatory activity

Models like neutrophil adhesion test in rats were used for studying volatile oil of wood of *Cedrus deodara* in immunomodulatory activity (Wilkinson, 1962). Reaction of Arthus reaction in mice (Goldlust, 1978), SRBC- induced delay type hypersensitivity (DTH) in mice (Saraf *et al.*, 1989; Ray *et al.*, 1991) and oxazolone-induced contact hypersensitivity in mice (West, 1982). *Cedrus deodara* oil of wood helps in inhibiting the adhesion of neutrophils to nylon fibers which are responsible for the simulation of blood vessels in the cells (margination). This shows that the *Cedrus deodara* wood oil lessens the number of neutrophils in turn decreasing phagocytosis action and also the release of various enzymes that make inflammation even worse (Ray *et al.*, 1991). *Cedrus deodara* wood oil significantly shows the inhibition for Arthus reaction due to inhibitory effect characterized in the following reaction: Formation of precipitation of an immune complex at the site of injection, Activation of complement system, neutrophil aggregation, release of lysosomal enzymes etc (Rodnan, 1989). In the early event hypersensitivity reaction to oxazolone, mast cell degranulation has been reported (Thomas, 1980). It is due to mast cell stabilization. This proved that *Cedrus deodara* oil mainly of wood produces and inhibitory effects on humoral as well as cell-mediated immune responses and hence shows lot of usefulness in curing inflammatory diseases.

◆ Antispasmodic Activity

Himachalol is one of the chief constituents of wood of *Cedrus deodara*, which likely to have antispasmodic activity. The pharmacological studies of himachalol on different isolated smooth muscles (rat uterus, pig ileum and rabbit jejunum) and against various other agonists histamine, serotonin, nicotine, acetylcholine etc proved spasmolytic activity. This antagonist activity had no relaxing effect when given alone. Himachalol had much faster and better action as compared to papaverine which compared to Himachalol. Intravenous injection of Himachalol when given to cat produces a dose dependent fall in blood pressure and also causes an increased femoral blood flow (Kar *et al.*, 1975).

◆ Antioxidant Activity

Brain and nervous system are mainly the two parts of our body which are highly prone to free radical damage as our nervous system and brain are rich in lipid and iron. *Cedrus deodara* was known and also evaluated to have high antioxidant property (Halliwell *et al.*, 1989). Fractionation and purification are the two processes which are involved in the identification of antioxidant components mainly from dried heart wood powder of *Cedrus deodara*.

◆ Anti-malarial activity

Oil from the *Cedrus deodara* was studied for bioactivity against the adults of *Culexquinue fasciatus* and *Aedesaegypti*. Various Wood chips of *Cedrus deodara* were used to get essential oils which are useful in anti-malarial activity.^[12]

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