1. Agaru \([Aquilaria agallocha\) Roxb.]

**Synonym:** \(Aquilaria malaccensis\) Lam.

**Family:** Thymelaeaceae

**Hindi name:** Agar

**English name:** Eagle’s wood, Agar wood, Aloe wood

---

Being highly priced and valuable, Agaru has equaled or exceeded the price of gold; hence, it was often referred to as “black gold” in the past.

---

**Introduction**

The word “Agaru” literally means the one which is the heaviest and no other aromatic wood is heavier (garu) than it.

Since thousands of years, Agaru “The wood of God” has been used for multiple purposes throughout the world. Besides its commercial, historical, spiritual, aromatic, medicinal, and social significance, it is considered as a symbol of high status, wealth, and prosperity. Its use has been reported in many old testaments of Ayurveda, and in Chinese, Tibetan, European, and East-Asian texts. In the ancient Hindu epic, the Mahābhārata, Agaru is referenced as a welcome offering. In the Holy Bible, the spiritual significance of Agaru is demonstrated with it being used along with myrrh in the anointing of Jesus Christ following his crucifixion. The spiritual importance of Agaru in Buddhism was similarly demonstrated when it was used among other fragrant products in the cremation of Buddha. Agaru is also cited thrice in the Holy Bible as a fragrant product for intimacy and seduction. In Islamic texts, Agaru appears as a conspicuous fragrance used in the ritual burning of incense, for spiritual purification, and as one of the rewards in paradise. Agaru wood mixed with camphor was the preferred scent of the Prophet Muhammad. In Arabian medicines, its oil is used for aromatherapy.

Due to its distinctive fragrance, Agaru is used abundantly for making incense sticks, perfumes, and soaps. Its wood is also used for making sculptures and carvings. In middle-east countries, beads prepared from its wood are used to keep oneself safe from evil spirit and for bringing good luck (Sampson et al 2018).

Medicinal uses of Agaru have been recorded in many pieces of Indian, Greek, Roman, Chinese, Middle Eastern, and European literature since ancient times by people of diverse culture. It is reported to be used as a folklore medicine in inflammatory diseases, skin diseases, headache, arthritis, vomiting, gout, etc. In traditional Chinese medicine, Agaru is used as a chi-regulating drug and carminative medicine.
to relieve gastric problems, coughs, rheumatism, and high fever. It can promote chi-circulation to relieve pain, warm the middle energizer to arrest vomiting, and regulate respiration to relieve asthma (National Pharmacopeia Committee 2015).

Acharya Charak has referred to Agaru as an ushna virya dravya in spite of having tikta rasa (C.S.Su. 26/49). Charak also advocated applying paste of Rasna and Agaru to counteract the effect of cold in agraya dravyas (C.S.Su. 25/40). Sushrut used Agaru as dhupan dravya along with Guggulu, Ral, and Shoma in the treatment of Karnasweda and vrana.

Because of its consistent high demand and slow natural growth rate, the plant is facing severe scarcity in nature. This is the reason for it being highly priced in trade and for placing it under the category of critically endangered or vulnerable species. Owing to its rapid declining rate, all the species of *Aquilaria* have been placed in the Appendix II list of the Convention on International Trade in Endangered Species of Wild Fauna and Flora since 2004 (CITES 2004).

### Vernacular Names

<table>
<thead>
<tr>
<th>Arabic</th>
<th>Oud, Oodh, Shajarat-al-oudh</th>
</tr>
</thead>
<tbody>
<tr>
<td>Assamese</td>
<td>Sasi, Sashi, Agaru</td>
</tr>
<tr>
<td>Bengali</td>
<td>Agar chandan, Agarkastha</td>
</tr>
<tr>
<td>Chinese</td>
<td>Chenxiang</td>
</tr>
<tr>
<td>Hong Kong</td>
<td>Aloe wood</td>
</tr>
<tr>
<td>Indonesia</td>
<td>Gaharu</td>
</tr>
<tr>
<td>Japanese</td>
<td>Jinko</td>
</tr>
<tr>
<td>Kannada</td>
<td>Krishna Agaru</td>
</tr>
<tr>
<td>Malayalam</td>
<td>Akil</td>
</tr>
<tr>
<td>Punjabi</td>
<td>Ooda, Pharsi</td>
</tr>
<tr>
<td>Tamil</td>
<td>Agalichandanam</td>
</tr>
<tr>
<td>Telugu</td>
<td>Agaru</td>
</tr>
<tr>
<td>Thailand</td>
<td>Mai kristsana</td>
</tr>
</tbody>
</table>

### Synonyms

- **Anaryaka:** It grows abundantly in the forest region of the Northeast of India.
- **Krimija:** The plant is infested by fungus.
- **Krimijagdh:** The gum resin is produced by fungal infestation.
- **Loha:** The infested heartwood is heavy and black like iron.
- **Pravar:** It means a substance which is best among its class.

**Rajarha:** Due to its valuable nature and great utility, it is used by royal families.

**Sheetshaman:** It has cold-allaying property.

**Shringaj:** The plant grows in hilly region.

**Vanshika:** The plant is gregarious in nature like the bamboo plant and has a nauseating smell.

**Varnaprasadana:** The heartwood is used to enhance luster of the skin.

**Vishvadhupa:** The aromatic wood is used for making incense and perfumes.

**Yogaj:** The resinous wood is produced by fungal association.

### Classical Categorization

- **Charak Samhita:** Sheetprasasmmana, Shwasahara, Tikta skanda
- **Sushrut Samhita:** Salasaradi, Eladi, Shleshmasansaman
- **Ashtang Hridaya:** Salasaradi, Eladi
- **Dhanvantari Nighantu:** Chandanadi varga
- **Madanpal Nighantu:** Karpuradi varga
- **Kaiyadev Nighantu:** Oushadi varga
- **Raj Nighantu:** Prabhadradi varga
- **Bhavaprakash Nighantu:** Karpuradi varga

### Distribution

Agaru is a native plant of China, India, Indonesia, Malaysia, Philippines, Laos, Thailand, Singapore, Sri Lanka, Tibet, Europe, and Africa.

In India, the plant is found growing naturally in evergreen forests of Eastern Himalayas. It grows at an altitude of 700 to 1400 m. It is found in abundance in Assam, Tripura, Meghalaya, Nagaland, Sikkim, Manipur, Bhutan, Khasi hills, etc. Agaru obtained from Sylhet region is considered the best.

### Morphology

A large evergreen tree about 70 to 80 ft in height and 4 to 5 ft in girth with a straight and fluted stem. Initially its wood is soft, light, elastic, whitish yellow in color without any characteristic smell. Later as the fungal infection progresses it becomes heavy and black (**Fig. 1.1**).

- **Leaves:** Simple, alternate, ovate-lanceolate to lanceolate-oblong in shape, about 8 to 10 cm long
and 2 to 3 cm broad, short petioled, silky glossy surface, and entire margin (Fig. 1.2).

- **Flowers**: Inflorescence of many small, greenish yellow-colored flowers on short peduncle umbels occurring on younger branchlets (Fig. 1.3a, b).

- **Fruits**: Capsule, obovoid shape, slightly compressed, yellowish, and tomentose (Fig. 1.4).

- **Seeds**: Brownish black colored, ovoid shape with a long tail (Fig. 1.5).

- **Heartwood**: Dark resinous wood which is formed when the plant becomes infected with a type of fungus (ascomycetous mold). Species of *Aspergillus*, *Fusarium*, and *Penicillium* are reported to be associated with the development of infection. Prior to infection, the heartwood is odorless, relatively light, and pale colored; however, as the infection progresses, the tree produces a dark aromatic resin in response to the attack, which results in accumulation of a very dense, dark resin in the heartwood. The infected resin–embedded wood is known as Agarwood (Fig. 1.6). Infection is more common on the trunk, roots, and area where branches divide. The formation of Agarwood starts when the tree attains the age of 20 years. On an average, approximately 30 mL oil is extracted from 100 kg of infected Agarwood. Oil extracted from the wood is popularly known as Oud oil. The plant is propagated by seeds.
**Phenology**

Flowering time: May to June  
Fruiting time: July to August

**Key Characters for Identification**

- An evergreen 70 to 80 ft tree with straight and fluted stem  
- Leaves: simple, alternate, ovate-lanceolate, silky glossy surface  
- Flowers: small, greenish yellow in axillary inflorescence  
- Heartwood: dark, resinous, heavy, aromatic, and is infected with fungus

**Types**

- Dhanvantari Nighantu describes Kaleyaka as a type of Agaru  
- Sodhala Nighantu describes three types of Agaru: Agaru, Krishna Agaru, and Kakatunda Agaru  
- Raj Nighantu describes five types of Agaru: Krishna Agaru, Kasht Agaru, Daha Agaru, Mangalya Agaru, and Agurusaar  
- Arthashastra describes three Agaru wood products:  
  - Jongaka: Black or variegated black in color and having variegated spots  
  - Dongaka: Black in color  
  - Parasamudraka: Black in color and smells like navamallika (Shamasastry 1915)

**Rasapanchaka**

<table>
<thead>
<tr>
<th>Guna</th>
<th>Laghu, Ruksha, Tikshna</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rasa</td>
<td>Katu, Tikta</td>
</tr>
<tr>
<td>Vipaka</td>
<td>Katu</td>
</tr>
<tr>
<td>Virya</td>
<td>Ushna</td>
</tr>
</tbody>
</table>

**Chemical Constituents**

Agaru's heartwood is rich in essential oil, resins, alkaloids (liriodenine), saponins, steroids, terpenoids, tannins,
flavonoids (aquisiflavoside, aquilarisinin, aquilarisin, and aquilarixanthone), and phenolic compounds (Satapathy et al 2009). Agaru wood predominantly contains 2-(2-phenylethyl)-4H-chromen-4-one derivatives and sesquiterpenes.

Chromone derivatives include 7,8-dimethoxy-2-[2-((3′-acetoxyphenyl)ethyl]chromones, 6-methoxy-2-(2-phenylethyl)chromones, 6,7-dimethoxy-2-(2-phenylethyl)chromones, aquilarone A-I, aquiseninone A-D, tetrahydrochromone A-M, and quinanone A-D.

Sesquiterpenes include agarol, aquilochin, α & β agarofuran, noragarofuran, agarspirol, 10-epi-g-eudesmol, jinkoeremol, jinkohol, kusunol, dihydrokaranone, oxoagarospirol, quinarol A-F, aquilarabietic acid A-K, aquilarin B, aquilacallane A-B, aquimavitalin, abietane ester, gmelofuran apigenin, and 4′7-dimethyl ether (Wang et al 2018; Srivastava et al 2016).


**Identity, Purity, and Strength**

- Foreign matter: Not more than 1%
- Total ash: Not more than 13%
- Acid-insoluble ash: Not more than 0.5%
- Alcohol-soluble extractive: Not less than 1%
- Water-soluble extractive: Not less than 2%

(Source: The Ayurvedic Pharmacopeia of India 2004).

**Karma (Actions)**

In various samhitas and nighantus, Agaru is described as tikshna, snigdh, sheetprasasmana, varnaprasadan (blood purifier), tvachya (skin tonic), pitta vartdaka (pitta aggravating), shirovirechan (procedure used for head purification), mangalya (auspicious), sugandhik (aromatic), and rochak (relish) in properties. Nighantus recommended its use in the form of lepa (topical application), udvartana (powder massage), and dhum pana (medicated inhalation therapy). Raj Nighantu has described the properties and action of five types of Agaru, which are as follows:

- Krishna Agaru: Katu, tikta rasa, ushna, sheet when applied externally and pittahara when taken orally, slightly tridoshahara.
- Kastha Agaru: Katu, ushna, ruksa, and kaphashamaka
- Mangalya Agaru: Sheet, yogavahi, aromatic
- Daha Agaru: Katu, ushna, keshvardhak, varnya, with persistent aroma
- Agarusaar: Katu, kashaya, ushna, produces aroma on burning, vataashamaka
- Doshakarma: Vata kapha shodhana, pitta vartdaka
- Dhatukarma: Rasayana, tvachya
- Malakarma: Vataanulomaka

**Pharmacological Actions**

Its heartwood and oil is reported to have antinociceptive, antimicrobial, analgesic, antinflammatory, antihyperglycaemic, antipyretic, antioxidant, ulcer-protecting, anticancerous, hepatoprotective, antihistaminic, anxiolytic, and thrombolytic properties (Alam et al 2015).

**Indications**

Traditionally, Agaru's heartwood and oil is used in the treatment of sheet (chill), karna akshi roga (ear and eye diseases), shwasa (asthma), kustha (skin diseases), dustha vrana (chronic ulcers), visha (poison), and shirashool (headache). Charak suggested an external application of Agaru and Rasna to counteract the effect of cold. Sushrut uses Agaru taila for dustha vrana shodhana (cleansing of chronic wound), krimi (microbes), and kustha.

It is also used as a mouth freshener, carminative, and an appetizer in digestive ailments, and it relieves itching, improves blood circulation, and gives relief in cough, bronchitis, and asthma. Agaru oil massage is effective in rigors in fever. Its oil is used to treat toothache, colic pain, and pains during pregnancy (Burfield and Kirkham 2005).

**Therapeutic Uses**

**External Use**

1. **Sotha** (edema): Chanda (choraka), Agaru paste is applied externally to decrease edema (A.H.Ci. 17/36, C.S.Ci. 12/70).

2. **Dadru, Kustha** (skin diseases): External application of oil prepared by Agarusaar and Sinshipa is used in chronic nonhealing ulcers and skin diseases like dadru, kitibh, and kustha (S.S.Ci. 31/5).
**Chapter 1**

**Internal Use**

1. **Shwasa and Hikka** (asthma and hic-cough): Agaru powder mixed with honey twice daily is used as leha to get relief in shwasa and hikka (C.S.Ci. 17/129). Incenses of Agaru wood can also be used to get relief in respiratory congestion and asthma.

2. **Kasa** (cough): Taking 1 to 3 g of Agaru’s heartwood powder with honey gives relief in kasa (A.H.Ci. 3/47).

3. **Lavanmeha** (a type of diabetes): Decoction prepared with Patha and Agaru is used to cure lavanmeha (S.S.Ci. 11/8).


**Officinal Parts Used**

Heartwood and oil

**Dose**

Powder: 1 to 3 g
Oil: 1 to 5 drops

**Formulations**

Agaruvadi taila, Chandan Agaru kwath, Anu taila, Madhukasava, Chandanadi taila, Shwasahara kasaya churna, Guduchyadi taila, Khadiradi gutika.

**Toxicity/Adverse Effects**

There are no reported side effects of Agaru when used in recommended dose. Agaru oil being pitta aggravating in nature can cause redness and irritation on local application, while inhalation of excessive fumes or oral intake may result in nausea, dizziness, and burning sensations.

**Substitution and Adulteration**

Other species of *Aquilaria*, such as *A. crassna*, *A. malaccensis*, and *A. sinensis*, are used as Agaru’s substitutes.

---

**Points to Ponder**

**Qualities of best Agaru:**
- It should be black in color.
- It should be extremely heavy and aromatic.
- It should be oily in appearance and taste.
- It should sink in water.
- It should burn easily with a bright flame giving off a pleasant smell.

**Suggested Readings**

Burfield T, Kirkham K. The Agarwood Files. Cropwatch; 2005:6–8


Shamasastro R. *Kautilya’s Arthashastra*; 1915. [http://libarch.nmu.org.ua/ bitstream/handle/G e n o f o n d U A /1 9 2 7 3/ f2c8936431b9587a3448e1b3d8e8f844.pdf?sequence=1](http://libarch.nmu.org.ua/ bitstream/handle/G e n o f o n d U A /1 9 2 7 3/ f2c8936431b9587a3448e1b3d8e8f844.pdf?sequence=1)

Srivastava B, Sharma VC, Sharma H, Pant P, Jadhav AD. Comparative physicochemical, phytochemical and high performance thin layer chromatography evaluation of heart wood and small


रास्तागुरूणीशीतापनयनप्रलेल्पनानां ।
—च.सू. 25/40

अगुरूषणवटयतिक्षिक्षणशिक्षितम ।
लघुकाणाकिरोगधलितशीतवातकप्रप्रणुत् ॥
कृष्णागुणाधिकांतुलोहबद्वारामणजति ।
अगुरूप्रभवःस्नेहःकृष्णागुरुसमःस्मृतः ॥२॥
—आ.प्र.नि. कर्पोरादिवर्ग