

Ethno Botanical Significance of Critically Endangered Species, *Canarium strictum* Roxb.: A Review

Review Article

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Abstract

For many decades, medicinal plants have been playing a significant role in the preparation of traditional medicines by different indigenous communities in and around the world as a form of primary healthcare. *Canarium strictum* Roxb. commonly known as black dammar or Yunnan tree is a large deciduous tree used generally for the extraction of aromatic resin. This extreme extraction leads to the exploitation and decline of the species in their natural habitats and increases commercial value in the market. *Canarium strictum* Roxb. is well known for its therapeutic properties and hence abundantly used in the preparation of traditional medicines from different parts of the plant viz. bark, stem, leaf, fruit and resin. Several studies have also shown the presence of anti-bacterial, anti-microbial, anti-oxidant and anti-inflammatory properties in the resin, hence further research could help in the discovery of new drugs having lesser side effects in treating different ailments of humankind..

Keywords: Burseraceae; *Canarium*; Endangered; Ethno botany

Introduction

Since time immemorial, plants have become the source of food, shelter, clothing, medicines and other livelihood purposes. Globally, 66 – 85% of world populations are dependent on 35,000 – 70,000 medicinal plants, out of which 6,500 were abundantly found in Asian countries [1,2]. Harsberger explored the plants used by the aboriginals and coined the term ethno botany for the first time in 1895. Presently, it has become a distinctive branch in the field of natural science interrelating with other disciplines such as anthropology, botany, and ecology [3]. The field of ethno botany led to the discovery of conventional medicines such as aspirin and reserpine which were originally derived from *Salix* sp. and *Rauwolfia* sp. respectively [4]. New practices in pharmacological research have also been initiated with the knowledge of medicinal plants used traditionally by ethnic communities [1,5,6].

Canarium strictum Roxb. one of the critically endangered species belonging to Burseraceae family, commonly known as black dammar or Yunnan tree is widely used for the extraction of aromatic resin [Figure1]. The species is a poly-gamodiocious tree and widely distributed in different parts of India, Myanmar and Yunnan province located in China. *Canarium strictum* are mostly thriving in moist deciduous to evergreen forests at an elevation ranging from ca. 750 – 1400 m [7]. In India, *Canarium strictum* is found distributing naturally in Sikkim, Arunachal Pradesh, Assam, Meghalaya, Orissa, Maharashtra, Karnataka, Kerala, Tamil Nadu and Andaman Islands [8]. The resin of the *Canarium strictum* possesses several therapeutic properties and is used for treating rheumatism, fever, cough, asthma, epilepsy, hernia, and various bronchial ailments [7]. The powders of resins are used for performing many religious rituals in India. They are also used as excellent mosquito repellent [9,10,11]. The taxonomic position of the *Canarium strictum* is given in (Table 1).

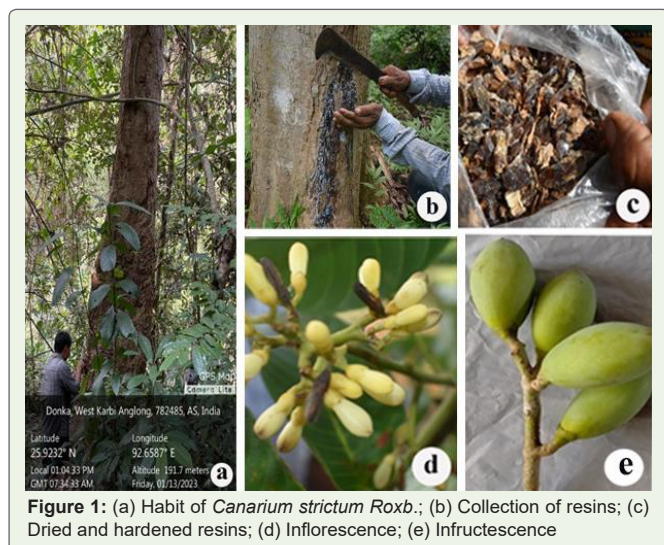


Figure 1: (a) Habit of *Canarium strictum* Roxb.; (b) Collection of resins; (c) Dried and hardened resins; (d) Inflorescence; (e) Infructescence

Table 1: Systematic position of *Canarium strictum* Roxb.

Kingdom	Plantae
Division	Magnoliophyta
Sub-class	Rosidae
Order	Sapindales
Family	Burseraceae
Genus	<i>Canarium</i>
Species	<i>strictum</i> Roxb.

Different Purposes of *Canarium strictum* Roxb.

Role in traditional medicines

The decoction and infusion prepared from the bark of *Canarium strictum* are used for the treatment of skin eruption and various colic ailments. A mixture of *Sesamum indicum* oil and resin gum is also used for reducing rheumatic pains [12]. The gum is also reported to be utilized as an analgesic by the villagers residing in Thrissur and Palakkad forest tract in Western Ghats [13]. The Kanikkars are tribal inhabitants residing in some of the regions of the Tirunelveli district in Tamil Nadu, India. They utilize the resin of *Canarium strictum* for easing headaches and relieving common cold through smoke inhalation [14]. The bark of *Canarium strictum* is used for treating skin rashes by some of the local people residing in Mizoram [15]. The dammar oil extracted from the *Canarium strictum* is applied over the skin to treat rheumatism, asthma and venereal diseases. Powdered resin is used for treating small or minor wounds and cuts by applying it directly. The resin is also used for treating various skin diseases such as psoriasis and pityriasis [16]. In Arunachal Pradesh, the local people treat the itchiness and redness caused by poisonous hairs of the caterpillar larvae by applying the fresh resin of *Canarium strictum* over the affected areas [17]. *Canarium strictum* is considered one of the important medicinal plants in Manipur as the resin of the plant was used in the preparation of multi-ingredient herbal medicine for treating polychondritis [18]. Local people residing in and around Nongkhylllem Wildlife Sanctuary in Meghalaya and Arunachal Pradesh were found consuming mature fruit of *Canarium strictum*

for curing indigestion and urinary problems [19, 20]. The dried fruits of *Canarium strictum* are chopped into small pieces and consumed by some of the local inhabitants in Meghalaya and Nagaland to treat nausea and motion sickness [21].

Religious and cultural aspects

The aromatic resin of *Canarium strictum* is widely used for fumigation and as incense in various religious ceremonies among individual households and community gatherings [11]. The Kurichya tribes of Wayanad district in Kerala utilizes the hardened resin in many of their religious ceremonies such as fumigating the bow and arrow before the hunting of Thulappathu or in the paddy fields during Ayilyam-Makam, a festival which is held after Onam [22]. Local people living in Singhason Hills of Karbi Anglong district, Assam use resin to prevent the evil spirits and bad energies in their houses [10]. The Konyaks tribe of Mon district in Nagaland combines the soot obtained from the exudates of *Canarium strictum* known as ying with the leaf juice of the plant forming a dark green pigment which is then utilized for tattooing [23].

Other Miscellaneous Uses

In different parts of India, the resins of *Canarium strictum* are mainly used as a mosquito repellent while Irula tribes of Walayar Valley in Kerala use bark instead of the resin. They also used the powdered bark after mixing with *Allium sativum* and *Curcuma longa* to apply on the skin directly to prevent mosquito bites [7,9,10,24]. Apart from repelling mosquitoes, the resins are also considered an excellent replacement for burgundy pitch and used in medical plasters. The timber obtained from mature *Canarium strictum* also has tanguile properties and has been used in several ways for making ceiling boards, flooring, room partitions, packaging cases, etc [7]. The ripe fruits of *Canarium strictum* are commonly found to be sold in the local markets and used as wild edible fruit by the Adi tribes of Arunachal Pradesh and Konyak tribes of Nagaland [25,26]. The crushed leaves and crude extract of *Canarium strictum* are also used in fish poisoning [12,27].

Phytochemical Studies and Chemical Components

Several phytochemical studies have shown the presence of triterpenoids and terpenoids along with several compounds such as α -amyrin, β -amyrin acetate, junenol, canarone, junenol, canarone, epikhusinol and sesquiterpene ketone-canarone having anti-microbial and anti-fungal properties in the resin of *Canarium strictum* [15,28,29]. The presence of phenolic and alkaloids in fewer amounts and the absence of flavonoids, steroids and anthraquinones have also been shown in several phytochemical screening. The resin of *Canarium strictum* shows anti-microbial activity against the microorganisms *Staphylococcus aureus* and *Pseudomonas aeruginosa* [30]. The methanolic leaf extract of *Canarium strictum* is reported to be effective against two vectors *Culex quinquefasciatus* and *Aedes aegypti* at the LC₅₀ with a value of 263.0 ppm and 245.47 ppm respectively [31].

Research works

The rate of germination in *Canarium strictum* is varied in different habitats as well as in different chemical treatments. Seed treated with

10% concentrated H₂SO₄ and 10% concentrated HCl before sowing shows a high rate of germination compared to natural growing [32]. The earliest germination of *Canarium strictum* is found in indolebutyric acid (IBA) treatment at 2000 ppm and gibberellic acid (GA) treatment at 1000 ppm while control treatment and mechanical scarification leads to the lowest germination rate [8]. Soaking the seeds in 4% H₂O₂ both in the nursery and laboratory shows maximum germination percentage, germination value and peak value compare to natural growing [33]. Exposing the seeds of *Canarium strictum* to the radiation of gamma rays at 0 Gy – 200 Gy for a few minutes increases the rate and speed of their germination [34]. Osmo-priming of seeds either with potassium dihydrogen phosphate or GA₃ treatment breaks the dormancy of the seeds by 69.3% and 56% respectively and enhances the rate of germination [35].

Conclusion

With the survey of several literatures, it could be state that the plant species, *Canarium strictum* has immense significance in various aspects of human life viz. in traditional medicines, religious and cultural aspects, and the presence of several vital phytochemical compounds, an excellent mosquito repellent and as wild edible fruits. The individual population of the plant is declining in their natural habitats due to over-exploitation by humankind for their needs and for its resin extraction. So far no proper conservation has been initiated of this plant species in any part of the country. The species is declining gradually and has become a critically endangered species. The study recommends for urgent conservation of the plant properly by regeneration of their vegetative parts or by propagating using *in vitro* methods.

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