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Traditional and ethnobotanical uses of *Quercus leucotrichophora* A. Camus (*Quercus oblongata* D. Don) in Kumaun and Garhwal regions of Uttarakhand, India: A review

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Abstract

Kumaun and Garhwal region of Uttarakhand State is characterized by a rich diversity of ethno-medicinal plants as well as a rich heritage of traditional medicine system. The present study focuses on the status traditional and ethno-botanical uses of *Quercus leucotrichophora* A. Camus (*Quercus oblongata* D. Don) and its importance preserved by the local population in Kumaun and Garhwal region of Uttarakhand. *Quercus* genus (family- Fagaceae) consists of around 450 species worldwide and represents an important group of evergreen or deciduous trees from temperate and tropical climatic areas. *Quercus leucotrichophora* A. Camus plant is belonging to family Fagaceae. Oak forests occupy approximately 20,000Km² areas in the Central Himalaya between 1000 and 3000 m elevations and are considered as a key stone species. For the present study, an intensive and extensive survey was made in different districts of Kumaun and Garhwal region of Uttarakhand (Almora, Tehri Garhwal, Rudrapriyag, Chamoli, Bageshwar and Pithoragarh) and other States. The present paper is a review on ethno-medicinal uses of *Quercus leucotrichophora* A. Camus (*Quercus oblongata* D. Don) used by different tribes for treating of various diseases. Different parts of the plant (bark, leaves, fruits and resins) are variably used in treating wide range of diseases such as urinary infection, toothache, piles, astrigent, diarrhea, stomachache, gonorrhoea, asthma, dysentery, stomach pain.

Keywords: *Quercus leucotrichophora* A. Camus, Fagaceae, Ethno-botanicalgum resin, Kumaun, Garhwal

1. Introduction

Plants have, at one time, supplied virtually all cultures with food, clothing, shelter, and medicines. It is estimated that approximately 10 to 15 percent of the roughly 300,000 species of higher plants have a history of use in traditional medicine [1]. Medicinal plants are an important part of our natural wealth. They serve as important therapeutic agents as well as valuable raw materials for manufacturing numerous traditional and modern medicines [2]. Nearly 80% of the world's population relies on traditional medicines for primary health care, most of which involve the use of plant extracts [3]. In India, almost 95% of the prescriptions were plant based in the traditional systems of Unani, Ayurveda, Homeopathy and Siddha [4]. Despite the vast scientific development in contemporary medicine, many people in world still rely on traditional curative practices and medicinal plants for their daily healthcare requirements [5]. According to World Health Organization (WHO), 80 percent of the developing world's ruler population depends on traditional medicines for its primary health care needs [6].

1.1 Plant Description

Quercus spp. (family: Fagaceae) represents an important group of evergreen or deciduous trees from temperate and tropical climatic areas. The *Quercus* genus comprised of around 450 species worldwide, which often differ in their flowering and fruiting dynamics [7]. *Quercus leucotrichophora* A. Camus (*Quercus oblongata* D. Don) is a medium-sized tree, usually attaining about 15 m in height, occasionally 24 m. Young seedlings up to two years old are very shade-tolerant, and thereafter the tree needs moderate to full light. It needs moderately fertile soils, growing well on clays derived from shale's and clay loams, but does not do well on dry sites. The seed ripens between November and March, according to the locality, but ripe seed may remain on the trees for several months. In the Himalayas, the banj oak is found at altitudes between 1500 and 2400 m above sea level [8].

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Quercus leucotrichophora A. Camus has a full, rounded canopy. The bark is a smooth tan-brown at first, becoming lightly furrowed and corky with age. The leaves are alternate, elongated ovals with jagged teeth. Young leaves are pink purple in color and the upper surface turns deep green as it matures, while the lower side is silvery grey due to the presence of white hairs (hence the name leucotrichophora, meaning "which has white hairs"). The male inflorescences (catkins) are borne on the tips of the branches, while the tiny round female flowers are borne at the base of the leaves. The fruits are orange-tan, marble-sized acorns [8, 9].

2. Materials and methods

Local survey and identification of plants *Quercus leucotrichophora* A. Camus (*Quercus oblongata* D. Don) growing in hills of Kumaun and Garhwal region of Uttarakhand was done. The plants were collected, identified and preserved. Plant was taxonomically identified by botanist of Botanical Survey of India, Northern Regional Center, 192, Kaulagarh Road, Dehradun-248195. One set of the sample was deposited in the herbarium of Botanical Survey of India. To identify and verify the efficacy of *Quercus leucotrichophora* A. Camus (*Quercus oblongata* D. Don), information was collected from tribal people of several areas. Ethno-medicinal uses were collected from informants of adjacent villages. The neighboring villages of the study areas were also visited for identification of plant species and to explore the traditional knowledge about the use of indigenous medicinal plant.

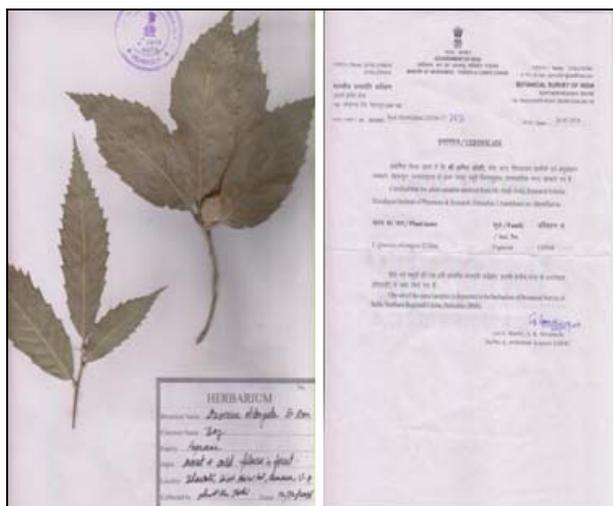


Fig 1: Identified Specimen and certificate of *Quercus leucotrichophora* A. Camus (*Quercus oblongata* D. Don)

3. Results and Discussion

Ethno-botanical information on medicinal plants and their uses by indigenous cultures is useful not only for the conservation of traditional knowledge and biodiversity, but also to promote community health care, and might serve in drug development. The information can provide a guide for drug development, assuming that a plant that has been used by indigenous people over a long period of time may well have an allopathic application [10, 11]. Uttaranchal has tremendous potential for medicinal plants cultivation and it can become one of the important options for sustainable livelihood for the hilly area. About 300 medicinal plants species have been documented from Uttaranchal, indicating its potential as an herbal state and for strengthening herbal-based industry in this region [12].

3.1. Ethno-medicinal uses

Local population and different tribal groups in Kumaun and Garhwal region of Uttarakhand and other Indian states uses *Quercus leucotrichophora* A. Camus for treatment of various ailments. Various ethno-medicinal uses of *Quercus leucotrichophora* A. Camus are mentioned below.

- In the region Swat, North Pakistan fruit powder is taken for the treatment of urinary infection [13].
- Cross culture analysis of medicinal plants of Jammu, Kashmir and Ladakh (India) reveals that bark of *Quercus leucotrichophora* A. Camus is used to cure toothache and piles, leaves is used as an astringent and in the treatment of diarrhea while the gum resin is used as Stomachache [14].
- Tribals of district Tehri Garhwal, Uttarakhand uses gum resin of the plant by making its paste to cure Gonorrheal, asthma, hemorrhages, diarrhea, dysentery [15].
- A survey was done on ethno-medicinal and ecological status of plants in Garhwal Himalaya, India which reveals that *Quercus leucotrichophora* A. Camus is used in the treatment of gonorrheal and digestive disorders [16].
- Survey was made on traditional knowledge of medicinal plants among rural women of Garhwal. 70 women's of 11 villages were interviewed on the basis of their traditional knowledge on the various uses of medicinal plants found in the adjoining forest and agricultural area. It was found that dry resin of *Quercus leucotrichophora* A. Camus, Baanj (local name) is taken with water for stomach pain [17].
- Ethano-pharmacological survey was conducted in Galliyat areas of NWFP, Pakistan among the local people which suggest that the corm of the plant is used as an astringent and diuretic [18].
- A study was conducted in the Thalain block of Pauri Garhwal to document the medicinal plants used by the local communities and it was stated that the seeds of the plant is used in the treatment of urinary disorder [19].
- The peoples of Almora district, Uttarakhand uses bark of the plant (25g bark in 100ml) in the form of gargle in tonsillitis [20].
- Study was carried out on the indigenous knowledge of medicinal plants used in the Alaknanda catchment of Uttarakhand state in India. In this study it was found that *Quercus leucotrichophora* A. Camus seeds were used in the treatment of snake bite [21].
- An ethnobotanical survey was conducted during 2013-14 to document the traditional knowledge of medicinal plants that are used by the local communities residing along the National Highway 5 from Solan to Shimla in Himachal Pradesh in household remedies for the treatment of diseases. A decoction of leaves (about 10 ml) of the plant is given thrice daily in order to check dysentery and diarrhea [22].
- General local people, experienced aged rural folk and traditional herbal medicine practioners of Kumaun, uttarakhand reveals the status of ethno-medicinal flora and their importance preserved by the local population in Kumaun region. According to the survey the corm of *Quercus leucotrichophora* A. Camus is used as astringent and diuretic [23].
- The peoples of Haat Kali sacred Grove in Kumaun Himalaya, Uttarakhand, India used dried gum powder of the plant with milk during weakness in body [24].

4. Conclusion

The traditional system of medicine is an integral part of Kumaun and Garhwal regions of Uttarakhand and others states in India. A large number of medicinal plants of great commercial value grow spontaneously in the forests. Some of these grown in the valleys, some in sub-mountain tracts while some other in various altitudes. A number of workers have explored the utility of Himalayan flora. The present study states that *Quercus leucotrichophora* A. Camus (*Quercus oblongata* D. Don) is multipotential medicinal plant and it is used to treat various ranges of diseases in traditional system of medicine and is used by different tribes and communities in different parts of Uttarakhand and other states in India. Different parts of the plant such as corm, seeds, leaves, fruit and dry gum resin is used to cure various ailments such as urinary infection, toothache, piles, diarrhea, asthma, hemorrhages, dysentery, astringent, diuretic, tonsillitis and snake bite. Thus from ethano-botanical study it can be concluded that *Quercus leucotrichophora* A. Camus (*Quercus oblongata* D. Don) can be a valuable plant especially for the treatment of GIT disorders and urinary tract infections. The plant can be thus considered as a promising source for the synthesis and development of new drug molecules.

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