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Ethnobotanical and therapeutic insights into *Quercus incana* Roxb. (Baloot)

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Abstract
Quercus incana Roxb. Commonly known as bluejack oak or grey oak, is a deciduous tree belonging to the Fagaceae family. It is widely distributed across temperate regions of Pakistan, the western Himalayas, and parts of South Asia, including Kashmir, Nepal, and northern India. Traditionally known as *baloot* in Unani medicine, various parts of the tree, particularly its fruit (acorn) and inner membrane (*jufte baloot*), are used for therapeutic purposes. Ethnobotanical evidence highlights its application in the treatment of gonorrhea, diarrhea, asthma, rheumatism, and urinary disorders. Pharmacologically, *Q. incana* exhibits antioxidant, antibacterial, anti-inflammatory, antinociceptive, astringent, and diuretic properties. Phytochemical analysis reveals it to be rich in tannins, flavonoids, ellagitannins, β-sitosterol, and ursolic acid. Scientific studies confirm its free radical scavenging activity, with notable effects observed in n-butanol and ethyl acetate extracts. In vivo experiments have demonstrated its significant anti-inflammatory and analgesic effects in animal models. Despite its medicinal value, excessive use can lead to adverse effects such as throat irritation and flatulence. Correctives like *qand, safed,* and *sikanjabeen* are traditionally prescribed to mitigate side effects. The therapeutic potential of *Q. incana* supports its continued use in traditional medicine and warrants further pharmacological investigation.

Keywords: *Quercus incana, Baloot,* Ethnobotanical, oak, therapeutic insights

Introduction
Quercus incana Rox is a type of oak that is also referred to as cinnamon oak or bluejack oak. Originally derived from two Celtic terms, quer, which means "beautiful", and cuez, which means "tree", *Quercus incana* is the Latin word for "oak" [1-4]. Originating from the Latin word *incana*, the species name *incana* implies "grey or white with age." 'Bluejack' is also a reference to the bluish hue of the foliage [5].

- **Botanical name:** *Quercus incana.* [6, 7]
- **Synonyms:** *Quercus leucotrichophora*. [6]
- **Family:** Fagaceae [5-7]

Vernacular name
- **Arabic:** *Sitasupari* [8, 9]
- **English:** *Grey oak* [7, 10, 11]
- **Hindi:** *Ban, banj* [10]
- **Garhwal:** *Phanat* [7]
- **Kashmir:** *silasupuri, shiddar* [7, 10]
- **Punjab:** *Rin, Rinj, shindar, vari* [10]
- **Unani:** *Baloot* [7]
- ***Mahiyat:*** *Baloot* is the fruit of a giant tree, which grows in a cold and mountainous region [8, 12-15]

These trees bear large-sized, good-quality fruits and low-quality fruits alternatively and these low-quality fruits resemble *mazu.* The outer covering *baloot* is green and white in colour [12]. *BaIoot* is found in two shapes, one is round and the other is an oval pulp [13]. *Baloot,* also known as *shah baloot* or *baloot,* is a coloured thin membrane found between the outer covering and pulp of the fruit [26, 28, 15].

- **Part used:** Fruit [8, 12, 13]
- **Part studied:** *Jufte baloot* (thin membrane of fruit)
  ***Mizaj* (temperament):** Cold and dry. [8, 12, 13, 9, 15]
- ***Af'al* (action):** *Habis, mujaffif* [8, 14, 15] *qabidh* [8,10,12-15]

Powder of *baloot* and *nagar motha* is curative for *salas-al-baul, taqtir al-baul, and baul fi 'al-farash* [8].
Powder prepared with *baloot* (2 parts) and *kundur* (1 part) mixed with Olive oil is curative to *salas-al-baul, taqtir al-baul, baul fi 'l farash* [12, 14].
Joshanda of *jufte baloot* is beneficial for *Taqtir-ul-bual, quruh-al-ama, jarayan al-dum, jarayan al-mani, nafth al-dam, Is'hal wa pechish* [8, 9]
Local application of powder of incinerated *baloot* is useful in *qulla,* fresh wounds, and ulcer of penis and testicles [8, 14].
Sitz bath with *Joshanda* and local application are both beneficial for rectal prolapse [8].
Joshanda of *baloot* or *juft baloot* prepared with cow milk is beneficial to *shikran* and *suranjan* poisoning [9].

- ***Miqdar Khurak* (dosage):** 2 to3 *masha* and up to 9 *masha* from *joshanda* [8]. A maximum 5 *Tola* can be given [12].
- ***Muzir* (adverse effect):** It is *mowlide sauda* toxic to the throat. It causes flatulence and headache [8, 12, 14, 15].
- ***Musleh* (corrective):** *Qand safed, sikanjabeen*. Seeds of handeqooqa [8, 12, 14].
- ***Budal* (substitute):** *Gulnar, Kharnub, Morad, Chhale Anar*. [8, 12, 14].
- **Ethnobotanical Description:** An evergreen tree with dark grey, young shoots and Petioles that are hoary. It usually grows to 35 feet, with a maximum height of about 55 feet. Leaves are simple and alternate, growing between 1 and 4 inches long. The top side of the leaf is bluish to ashy green, and the underside is a silvery light layer of pubescence. Acorns mature in two years, yielding nuts that are small (ranging from 3/8 to 5/8inches long) and brown. The top 1/4 of the nut is attached to a reddish-brown cup that exhibits pubescence on its underside [5, 10].
- **Habitat:** Bluejack oak occurs frequently in the emperate region of Pakistan and is also found in Balakot, Sangar, Kaghan, Swat, Dir, and Kohistan. They also grow in Kashmir and the western Himalayas up to Bartania, Australia, and Nepal at altitudes of 1000-2400 m [7, 13, 3,15].
- **Part used:** Acorn [7, 3].
- **Action:** Diuretic, astringent, anti-gonorrheal, asthma, hemostatic, anti-inflammatory, gastroprotective, antioxidant, analgesic [2, 7, 10, 3, 4, 11].
- **Uses:** Gonorrhea, indigestion, diarrhea, asthma, antipyretic, antirheumatic, and antidiabetic. Anti-arthritic, anticancer, and for wound healing and immature abscesses [6, 7, 10, 4].
- **Constituent:** It possesses a rich load of lignins, hydrolysable tannins, ellagitannins, flavanoellagitannins, catechins, flavan and proanthocyanidin glycosides, flavonoids and simple phenols. ß. Sitosterol and ursolic acid, and quercusides A and B have been reported in this genus [2, 4].

Evidence-based pharmacological action

- **Anti-oxidant:** Free radical scavenging activity (RSA) of all fractions of the plant was measured by the DPPH method. The degree of discoloration indicates the scavenging potential of the antioxidant present in the fractions. The result showed that the highest RSA was observed in n-butanol and ethyl acetate with inhibition of 64.85% and 58.89% respectively, while the least in n-hexane fraction with 26.02% [3].
- **Antibacterial Antifungal activity:** In antibacterial activity, the n-butanol fraction was found significantly active against M leuteus, Salmonella setubal, and Pseudomonas pickenii bacterial strains. The ethylacetate fraction was active against M. leuteus as compared to other strains. Chloroform fraction showed good activity against *P. pickettii*, moderately active against rest of the strains. Similarly, 'I-hexane and n-butanol fractions were active against all strains except Sigella fexneri. All fractions were found inactive against *E. coli* [3, 16].
- **Anti-inflammatory and antinociceptive:** Anti-inflammatory and antinociceptive properties of crude methanol fruit extract of *Quercus incana* (QI), on two animal models, one is Wistar rats for carrageenan-induced paw inflammation, and the other is Swiss albino mice for the acetic acid-induced writhing test. The extract showed significant (p<0.01) anti-inflammatory and anti-nociceptive effects at doses of 50, 100, and 150mg/kg [2].

Conclusion

Quercus incana Roxb. (Baloot) exhibits significant ethnomedicinal and pharmacological potential, validated through traditional Unani practices and modern scientific studies. Its fruit and inner membrane possess antioxidant, antimicrobial, anti-inflammatory, and analgesic properties, attributed to the presence of tannins, flavonoids, and triterpenoids like β-sitosterol and ursolic acid. These findings confirm its therapeutic use in managing gastrointestinal, urinary, and inflammatory disorders. However, excessive use may cause adverse effects, emphasizing the importance of correctives. Future research should focus on isolating bioactive compounds, elucidating mechanisms of action, and conducting clinical trials to standardize dosage, ensuring safe and evidence-based utilization of *Q. incana* in modern phytomedicine.

Conflict of Interest
Not available

Financial Support
Not available

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