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## ***Berberis aristata (kilmora): A Himalayan Treasure Neglected In Uttarakhand***

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### **Introduction**

Uttarakhand, a state renowned for its rich biodiversity, is home to numerous endemic species of plants having the medicinal properties. Among these unique inhabitants is *Berberis aristata*, which belongs to family *Berberidaceae* and one of the major shrub used in Ayurveda for several remedies. It is commonly known as Indian berberry, Tree turmeric and daruhaldi or daruharidra and in Uttarakhand it is known by kilmora or kingoda. It is a spine scent shrub, 3-6 m in height with obovate to elliptic, toothed leaves, yellow flowers, bright red berries. The decoction of root bark of *Berberis aristata* is found to be effective against cisplatin induced urinary trouble or nephrotoxicity as it was able to reverse the side effects of cisplatin due to its antioxidative properties. The extract from root-barks, roots and lower stem-wood, (known as Rasanjana or Rasaut or

Rasavanti) is used as stomachic, laxative, hepatoprotective, antipyretic and in other ailments. It is useful in eye diseases particularly in conjunctivitis, indolent ulcers and in haemorrhoids. The root bark contains the bitter alkaloid berberine, which has been studied for its potential pharmacological properties. Berberine ( $C_{20}H_{18}NO_4^+$ ) or benzyl tetrahydroxy quinolone is a pale-yellow quaternary ammonium salt (5,6-dihydrodibenzo [a,g] quinolizinium derivative) which is obtained from protoberberine group of isoquinoline alkaloids extracted from *Berberis* and it is known to possess different immunomodulatory, pharmacological activities anti-inflammatory, such as anti-microbial, hepatoprotective, analgesic, antipyretic and anti-depressant activity. *Berberis aristata* is listed as “Least Concern” on the IUCN Red List. However, its habitat

is under threat due to deforestation, overgrazing, and urbanization.



**Figure : Fruit and plant of *Berberis aristata***

**Phytochemical and pharmacological properties of *Berberis aristata***

While the Kingoda or kilmora may be diminutive in size, it packs a powerful

nutritional punch. *Berberis aristata* contains wide range of phytochemical which includes,

- 1. Berberine:** A alkaloid with Antimicrobial, anti-inflammatory, and Anti-diabetic properties.
- 2. Berbamine:** A alkaloid with Anti-inflammatory and antimicrobial Properties
- 3. Palmatine:** A alkaloid with Anti-inflammatory and antimicrobial Properties.

Pharmacological studies have Demonstrated that *Berberis aristata* extracts possess:

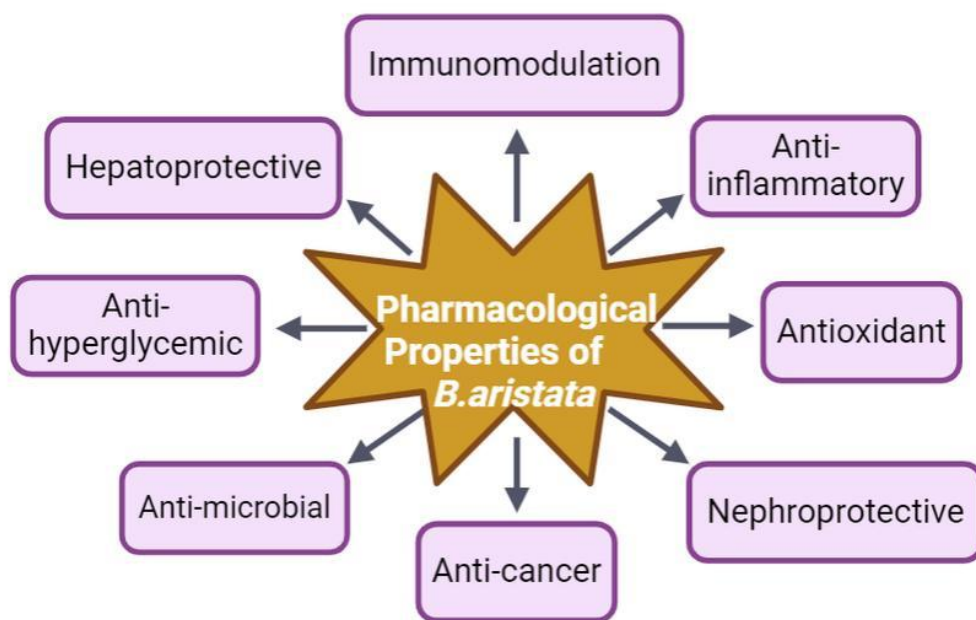
- 1. Antimicrobial and Anti-inflammatory:** Berberine's antimicrobial properties make it effective against a range of bacteria, fungi, and parasites. Its anti-inflammatory effects can alleviate conditions like Arthritis and inflammatory bowel disease.
- 2. Antioxidant and Antidiabetic:** The plant's antioxidant activity helps combat oxidative stress, while its ability to regulate blood sugar levels makes it a promising agent in diabetes. Management.
- 3. Anticancer potential:** Studies suggest that berberine may possess anti-cancer properties, inhibiting the growth and proliferation of certain tumour cells.
- 4. Hepatoprotective and cardiovascular benefits:** Berberine has been shown to

protect the liver from damage and improve cardiovascular health by lowering cholesterol and blood pressure and reduce the risk of heart attack.

5. Other potential benefits: *Berberis aristata* extracts and its formulations are also useful in the treatment of diarrhoea, haemorrhoids, gynaecological disorders, HIV-AIDS, osteoporosis, diabetes, eye and ear infections, wound healing, jaundice, skin diseases and malarial fever.

Haldi' due to its striking resemblance to turmeric. Some of the reasons are:

1. Similar Looks: The inner bark of Daru haridra is yellowish, just like turmeric.
2. Similar Benefits: Both plants help with inflammation, infections, and liver health.
3. Similar Uses: They're used in traditional medicine for skin problems, digestion issues, liver problems, menstrual disorders and more.



***Berberis aristata* often called Daruharidra**  
*Berberis aristata*, often called Indian barberry earns the nicknames 'Daru Haridra' and 'Daru

***Berberis aristata* : A culinary delight**  
The Kingoda, with its sweet and tangy flavour, is a versatile ingredient in Uttarakhand's culinary heritage. It can be

consumed fresh, dried, or processed into jams, jellies, and juices. The berries are also used to make traditional beverages like sherbets and chutneys.

**(i) Fresh consumption:** The simplest way to enjoy the Kingoda is to consume it fresh, straight from the bush.

**(ii) Dried berries:** Dried Kilmora berries can be added to cereals, yogurt, or trail mix for a nutritious and flavourful snack.

**(iii) Jams and jellies:** The berries can be transformed into delicious jams and jellies, perfect for spreading on toast or using as a topping for desserts.

**(iv) Chutneys and Pickles:** The tangy flavour of Kilmora makes it an ideal ingredient for chutneys and pickles, which can be paired with various dishes.

### Unknown Reasons for Lack of Recognition in native state:

Despite its numerous benefits, *Berberis aristata* remains a relatively unknown plant species, even in Uttarakhand, where it is native. Some possible reasons for this lack of recognition include,

**1. Limited Awareness and Scientific Research:** While traditional knowledge about the plant exists, further scientific

research is needed to fully understand its properties and potential medical applications. This lack of scientific validation currently limits its broader acceptance and use.

**2. Unsustainable Harvesting Practices:** Overharvesting for commercial purposes without proper regulations can lead to the depletion of natural populations. This unsustainable approach threatens the long-term availability of the plant and its associated ecological benefits.

**3. Lack of Value Chain Development:** Value chain development is insufficient for *Berberis aristata*, hindering its economic potential for local communities. This is due to difficulties in processing, standardization, and marketing products derived from the plant.

**4. Competition from Synthetic Drugs:** The availability of synthetic drugs often overshadows the use of traditional herbal remedies like *Berberis aristata*. This is particularly true in urban areas where access to modern healthcare is more readily available.

Tackling these problems needs a multi-faceted approach which includes scientific research, sustainable harvesting, better value

chains, community involvement, and supportive policies.

### A Call to Action

The Kingoda, a hidden gem of Uttarakhand, deserves recognition and appreciation. By supporting sustainable practices, promoting its consumption, and investing in research, we can secure the future of this remarkable fruit. We should work together to protect this invaluable natural resource and share its benefits globally. Harnessing the kilmora fruit will promote both human health and the conservation of biodiversity and sustainable development within the Himalayan region.

### Conclusion

*Berberis aristata* is a valuable plant species with a range of traditional uses in Uttarakhand and pharmacological properties. However, despite its numerous benefits, it remains a relatively unknown plant species. The lack of awareness, research, and conservation efforts has led to the underutilization of *Berberis aristata*, resulting in a loss of its potential benefits for the environment, human health, and the local economy. By promoting research, awareness, and conservation efforts, we can ensure the sustainable use and conservation

of *Berberis Aristata*, and unlock its full potential as a natural remedy for various health ailments. However, it is not too late to recognize the importance of *Berberis aristata* and take steps to conserve and promote its sustainable use.

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