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DARUHARIDRA BERBERIS ARISTATA AN EVIDENCE BASED REVIEW OF ITS MEDICINAL PROPERTIES

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Abstract:- Daruharidra, also known as *Berberis aristata*, is a medicinal plant native to the Himalayas and widely distributed across India. It has been used for centuries in traditional Ayurvedic medicine for its various therapeutic properties. In Ayurveda, Daruharidra is considered a bitter herb with potent medicinal properties. It is primarily used to support digestive health and treat gastrointestinal disorders such as diarrhoea, dysentery and indigestion. Additionally, it is believed to possess antimicrobial, anti-inflammatory, antioxidant, and hepatoprotective properties. Phytochemical analysis of Daruharidra has revealed the presence of various bioactive compounds, including alkaloids (berberine, palmatine), flavonoids (quercetin, isoquercetin), lignans, tannins, and essential oils. Daruharidra valuable medicinal plant in traditional Ayurvedic medicine. Although further research is needed to validate its traditional uses and explore its full potential.

Keyword: Daruharidra, Berberine, Hepatoprotective, Anti-inflammatory, Liver diseases

Introduction: - Herbal medicines are considered as the major healthcare provider in the whole world mainly in rural and remote areas. Daruharidra also known as Indian Barberry or tree Turmeric. It is a medicinal plant that holds significant importance in traditional Ayurvedic medicine.¹ *Berberis aristata* is a thorny shrub that typically grows in Himalayan region of India, Nepal, and Pakistan at a height of 1-3 meters. It has woody stems and oval-shaped leaves with sharp spines. The plant produces bright yellow flowers that give way to small, oblong-shaped berries, which are red when ripe.²

The name "Daruharidra" is derived from two Sanskrit words: "Daruh" meaning wood or tree, and "Haridra" meaning turmeric. This name reflects its characteristic yellow roots, which resemble the colour of turmeric.³ The plant contains several beneficial compounds including berberine, which is found in the bark of leaves, roots, rhizomes and stems. It is considered the most important herbal plant in the Ayurveda, Siddha and Unani medicinal system due to its medicinal importance.^{4,5} In Ayurveda Daruharidra has been classified as a bitter herb and traditionally this plant was used as a tonic, emollient, diaphoretic, diuretic, and as an alternative treatment for wound healing, skin ailments, rheumatism, snake bites, menorrhagia, jaundice, eye problems, and other

ailments.^{6,7} According to reported studies, in India the stem and root parts of *Berberis aristata* are marketed as Dalharidra and used to treat allergies, metabolic disorders, cholera, acute diarrhoea, subclinical malaria, amebiasis, digestive disorders, liver problems, skin diseases, eye ailments, and urinary tract infections.⁸

Table no. 1 Vernacular names of *Berberis aristata* ^{9,10}

Hindi	Daruhaldi, Chitra, Chotra, Kashmal, Kashmar
English	Indian beriberi
Bengali	Daruharidra, Darhaldi
Greek	Lykion indikoc
Gujrat	Daruhaldar
Kannada	Doddamaradarisina
Malayalam	Maradarisina, Maramanjil
Marathi	Daruhalad
Oriya	Daruharidra, Daruhalidi
Punjabi	Chitra, Kasmal, Simlu, Sumlu, Daruhaldi
Tamil	Mullukala, Usikkala, Garamenjal
Telugu	Kasturipuspu
Sanskrit	Katamkateri, Darvi, pitadaru, Pnachmpacha suvarnavarna
Uttarakhand	Kirmod
Himachal Pradesh	Rasont, kashmal
Nepal	Chitra, chutro

Geographical Distribution of Daruharidra:^{11,12} Daruharidra is native to the Himalayan region of India and Nepal. It is found in the northern parts of India, particularly in the states of Himachal Pradesh, Uttarakhand, Jammu and Kashmir. It is also present in neighbouring regions of Nepal, including the central and western parts of the country. The natural distribution of *Berberis aristata* is influenced by the climatic conditions of the Himalayan region, including its altitude and temperature. It tends to grow in cool and temperate regions, often in hilly or mountainous areas, at elevations ranging from 1,500 to 3,300 meters (5,000 to 11,000 feet) above sea level.

Morphological characteristic:^{13,14,15} *Berberis aristata* is a deciduous shrub that grows upright and can reach a height of 1 to 3 meters (3 to 10 feet). It has a compact and branching growth habit.

Stem: The stems of *Berberis aristata* are woody and often have numerous spines or thorns along the branches. These thorns can be sharp and are used for protection against herbivores.

Leaves: The leaves are simple, alternate, and clustered along the branches. They are oval-shaped, approximately 2.5 to 7.5 centimetres long, and have toothed margins. The upper surface of the leaves is green, while the lower surface is often pale or whitish.

Flowers: *Berberis aristata* produces small, bright yellow flowers that are arranged in clusters. The flowers have six petals and are typically bisexual (containing both male and female reproductive parts). They bloom in late spring to early summer.

Fruits: After the flowers, *Berberis aristata* develops small berries that are oval-shaped and reddish to blackish-purple in colour; these berries are edible and have a sour taste.

Phytochemical constituents of *Daruharidra*:^{16,17,18}

The plant contains several bioactive compounds, including alkaloids, flavonoids, phenolic acids, and other secondary metabolites. Here are some of the main phytochemical constituents found in *Berberis aristata*.

Berberine: Berberine is the most well-known and abundant alkaloid present in *Berberis aristata*. It is responsible for the characteristic yellow colour of the plant's roots. Berberine has been extensively studied for its various pharmacological properties, including antimicrobial, anti-inflammatory, antioxidant, and antidiabetic activities.

Palmatine: Palmatine is another alkaloid found in *Berberis aristata*. It is structurally similar to berberine and shares some of its pharmacological properties.

Isoquinoline: Apart from berberine and palmatine, *Berberis aristata* contains several other isoquinoline alkaloids, such as jatrorrhizine, columbamine, and magnoflorine.

Flavonoids: *Berberis aristata* contains various flavonoids, including quercetin, kaempferol, and their glycosides. Flavonoids are known for their antioxidant and anti-inflammatory properties and play a role in the plant's therapeutic potential.

Phenolic Acids: Gallic acid, ferulic acid, and caffeic acid are some of the phenolic acids identified in *Berberis aristata*. These compounds possess antioxidant and anti-inflammatory activities and contribute to the overall antioxidant capacity of the plant.

Tannins: *Berberis aristata* contains tannins, which are polyphenolic compounds with astringent properties. Tannins are known for their antioxidant and antimicrobial effects.

Table: 2 **Pharmacological properties (Rasapanchak) of *Berberis aristata*:**¹⁹

Rasa	Guna	Virya	Vipaka	Prabhava
Tikta, kasaya	Laghu, Ruksha	Usna	katu	-

Karma (Actions) of *Daruharidra*²⁰

- **Deepan:** It helps as an appetizer.
- **Vrana shodhana:** It promotes the healing of wounds.
- **Shothahara:** It is used to treat oedema.
- **Vedana sthapan:** It alleviates pain and exhibits analgesic properties.
- **Pitta sarak:** It regulates metabolism and is used to treat ailments affecting the pancreas, digestive and liver disease.
- **Grahi:** It helps to cure diarrhoea and dysentery problems.
- **Rakta shodhaka:** It purifies the blood.

Table: 3 Indication of the Plant Drug as per Ayurvedic Lexicons ^{21,22,23,24,25,26,27,28}

S.No	Indication	DN	MN	RN	KN	BN	MoN	PN	GN
1	Karna roga	+	+	+	+	+	+	+	+
2	Mukh roga	+	+	-	+	+	+	-	+
3	Netra roga	+	-	+	-	-	-	-	-
4	Kandu	+	-	+	-	-	-	-	-
5	Prameha	+	-	+	-	-	-	+	-
6	Vrana	+	-	+	-	-	-	+	-
7	Tawag roga	-	-	+	-	-	-	-	-
8	Visarp	-	-	+	-	-	-	-	-
9	Vish	-	-	+	-	-	-	-	-
10	Yoni roga	-	-	-	-	-	-	+	-

Ethnomedicinal uses of Daruharidra (*B. aristata*):^{29,30,31}

- Decoction of Daruharidra root is used in Diabetes.
- Decoction of Berberis aristata root is used to wash eyes in conjunctivitis.
- Stem paste of Indian barberry is used to treat abscess.
- Grind the root with water and applied on the wound for wound healing.
- Decoction of root-bark is used as a wash for ulcers to improve their appearance and promote cicatrisation.
- A decoction of root bark tried in the management of oriental sore.
- Daruharidra root bark ointment prepared with camphor and butter is applied to pimples and boils.
- Daruharidra root bark decoction given with honey for the treatment of jaundice.

Pharmacological properties of Daruharidra (*Berberis aristata*):³²

- **Anti-inflammatory Activity:** The plant's elements, especially Berberine, have strong anti-inflammatory properties. Due to this characteristic it is beneficial for treating inflammatory diseases like arthritis and inflammatory bowel disease and arthritis.
- **Antimicrobial Activity:**³³ Berberine, an alkaloid recognized for its broad-spectrum antibacterial effects, is found in *Berberis aristata*. It has shown that it is effective against a wide range of bacteria, fungi, viruses, and parasites.
- **Hepatoprotective:**³⁴ Traditional uses of *Berberis aristata* involve enhancing liver function. Its extracts contain hepatoprotective qualities that can help protect the liver from damages caused on by harmful substances, oxidative stress, and inflammation. Due to this, it may be advantageous in treating liver conditions and acting as an adjuvant during liver detoxification.
- **Antidiabetic Activity:**³⁵ *Berberis aristata*, has exhibit antidiabetic properties. It can help regulate blood sugar levels by improving insulin sensitivity, enhancing glucose uptake by cells, and reducing glucose production in the liver. It may be beneficial in managing type 2 diabetes and related complications.

- **Gastrointestinal Effects:**³⁶ *Berberis aristata* show anti-secretory and anti-diarrheal effects, making it useful in conditions like diarrhea and gastroenteritis. It also shows potential benefits in gastric ulcer management.

Substitution³⁷

1. *Curcuma longa* (Haldi) contains curcumin, an active ingredient that resembles the berberine in *Daruharidra*. Turmeric is frequently used in cooking and can be purchased as a supplement.
2. Chinese goldthread (*Coptis chinensis*) rich in berberine and used in traditional Chinese medicine. It has several characteristics in common with *Daruharidra* and can be used as a substitute.
3. *Hydrastis Canadensis* (Goldenseal) This North American native herb, like *Daruharidra*, contains berberine. It is frequently used as an immune system builder and antibacterial herb. However, it is crucial to use goldenseal carefully and take alternative solutions into consideration due to worries regarding sustainability and overharvesting.
4. *Mahonia* spp. (Oregon grape) This North American natural plant contains berberine. It is frequently used as a stand-in for *Daruharidra* since it has similar qualities.

Conclusion: - *Daruharidra* (*Berberis aristata*) is a plant with a rich history of traditional use in various medicinal systems, particularly in Ayurveda. It possesses a diverse range of pharmacological properties, including antimicrobial, anti-inflammatory, antioxidant, hepatoprotective, and antidiabetic activities. The main bioactive compounds found in *Daruharidra*, such as berberine and other alkaloids, contribute to its therapeutic potential. Traditional uses of *Daruharidra* include the treatment of digestive disorders, liver disorders, skin conditions, urinary tract infections, diabetes, eye disorders, fever, and pain relief. These traditional uses reflect its historical significance and the cultural belief in its healing properties. However, it is important to note that while *Daruharidra* has been used for centuries, further scientific research, including clinical trials, is necessary to fully understand its efficacy, safety, and optimal usage. As with any herbal remedy, it is always advisable to consult with a healthcare professional or qualified herbalist before using *Daruharidra* for medicinal purposes, especially in specific health conditions or in combination with other medications.

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