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Review Article

DARUHARIDRA (*BERBERIS ARISTATA* DC): A SOLUTION TO AILMENTS IN PRESENT AND FUTURE

Sharma Divya[1]*, Mishra H.S[2], Agarwal A.K[3]

*[1]PG Scholar, [2]Lecturer, [3]Reader, Department of Dravyaguna, Lalit Hari State P.G. Ayurvedic College and Hospital, Pilibhit, U.P, India.

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ABSTRACT

Berberis aristata, generally known as *Daruharidra* because of yellow coloured wood, belongs to the family Berberidaceae. Approximately 500 species of genus Berberis are found Worldwide. 77 species of Berberis reported in India, 21 species are present in Himachal Pradesh in which *Berberis aristata, Berberis asiatica* and *Berberis lycium* are more common. *B. aristata* has been accepted as an official source for classical drug *Daruharidra.* It is deciduous, thorny shrub attaining a height of about 6-12 feet, found at the altitude of 6000 to 10,000 feet in Himalayan range, also found in Neelgiri hills, Sri Lanka, South Africa, Afganistan, Iran. Therapeutically used part of the plant is root bark. The major chemical constituents of *B. aristata* are alkaloids and Berberine is one of the important alkaloids in it. Berberine-containing plants are used as food supplements subject to certain restrictive conditions of use. It is a red listed endemic medicinal plant species of conservational concern and has become dominantly important in current years due to its scarcity and increased demand. Species, such *as B. lycium* Royle. and *B. chitria* Lindl. are also generally used in Ayurveda formulations for therapeutic purposes and for the preparation of *rasanjana,* crude concentrated extract prepared from the roots and stem bark. It is use to cure several ailments, including conjunctivitis, bleeding piles, ulcers, jaundice, hepatosplenomegaly. However, many other plants belonging to different genera like *Cosinium fenestratum* (Gaertn.) *Coleb* and *Morinda umbellate* have been recommended as substitutes for *Daruharidra* and traded in the market in its name. Present paper is an effort towards establishment of therapeutic potential of *Daruharidra* through reverse pharmacology and measures for its in-situ conservation.

INTRODUCTION

Berberis aristata DC, a deciduous, thorny shrub attaining a height of about 6-12 feet, belongs to the family *Barberidaceae.* In Ayurveda it's known as *Daruharidra* which means plant having yellow wood and flowers.[1] Other synonyms of *Daruharidra* are *Kusumbhala* (flowers are utilised in making yellow dye), *Katankateri, Kantakini* (leaves have spinatous margin), *Vishodhini* (work as purifier), *Krimihara* (act as anthelmintic) and *Pachampacha* (improves liver functions).

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Distribution

Worldwide approximately 500 species of genus Berberis are found, 77 species reported in India in which *Berberis aristata, B.asiatica* and *B. lycium* are more common.[2] *B. aristata* DC has been accepted as official source for classical drug *Daruharidra.* It is distributed in Himalayan range at an altitude of about 6000 to 10,000 feet, in Neelgiri hills, Sri Lanka, South Africa, Afganistan and Iran.[3]

Pharmacological Properties in Ayurveda *(Dravya Guna-Karma)*

Daruharidra has *Ruksha* (dry) *Guna* (physical-property); *Katu* (pungent), *Tikta* (bitter) in *Rasa* (taste); hot (*Ushna*) in potency (*Virya*) and becomes *Katu* in *Vipak* (tissue metabolism).[4]

Pharmacological Action *(Karma)*: A number of the important actions have been reported in the literature listed in the Table 1 and 2.

Table 1: Action of *B. aristate* over different *Doshas* (*Dosha-karma*)

Doshakarma	**D.Ni[5]**	**Sh.Ni.[6]**	**MP.Ni.[7]**	**K.Ni.[8]**	**BP.Ni.[9]**	**R.Ni.[10]**	**P.Ni.[11]**
Vata Shamak	-	+*	-	-	-	-	-
Pitta Shamak	-	-	+	+	+	-	+
Kapha Shamak	-	+	+	+	+	-	+

Shaligram Nighantu Considers *Haridra Kaphavata Shamak*. Here he quotes a verse from *Bhavpraksha Nighantu*. Though, in all other available commentaries on *Bhav Prakash Nighantu,* it has been said to be *Kaph-Pitta Shamak*.

Table 2: Action over different parts of body (*Sansthanik karma*)

Karma	**D.Ni.[5]**	**MP.Ni.[7]**	**K.Ni.[8]**	**BP.Ni.[9]**	**R.Ni.[10]**	**P.Ni.[11]**	**Sh.Ni.[6]**
Shothanashak (Anti-inflammatory)	-	+	+	+	-	-	-
Pramehaghna (Antidiabetic)	+	+	+	+	+	+	+
Chedan (Excision)	-	-	-	+	-	-	-
Varnya (Complexion enhancer)	-	-	+	+	-	-	-
Krimighna (Anthelmintic)	-	-	+	+	-	-	-
Kandughna (Anti pruritic)	+	+	-	-	+	-	+

Phytochemical Constitution [12]- Phytoconstituents reported in *B. aristata* have been listed Table no. 3.

Table 3: Chemical Constituent of *Daruharidra.*

1.	Alkaloids	Berbamine, berberine, oxyberberine, oxyacamthine, epiberberine, aromoline,[13,14] Karachine, dihyrokarachine, tetrahydropalmatine, tetrahydroberberine, palmatine dehydrocaroline, jatrorhizine, columbamine and palmatine chloride,[15] pseudopalmatine chloride, pseudoberberine chloride, taxilamine, pakistanine and 1-O-methylpakistanine [16,17]
2.	Resins	Podophylloresin, podophyllotoxine
3.	Colouring matter	Podophyllaquercetin
4.	Acids	Malic, citric
5.	Heavy metals	Cadmium, lead, chromium, zinc, iron and manganese [18]

Pharmacological Uses (*Prayoga*)- Some of the important uses cited in classical texts are listed in the Table no. 4.

Table 4: Uses of *B. aristata*

***Vyadhi* (Diseases)**	**D.Ni.[5]**	**MP.Ni.[6]**	**K.Ni.[8]**	**R.Ni.[10]**	**Sh.Ni.[6]**	**BP.Ni.[9]**	**P.Ni.[11]**
Netra roga (Eye diseases)	+	+	+	+	+	+	+
Karna roga (Ear diseases)	+	+	+	+	+	+	-
Mukha roga (Mouth diseases)	+	+	+	-	+	+	-
Vrana (Ulcers)	+	+	+	+	+	+	+
Visarpa (Erysipelas)	-	-	-	+	+	-	-
Vishavikara (Toxicological diseases)	-	-	+	+	+	+	-
Shotha (Inflammation)	-	+	+	-	-	+	-
Pandu (Anemia)	-	+	+	-	-	+	-
Prameha (Diabetes)	+	+	+	+	+	+	+
Kandu (Itching)	+	-	-	+	+	-	-
Yakritvikara (Liver diseases)	-	-	-	+	-	-	+
Raktavikara (Blood diseases)	-	+	-	+	-	+	+
Twak vikara (Skin diseases)	-	+	-	+	+	-	-

Traditional uses of *B. aristata*[19]

Traditional uses of *Daruharidra*, given in Indian Materia Medica are as follow-

- Tincture of *Daruharidra* is effective in cases of enlargement of the liver and spleen.
- It is much recommended in fever accompanied by bilious symptoms and diarrhoea.
- A crude extract of *Daruharidra* referred to as *Rasanjana*, prepared from its root-bark, is used as a local application in affections of the eyelids and in chronic ophthalmia in which it is painted over the eyelids occasionally combined with opium (*Papaver somniferum*), sodium-chloride (NaCl) and alum ($K_2SO_4.Al_2(SO_4)_3.24H_2O$).
- A decoction of root bark tried in the management of oriental sore.
- In bleeding piles, it administered in the doses of 5 to 15 grains with butter. Its solution (1 in 32 of water) is used as a wash in haemorrhoids.
- Its ointment prepared with camphor and butter is applied to pimples and boils.
- A decoction of *Daruharidra* root bark, with honey is taken in jaundice.
- With the addition of *Emblic myrobalan* (*Amla*), the decoction is beneficial in painful micturition from bilious or acrid urine.
- Externally the decoction of Indian barberry root-bark is used as a wash for unhealthy ulcers to improve their appearance and promote cicatrisation.
- *Rasanjana* mixed with honey is applied to aphthous sores, abrasions and ulcerations of the skin.
- The ancient Egyptians used it to stop plagues. India's Ayurvedic healers used it for dysentery. During the early middle ages, European herbalists used it to manage liver and gallbladder ailments. Russian healers also used it for inflammations, high blood pressure, and for abnormal uterine bleeding. American Indians recognize barberry almost like Oregon grape.[12]

Revalidation of Classical Pharmacological Action

Reported pharmacological activities of *B.aristate* have been validated by various scientific and experimental studies that are summarized below.

Table 5: Revalidated Classical Pharmacological Action

S.No	Classical Claim / Indication	Biological Activity Demonstrated	Part Used	Extract
1.	*Yakritdoshahara* [10,11]	Hepatoprotective activity	Root [20]	Aquous/ methanolic
			Fruit and shoot [21]	Crude
2.	*Pramehaghna* [5, 6, 8-11]	Antidiabetic Action	Root [22]	Water/Methanol/ Crude
			Stem bark	Methanolic [23]
				Ethanolic [24]
3.	*Rasayana* [9]	Antioxidant Activity	Root [25]	Aq. Ethanolic
			Dried fruit [20]	Methanolic
4.	*Lekhya* (CS.Su.4.8.3)	Anticancer Activity [26]	Stem	Methanolic
5.	*Vishamjwarahara* [27]	Antimalarial action [28]	Root	Ethanolic
6.	*Grahi* [27]	Antidiarrheal Action	Bark [29]	Ethanolic/ Aquous
			Leaves [30]	Aquous
7.	*Shothaghna*	Anti-inflammatory action [31]	-	Alcoholic/ aquous
8.	*Vranahara* [5, 6, 8-10]	Wound healing [32]	Ointment	Aquous/ Alcoholic

Conservation

Despite India being rich in biodiversity and one of the 12 mega biodiversity centres, the growing demand for medicinal plants is putting a heavy strain on the natural resources. This has resulted in depletion of large number of higher plant species which are categorized as either threatened or endangered. Since most of the part of medicinal plants like root stem, bark, wood or whole plants are used for medicinal purposes, the plant loss in India is high due to unsustainable, destructive harvesting. This poses a marked threat to the genetic stocks and to the diversity of medicinal plants. A number of surveys have been conducted from time to time and at various places in India to estimate the threat status. A rapid assessment of the threat status of medicinal plants using International Union for Conservation of Nature and Natural Resources (IUCN) designed Conservation Assessment and Management Prioritisation (CAMP)

methodology revealed that about 112 species in southern India, 74 species in Northern and Central India and 42 species within the high altitude of Himalayas are threatened in the wild (Jain et al., 2003). According to a report published in Times of India (2004), ninety three percent of wild medicinal plants used for preparing Ayurvedic drugs in the country are endangered and the government is trying to relocate them from their usual habitat to protect them [33] and. *Daruharidra* is one of them. Following conservative measures opted for *Daruharidra*:

- Controlled harvesting (not more than 40%).
- Cultivation of *Daruharidra* in its natural habitat.
- Exploration of possibilities of use of other plant part in place of root if leaves, fruits are having same potency as root of *B.aristata* such as crude extract of fruits and leaves showed hepatoprotection in an animal model of hepatotoxicity.[12]
- Use of official substitute of *Daruharidra.*

Substitution

Haridra (*Curcuma longa* L., Zingiberaceae) has been considered as official substitute in cases of scarcity of *Daruharidra*[34,35] on the basis of similarities in pharmacotherapeutic properties of both the drugs. Phytochemical composition of both the plant drugs i.e., substituted and substitute may be considered as a ground for consideration of substitution. In present case, phytochemical constitution of both the drugs is not similar. Therefore, substitution of *Daruharidra* with *Haridra* needs further exploration. Other species of genus *Berberis* viz. *Berberis asiatica* Roxb ex.DC and Berberis lyceum Royle have been considered as official substitute for *Berbaris aristata* in Ayurvedic Formulary of India[36]. Regionally, other plants belonging to different genera like *Cosinium fenestratum* (Gaertn.) *Coleb* and *Morinda umbellate* are being used in the name of *Daruharidra*. *Cosinium fenestratum* is also found adulterated in *Daruharidra* [37].

DISCUSSION AND CONCLUSION

Daruharidra (B.aristata) has a significant therapeutical uses in Ayurveda, Unani and other traditional systems of medicine world over. Chemical constituents found in plants such as berberine have various pharmacological properties such as Hypolipidemic, anti-diarrhoeal, anti-diabetic, anti-cancer and Ophthalmic activity. Dietary flavonoid is found to have a close relationship with decreased insulin resistance and reducing the symptoms of PCOS (Poly Cystic Ovarian Syndrome). Over exploitation of *B. aristata* from natural resources has pushed it in the well of endangered species. In-situ conservation of the plant may be the best regimen towards conservation of this valuable medicinal plant. Cultivation rather than wild harvest, use of its official substitutes and use of other plant parts in place of root are other possible measures to protect it from getting extinct.

Abbreviation Used

BP.Ni- Bhav Prakash Nighantu; CS- Charak Samhita; D.Ni.- Dhanvantari Nighantu; MP.Ni.- Madan Pal Nighantu; K.Ni- Kaiyya Dev Nighantu; P.Ni.- Priya Nighantu; R.Ni.- Raj Nighantu; Sh.Ni.- Shaligram Nighantu; Su- Sutra Sthana.

REFERENCES

1. The wealth of India publications and information Directorate. Vol 2 (B); CSIR, Delhi. 1985; Pg no.116-117.
2. Rajasekaran, Kumar. Rasont– A traditional crude drug prepared from Berberis species and its uses. Indian Journal of Traditional Knowledge. October 2009; Vol. 8 (4): pp. 562-563.
3. E Reddy Shiva Rami. A Review on Phytochemical and Pharmacological studies of Berberis Aristata, International Journal of Trend in Scientific Research and Development. 2018; Vol 2 (2).
4. Reviews on Indian Medicinal Plants, Vol 4, Indian Council of Medicinal Research, New Delhi, 2004. Pg. No. 150.
5. Sharma Priyavrat, Dhanvantri Nighantu, Chowkhambha Orientalia, Varanasi, pg.26.
6. Vaisya Shaligram, Shaligram Nighantu, pg 160-161.
7. Vaidya Ramprasad Pandit, Madanpal Nighantu, Krishnadas Prakashan, Mumbai, pg 42.
8. Sharma P.V., Kaiyadev Nighantu, Chowkhambha Orientalia, Varanasi, 1979, pg 206.
9. Chunekar Krishnachandra, Bhavprakash Nighantu, Chowkhambha Bharti Academy, Varanasi, 2018, pg 114-118.
10. Tripathi Indradev, Raj Nighantu, Krishnadas Academy, Varanasi, 1982, pg 175.
11. Sharma Priyavrat, Priya Nighantu, Chowkhambha Sanskrit sansthan, Varanasi, 1995, pg 108.
12. Mazumder P. M., Das Saumya, Das Sanjita, Das M. K. Phyto-pharmacology of berberis aristata DC: A review. Journal of Drug Delivery & Therapeutics, 2011; 1(2): 46-50.
13. Blasko, G., Murugesan, N., Freyer, A. J., Shamma, M., & Ansari, A. A. Karachine: an unusual protoberberine alkaloid. Journal of the American Chemical Society. 1982; 104(7), 2039-2041.
14. Rahman, A., & Ansari, A. A. Alkaloids of Berberis aristata-isolation of aromoline and oxyberberine. Journal of the Chemical Society of Pakistan. 2011; 5(4), 283.
15. Chakravarti, K. K., Dhar, D. C., & Siddiqui, S. Alkaloid constituents of the bark of Berberis aristata. Journal of Scientific and Industrial Research. 1950;(7),161-4.
16. Saied, S., & Batool, S. Shaista Naz. Phytochemical studies of Berberis aristata, J. Basic Appl. Sci. 2007; 3(1), 1-3.

17. Blasko, G., Ansari, A. A., & Rahman, A. U. Taxilamine, a pseudobenzylisoquinoline alkaloid. 1982.
18. Meena, A. K., Bansal, P., Kumar, S., Rao, M. M., & Garg, V. K. Estimation of heavy metals in commonly used medicinal plants: a market basket survey. Environmental monitoring and assessment, 2010; 170(1), 657-660.
19. Nadakarni K.M, Indian Materia Medica, Vol 1, Popular Prakashan Pvt. Ltd, 1976. Page No. 189.
20. Brijesh K. Tiwari, Khosha RL Evalution of the Hepatoprotective and antioxidant effect of Berberis asiatica against experimentally induced liver injury in rats. International Journal of Pharmacy and Pharmaceutical Sciences. 2010; 2(1).
21. Gilani AH, Janbaz KH. Preventive and curative effects of berberis aristata fruit extract on paracetamol- and CCl4- induced hepatotoxicity. Phytotherapy Res. 1995; 9: 489-94.
22. Akhtar MS, Sajid MS, Ahmad M Hypoglycemic effect of Berberis aristata root, its aqueous and methanolic extract in normal and alloxan induced diabetic rabbits, Pharmacology online (Italy). 2008; 2: 845-856.
23. Gupta J. K., Mishra P., Rani A. and Mazumder P. Mitra. Blood Glucose Lowering Potential of Stem Bark of Berberis aristata Dc in Alloxan-Induced Diabetic Rats. Iranian J of Pharmacology& Therapeutics 2010 January; 9(1):21-24.
24. Shah Kamal, Nagendra Singh Chauhan, Bhupesh Chander Semwal, Rohit Badhe, Kalyani Divakar. Antidiabetic activity of stem bark of Berberis aristata D.C. (Berberdiaceae) in alloxan induced diabetic rats. Internet J of Pharmacology 2008.
25. Singh J, Kakkar P. Antihyperglycemic and antioxidant effect of Berberis aristata root extract and its role in regulating carbohydrate metabolism in diabetic rats. J Ethnopharmacology 2009 May 4; 123(1):22.
26. Das Sanjita and Basu Saumya Priya. Cytotoxic Activity of Methanolic Extract of Berberis aristata DC on Colon Cancer, Global J Pharmacology 2009; 3(3): 137-140.
27. Sharma P.V, Dravyaguna Vigyana 2nd part, Chaukhamba Bharti Academy, Varanasi, 2005, Pg.538.
28. Sanjeev kumar. A comparative study of some antimalarials on clearance of blood stage plasmodium Berghei. [Cited on 2022 March 10]. Available From http://www.puchd.ac.in/phd/zoology/sanjeevkumarzoo.pdf
29. Padmaja V. Joshi, Atul A Shirkhedkar, Krishnan Prakash, Vijay L Maheshwari. Antidiarrheal activity, chemical and toxicity profile of Berberis aristata. Pharmaceutical Biology 2011 January; 49(1):94-100.
30. Khanum Rizwana and Gilani S. Aneel. Conservational status of plant seedlings in Ayubia. National Park, Pakistan. Lyonia, 2005 July; 8(1): 51-60.
31. Shahid M, Rahim T, Shahzad A., Tajuddin, Latif A, Fatma T, Rashid M, Raza Adil and Mustafa S. Ethnobotanical studies on Berberis aristata DC. Root extracts. African J of Biotechnology 2009 February 18; 8 (4): 556-63.
32. Biswas Tuhin Kant, Mukherjee Biswapati. Plant Medicines of Indian Origin for Wound Healing Activity: A Review. Int J of Lower Extremity Wounds 2003 Mar; 2(1): 25-39.
33. Kumar Abhimanyu, Padhi M.M, Narayanam Srikant, Dhar ishnupriya, Mangal A.K, Conservation, cultivation and Exploration of Therapeutic Potential of Medicinal Plants, C.C.R.A.S., New Delhi, 978-93-83864-03-4.
34. Shastri Laxmipati, Hindi commentary on Yogratnakar, Seventh Edition, Chaukhamba Publications, New Delhi, 1999, Pg.171.
35. Sitaraman Bulusu, Chunekar K.C, Bhavaprakasa of Bhava Mishra, Part 1, Chaukhambha Orientalia, Varanasi, 2018, Pg. 115.
36. Ayurvedic Formulary of India, Part 1, Pg. 307-330.
37. Shastri J.L.N, Nesari Tanuja M., A text book of Ayurveda vigyan, Vol 1, Chaukhambha Orientalia, Varanasi, 2015, Pg.258.

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***Address for correspondence**
Dr. Sharma Divya
PG Scholar,
Department of Dravyaguna,
Lalit Hari State P.G. Ayurvedic College and Hospital, Pilibhit, U.P.
Email: divya8858525400@gmail.com
Ph.No: 9999019925