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RIDDHI (HABENARIA INTERMEDIA D. DON)- USEFUL MEDICINAL PLANT OF AYURVEDA SUFFERING FROM ADULTERATION SYNDROME

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ABSTRACT

Ṛddhī is an important member of Aṣṭavarga group of plants. Traditionally it is used in many herbal preparations for its rejuvenating and health promoting properties. Polyherbal formulation containing tubers of this herb possess properties viz. full of vital energy, high in antioxidants, and boosting immunity. In this modern time people are becoming more aware about benefits of medicinal plants and are attracted towards this plant possessing immense therapeutic value. The demand of this herb is increasing day by day but due to scarcity of this plant in wild, unaware about authentic botanical source, non-existing cultivation practices there is widespread problem of adulteration or substitution with other plants. The poor quality of raw material affect the quality of end product formed. So by taking into account the above situation this systematic review/metadata analysis has conducted to find out adulteration in Ṛddhī.

KEYWORDS: Ṛddhī, Aṣṭavarga, Orchidaceae, *Habenaria intermedia* D. Don, *Habenaria edgeworthii* Hook., f. ex Collett.

INTRODUCTION

Āyurveda is a science based on ancient Indian philosophy. In Āyurveda an absolute health is defined as a balance between body, mind, spirit and social wellbeing. Āyurveda is comprehensive system of natural health care that originated in the ancient Vedic times of

India. The main purpose of Āyurveda is to protect the health of a healthy person and to alleviate disorders in the diseased. In Āyurveda medicinal plants have been classified into various groups on the basis of their pharmacological actions viz. triphalā, trikaṭu, panchakolā, aṣṭavarga, dashmool etc. Among all medicinal plant groups, Aṣṭavarga is an important group of medicinal plants which is quoted in classical text books. Among all Aṣṭavarga plants, Ṛddhī is an important one and have various medicinal effects. It is a very good rasāyana and having rejuvenating, health-promoting properties. Ṛiddhī was introduced under Kākolyādi varga in Suśruta-saṁhitā**,** in Aṣṭāñga saṁgraha under Padamakādi gaṇa and Madhura skandha, in Aṣṭāñga Hṛdayam under Padamakādi gaṇa**.** Botanically this plant is considered as *Habenaria intermedia* D. Don and it belongs to family Orchidaceae.

Botanical source of Ṛddhī

The Āyurveda and Sanskrit literature has described a herb with many synonyms, which do not extactly indicate the botanical source but many a times attribute to therapeutic utility of the plant. For a single herb various synonyms are mentioned in ayurvedic lexicons on the basis of morphology, habitat, origin, medicinal property etc.

The first and foremost modern description of Aṣṭavarga plants were found in the book named 'Dravyaguṇa-Vijnāna' authored by Ācārya Priyavrata Sharma[1], however, the detailed description of Ṛddhī was missing. In the modern era, Dr. Krishna Chandra Chunekar made the first attempt to give a botanical description of Ṛddhī under the name of *Habenaria intermedia* D. Don (Syn. *Habenaria edgeworthii* Hook., f. ex Collett.).

Although work has been done on identification of medicinal plants mentioned under Aṣṭavarga, still there is multifaceted view of many scholars about the botanical identity of Ṛddhī. Most of the scholars infer Ṛddhī–Vṛddhī as synonyms or varieties of same plant. However documentation indicates them to be separate species.

During this review it has been found that many scholars has different view point about the botanical source of Ṛddhī.[2-53] However, on the basis of this meticulous review, majority of acceptance by various authors, on the basis of API & AFI, the botanical source of Ṛddhī is considered as *Habenaria intermedia* D. Don. The view point of all the scholars about the identity is presented in (**Table 1**).

Taxonomical classification[54]

Habenaria intermedia D. Don Syn*: Habenaria intermedia* var. *arietina* (Hook. f.) **Kingdom:** Plantae; **Phylum:** Tracheophyte; **Class:** Liliopside; **Order:** Asparagales; **Family:** Orchidaceae; **Genus:** Habenaria; **Species:** *intermedia*

Specific habitat of Ṛddhī as per Āyurveda

According to ancient scriptures mainly described in Bhāvaprakāsa[55] and Śāligram nighaṇṭu[56] Ṛddhī – Vṛddhī both grown in Kośala parvata (a Himalayan range).

Morphological characters of Ṛddhī as per Āyurveda

According to Bhāvaprakāsa nighaṇṭu,[55] the tubers of Ṛddhī show hairy perforated surface and appear like "cotton pod" but Ṛddhī climbs to its support in clock-wise direction.

Morphological description of botanical source accepted as Ṛddhī: (Family, Genus and Species)

Description of plant Family[57,58,59,60]

In this study, three self collected samples of herb considered as Ṛddhī and it belongs to family Orchidaceae.

Orchidaceae: Martinov, Tekhno-Bot. Slovar. 682. 1820.

Description

Orchidaceae is one of the largest families of flowering plants. It is perennial, but sometimes short-lived, terrestrial, epiphytic, or lithophytic, autotrophic or rarely mycotrophic herbs (or rarely scrambling vines), with rhizomes, tubers, or rootstocks with mycorrhizal fungi in roots. It is estimated that Orchidaceae family possess 800 genera and 25,000-30,000 species worldwide. Orchids form 9% of our flora and about 1331 species are reported from India.

Stems either sympodial or monopodial, usually leafy, but leaves sometimes reduced to bractlike scales.

Leaves one to many, alternate or occasionally opposite, often distichous, sometimes terete or canaliculate, glabrous or very rarely hairy, frequently fleshy or leathery, base almost always sheathing, sometimes articulated, sometimes forming a false petiole, margin entire apex often emarginate.

Seed fusiform with elongated testa cells, lacking any appendages; plants 8–75 cm tall; tubers ellipsoid or oblong.

Inflorescence basal, lateral, or terminal, erect to pendulous, racemose, spicate, subumbellate, or paniculate, one to many flowered. Flowers small to large, often quite showy, usually zygomorphic, very rarely ± actinomorphic, bisexual (very rarely monoecious and polymorphic), showy, usually resupinate with bilateral symmetry, the median inner tepal is differentiated into labellum (lip); highly modified androecial and gynoecial parts, fused into a column; pollen grouped into soft or hard masses (pollinia) united by a stalk into a pollinarium; ovary inferior with parietal. **Sepals** usually free but sometimes variously adnate, median(dorsal) one often dissimilar to laterals, laterals sometimes adnate to a column foot to form a saccate, conic, or spurlike mentum. Petals free or rarely partly adnate to sepals, similar to sepals or not, often showy, lip entire, variously lobed or 2- or 3- partite, ornamental or not with calli, ridges hair cushions, or crests, with or with out a basal spur or nectar, margins entire to laciniate. Column short to long, with without a basal foot, occasionally winged or with lobes or arms at apex or ventrally: anther mostly 1, less often 2 or 3, terminal or ventral on column, caplike or opening by longitudinal slits, pollen usually forming distinct pollinia, less often loose, pollinia 2,4,6 or 8, mealy, waxy or horny, sectile or not, sessile or attached by stalks.

Etymology of Orchidaceae[32,61]

In the western hemisphere, the first reference to orchids was by Theophrastus, the father of botany in his ‘Enquiry into Plants’ (372–286 B.C.), he coined the term Orchis to describe some of the terrestrial species of orchids. ‘Orchis’ is a Greek word meaning ‘testicles’. He used the term to describe the root structure of these plants as the underground tubers of many European terrestrial orchids resemble a pair of testicles

DESCRIPTION OF GENUS

Habenaria Willd[58,62,63,64,65]

This genus was established by C.L. Willdenow in 1805. A large genus of about 500-600 species widely distributed in grassland areas of temprate and tropical regions, but more common in tropical America, Africa and Asia. Out of all species, 65-75 has been reported in India. This genus comprises of terrestrial usually leafy herbs, plant 25-60 high.

Leaves one to several with sheathing base, loosely arranged or tufted, ovate or oblong or ovate-lanceolate, 5-10 cm long, acuminate, cordate at the base.

Inflorescence is terminal with few to many flowers. Flowers are in spikes or racemes usually green or yellow, or the sepals green and the petals white; bracts mostly narrow. Dorsal sepals and petals form hood; lip 3-liped and spurred sometimes saccate or spurless. Rostelum is 3-lobed; pollinia 2 and anthers adnate to short column. Capsules are ellipsoid or oblong, sometimes beaked.

Tubers are subglobose, ellipsoid, or oblong, fleshy, unlobed, neck with several slender roots. 600 species are known to occur in tropical and warmer parts of the world; about 65-70 of them has been reported from India.

Etymology of genus[66,67,68,69,70]

The generic name is derived from Latin word, *Habena* means "a rein, thong, a strap and holder", in allusion to the long strap- shaped lip of some species or thread like fringes of the lip. The lip is usually tri-lobed and always spurred but in some species the spur is long and strap –shaped, swollen towards the apex, or referring to the long anther canals.

Identification key to species

1. Flowers large, 2-6 in a raceme, lax, sepals 20-25 mm long, ovary 40 mm or long, anther canals long, spur 50-60 mm……***H. intermedia***

Botanical description of Ṛddhī (*Habenaria intermedia* D.Don)[71,72,73,74,75]

Habit: Terrestrial, glabrous and tuberous herbs, plants turning black when dried upto 25-60 cm tall. **Stem** herbaceous, teret, with 2-3 basal tubular sheaths. **Leaves** scattered usually 3-5, ovate-oblong or ovate-lanceolate, acuminate, cordate at the base, prominently 5-7 veined and 5-10 cm long. **Inflorescence** 2-6 flowered. **Flowers** large,white with greenish tinge. Floral bracts leafy, broadly lanceolate, acuminate, equal to or longer than the ovary. **Sepals** persistent, ovate-lanceolate, acute,recurved at the apex, inner surface white, enlarging after flowering**. Petals** pure white, overlapping at their apices**. Lip** longer than the sepals, long clawed at base; claw white, papillose towards the base, apically 3-lobed; lateral lobes deeply pectinate; apical lobe linear, 3-5 cm long. **Spur** stout, 6.5 cm long, longer than the ovary, tapering towards the apex, more or less curved. **Tuber:** Oblong, sessile, dull white, inner part white. **Flowering and Fruiting:** June to October.

Distribution

India: Jammu & Kasmir, Himachal Pradesh, Uttarakhand, Pakistan, Nepal.

Table 1: Range of Distribution of *Habenaria intermedia* D.Don.[76]

Zone of Presence / Species	N. W. Himalaya						E. Himalaya		
	Pakistan		J & K	H.P.	Ga.	Ku.			
	Chi. etc.	Other					Nepal	Si.-Bhu.	A.P.
H. intermedia D.Don.	+	+	+	+	+	+	+	+	+
Location Code	1.	2.	3.	4.	5.	6.	7.	8.	9.

1. Chi. - Chitral etc.; 2. Other Mountains; 3. Jammu & Kashmir; 4. Himachal Pradesh

5. Garhwal; 6. Kumaun; 7. Nepal; 8. Sikkim-Bhutan; 9. Arunachal Pradesh

Table 2: Botanical Source of Ṛddhī – According to Modern Scholars.

Sr.	Author name	Book name	Year	Botanical name
1.	Ācārya Vishavnatha Dwivedi	Sandigdha Vanaushadhi Anka[2]	1975	*Habenaria intermedia*
2.	R. L. Khosa	Some Controversial Aspects about Astavarga[3]	1981	Species of *Habenaria* and *E. compestries*
3.	Priya Vrat Sharma	Dhanvantari nighantu[4]	1982	*Habenaria* sp.
4.	Som Deva & H. B. Naithani	Orchids of North-West Himalaya[5]	1986	*Habenaria intermedia*
5.	Thakur Balwant Singh	Glossary of Vegetable Drugs in Brihattrayi[6]	1999	*Habenaria* sp.
6.	K. C. Chunekar, Khadanand Pondel	Plants of Sharangdhara Samhita[7]	1999	*Habenaria edgeworthii* Hook. f. ex Collett
7.	Vaidyaratnam PS Varier's	Indian Medicinal Plants A compendium of 500 species[8]	2001	*Habenaria edgeworthii* Hook.f. ex Collett
8.	Dobriyal Manmohan	Rare and Endangered Medicinal orchids of Asthavarga group in Uttaranchal- Habenaria intermedia (Vridhii) and Habenaria edgeworthii (Ridhii)[9]	2002	*Habenaria edgeworthii*
9.	Ministry of Health and Family Welfare Govt. of India	The Ayurvedic Formulary of India[10]	2003	*Habenaria intermedia* D. Don
10.	Ravindra Sharma	Medicinal Plants of India-An Encyclopaedia[11]	2003	*Habenaria intermedia* Don.
11.	C.P. Khare	Encyclopaedia of Indian Medicinal Plants[12]	2004	*Habenaria intermedia* D. Don.
12.	Anil K. Dhiman	Medicinal Plants of	2004	*Habenaria intermedia* D.Don

		Uttaranchal State[13]		
13.	K.C. Chunekar, C.L. Yadava	Medicinal Plants of Susruta[14]	2005	*Habenaria edgeworthii* Hook. f. ex Collett, *Eulophia nuda* Lindl.
14.	Ministry of Health and Family Welfare Govt. of India	The Ayurvedic Pharmacopoeia of India (Part-I, Vo.-V)[15]	2006	*Habenaria intermedia* D.Don
15.	T. Pullaiah	Encyclopaedia of World Medicinal Plants[16]	2006	*Habenaria edgeworthii* Hook. f. ex Collett. ; Syn. *Plantanthera edgeworthii* (Hook. f. ex Collett.) Gupta
16.	Amrit Pal Singh	Ashtavarga Rare Medicinal Plants[17]	2006	*Habenaria edgeworthii* H.f.
17.	P.C. Pande, Latit Tiwari, H. C. Pande	Folk –Medicine and Aromatic Plants of Uttaranchal[18]	2006	*Habenaria intermedia* D. Don(tonic)
18.	Narayan Das Prajapati, S. S. Purohit, et al.	A Handbook of Medicinal Plants[19]	2007	*Habenaria edgeworthii* Hook. F. ex Collett.
19.	Chauhan et al.	*Habenaria intermedia* D. Don.- an Endangered Medicinal Orchid[20]	2007	*Habenaria intermedia* D.Don
20.	Jalal et al.	Ethnomedicinal Orchids of Uttarakhand, Western Himalaya[21]	2008	*Habenaria intermedia* D.Don.
21.	Gyanendra Pandey, R.R. Dwivedi	Sodhala Nighantu[22]	2009	*Habenaria edgeworthii* Hook. f. ; *H. latiabris* Hook. f.
22.	PV Sharma & GP Sharma	Kaiydeva Nighantu[23]	2009	*Habenaria* Sp.
23.	Jalal J. S. et al.	Habitat Studies for Conservation of Medicinal Orchids of Uttarakhand, Western Himalaya[24]	2009	*Habenaria intermedia*
24.	Joshi G. C. et al.	Diversity of Orchids in Uttarakhand and Their Conservation Strategy With Special Reference to Their Medicinal Importance[25]	2009	*Habenaria intermedia* D. Don.
25.	Amritpal Singh, Sanjiv Duggal	Medicinal Orchids: An Overview[26]	2009	*Habenaria intermedia* D. Don **Syn:** *Habenaria arietina* H.f. ; *Habenaria edgeworthii* Hook. F. ex. Collett**. Syn:** *Habenaria acuminata* Lindl. syn *Platanthera edgeworthii* (Hook.f. ex Collett) R.K. Gupta)
26.	Dinesh Jadhav	Medicinal Plants of India Vol. III[27]	2009	*Habenaria edgeworthii* Hook. f. ex. Collett.
27.	M. R. Uinyal	Medicinal Flora of Garhwal Himalayas[28]	2010	*Habenaria intermedia* D. Don
28.	Dhyani et al.	Importance of Astavarga Plants in Traditional Systems	2010	*Habenaria intermedia*

		of Medicine in Garhwal, Indian Himalaya[29]		
29.	G. Vijaya Raghavan	Comprehensive Medicinal Plants vol. III[30]	2011	*Habenaria edgeworthii* H. f. Syn. *Habenaria acuminate* Lindl. ; *Platanthera edgeworthii* (Hook. f. ex. Collett) Gupta
30.	Ramesh Kumar Bhutya	Ayurvedic Medicinal Plants of India vol. I[31]	2011	*Habenaria intermedia* D. Don.
31.	Mohammad Musharof Hossain	Therapeutic Orchids: Traditional Uses and Recent Advances- An overview[32]	2011	*Habenaria intermedia* D. Don
32.	Habbu PV et al.	Protective Effect of Habenaria intermedia Tubers Against Acute and Chronic Physical and Psychological Stress Paradigms in rats.[33]	2012	*Habenaria edgeworthii* H.f.
33.	Kalaiarasan A. et al.	Antimicrobial activity of *Bulbophyllum kaitense.* Rechib. Stem of Eastern Penisular Flora in India.[34]	2012	*Habenaria intermedia* D. Don
34.	Balkrishna Ācārya et al.	Astavarga Plants-Threatened Medicinal Herbs of The North- West Himalaya.[35]	2012	*Habenaria intermedia* D.Don
35.	Dr. Rashtra Vardhana	Medicinal and The Economic Plants vol. V.[36]	2013	*Habenaria intermedia* D.Don
36.	Bhatt Indra D.	Assessment of Nutritional and Antioxidant Potential of Selected Vitality Strengthening Himalayan Medicinal Plants[37]	2013	*Habenaria intermedia* D.Don
37.	Yonzone Rajendra et at.	Present Availability Status, Diversity Resources and Distribution of Medicinal Orchid Species in Darjeeling Himalaya of West Bengal, India[38]	2013	*Habenaria intermedia* D. Don
38.	Behera D et al.	Mdicinal Orchids in India and Their Conservation[39]	2013	*Habenaria intermedia*
39.	Sharma B. D. et al.	Nutritional Composition of Rare Himalayan Herbs Constituting The World's First Health Food[40]	2014	*Habenaria intermedia*
40.	Nivedita Srivastava	Medico Botany of Garhwal Himalayas[41]	2014	*Habenaria intermedia* D. Don.
41.	K.C. Chunekar	Bhavaprakasa Nighantu[42]	2015	*Habenaria intermedia* D. Don. ; *H. edgeworthii* Hook.f. ex Collett. ; *H. acuminate* Thw. ; *H. goodyeroides* D. Don; *H. griffithii* HK.
42.	Ingalhalli R. et al.	A Short Review on	2015	*Habenaria intermedia* D. Wear

		Astavarga Plants- Losing Their Existence[43]		
43.	Ācārya Balkrishna	Chandra Nighantu[44]	2015	*Habenaria intermedia* D. Don (*Ochyrorchis intermedia* (D. Don) Szlach.
44.	Khajuria Arun K et al.	Diversity With Ethnomedicinal Notes on Orchids: A Case Study of Nagdev Forest Range, Pauri Garhwal, Uttarakhand, India[45]	2016	*Habenaria intermedia* D. Don
45.	S. K. Sood & Rakesh Thakur	Herbal Resources of India and Nepal[46]	2016	*Habenaria edgeworthii* Hook. f. ex Callett ; *Habenaria intermedia* D.Don ; Syn. : *H. arientina* H. f.
46.	Eng Soon Teoh	Medicinal Orchids of Asia[47]	2016	*Habenaria arientana* (*H. intermedia*)
47.	Ācārya Balkrishna	Hridyadipaka Nighantu[48]	2016	*Habenaria intermedia* D. Don
48.	C. P. Khare	Ayurvedic Pharmacopoeial Plant Drugs- Expanded Therapeutics[49]	2016	*Habenaria intermedia* D. Don
49.	Keshari Puneshwar et al.	Controversy, Adulteration and Substitution- Burning Problems in Āyurveda Practices[50]	2017	*Habenaria edgeworthii*
50.	Kumar Pankaj et al.	Morpho-Anatomical Standardization of Six Important RET Medicinal Plants of Astavarga Group From Western Himalaya, India[51]	2018	*Habenaria intermedia* D. Don (Syn.*Ochyrorchis intermedia* D. Don) Szlach.
51.	Ācārya Balkrishna	Raja-Nighantu[52]	2019	*Habenaria intermedia* D.Don (Syn. *Ochyrorchis intermedia* (D.Don))
52.	Ācārya Balkrishna	Madanpal Nighantu[53]	2019	*Habenaria intermedia* D.Don (Syn. *Ochyrorchis intermedia* (D.Don) Szlach.

Specific Epithet[77,78]

The specific epithet is derived from Latin word ‘intermedius’ meaning- in the middle, with reference to intermediate nature of species between Habenaria gigantean (=Pecteilis gigantean) and Habenaria pectinata D. Don.

Vernacular name of Ṛddhī

Names in Indian Languages[19,30]: **Hindi**- Ṛddhī; **Sanskrita**- Lakshmi, Mangala, Rathanga; **Kannada**- Ṛddhī; **Malayalam**- Ṛddhī; **Tamil**- Ṛddhī; **Telugu**- Ṛddhī

Name in Foreign Languages[79]: Intermediate Habenaria, white wild orchid, the in between Habenaria, Raindeer orchid.

Pharmacological properties and uses of Ṛddhī as mentioned in modern scriptures[19,27,31]

The tubers are sweet, refrigerant, emollient, intellect promoting, aphrodisiac, depurative, appetizer, anthelmintic, rejuvenating and tonic. They are useful in vitiated conditions of Pitta and vata, burinig sensation, hyperdipsia, fever, cough, asthma, insanity, leprosy, skin diseases, anorexia, helminthiasis, emaciation, haematemesis, gout and general debility.

Folklore[41]: Roots cooked, boiled and eaten as vegetable. Tender leaves are used as vegetable, locally tubers are used as tonic.

Adulteration and substitution of herb

All the plants of Aṣṭavarga group are rare and it has been already mentioned in the texts that Aṣṭavarga plants are not even easily available to kings and the substitute drug suggested for Ṛddhī is Varahikanda (*Dioscorea bulbifera*).[62,10]

The botanical identification of Aṣṭavarga has remained controversial, so some ayurvedic treatise suggested substitute of Aṣṭavarga plants. In the place of Ṛddhī, Varahikand (*Dioscorea bulbifera*), Bala (*Sida cordifolia* L.) and Chiriya musali (*Asparagus filicinus* Buch-Ham. ex D. Don).[2,79] In South region, substitute drug suggested for Ṛddhī is Black mushali (*Curculigo orchiodes*).[12]

CONCLUSION

From the above mentioned information we have concluded that various controversies were existing regarding the botanical source of Ṛddhī since past. Unfortunately due to the lack of plant identification knowledge many species are now named and used as Ṛddhī in various parts of our country but among them *Habenaria intermedia* D. Don is widely accepted as Ṛddhī.

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