

REVIEW ARTICLE ON *ADIANTUM LATIFOLIUM* LAM. – A SOURCE PLANT FOR HAMSAPADI

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ABSTRACT

Pteridophytes are one of the oldest land plant groups and constitute a vast group of vascular cryptograms. The position of the Pteridophytes as intermediate between the lower cryptograms and higher vascular plants has made the group fascinating. *Adiantum latifolium lam.* usually known as 'Broadleaf Maidenhair fern' is used as an ornamental plant and is widely distributed in India. Hamsapadi, a controversial drug mentioned in Ayurvedic texts is bestowed with medicinal value like vrana ropaka (wound healing), rasayana (rejuvenation) and raktaprasadana (blood purifier). *Adiantum latifolium lam.* can be a source for Hamsapadi with reference to its morphological similarity as it resembles the feet of swan. Current article reviews the complete details of the Ayurvedic perspective of the drug Hamsapadi along with its various botanical sources, and morphology, distribution, phytochemical analysis of the drug *Adiantum latifolium lam.*

KEYWORDS: *Hamsapadi, Adiantum latifolium lam., Adiantaceae.*

INTRODUCTION

Adiantum latifolium lam. has been reported as new record of fern from Andamans and Kerala in wild state belonging to the family Adiantaceae². *Adiantum*, the walking fern or maidenhair fern, is a genus of about 250 species of ferns in the family Pteridaceae/ Adiantaceae. They generally prefer humus rich, moist, well-drained sites, ranging from bottomland soils to vertical rock walls. Many species are especially known for growing on rock walls around waterfalls and water seepage areas³. *Adiantum latifolium* can be a source for Hamsapadi. Hamsapadi word meaning the frond resembles the feet of swan. Dalhana explained the drug Hamsapadi as; which has

leaves similar to feet of swan and has yellow flowers. It is grown in moist places having synonyms like Madhushrava and Hamsapayi⁴. *Adiantum latifolium* has been used in Latin American traditional medicine as anxiolytic, analgesic and anti-inflammatory. It has potential as a garden ornamental as the new growth is attractive in its deep mauve to purplish pink colouration⁵. In present over review article an effort has been put forth to rationalize the source plant *Adiantum latifolium lam.* to Hamsapadi.

TAXONOMICAL POSITION⁵

Kingdom- Plantae

Subkingdom – Trachiobionata

Division - Pteridophyta

Subdivision – Gymnospermae

Class - Filicopsida

Order - Polypodiales

Family – Polypodiaceae

Sub family - Papilionatal

Genus – *Adiantum*

Species – *latifolium*

Scientific Name – *Adiantum latifolium* Lam.

***Adiantum latifolium* lam.**

ETYMOLOGY⁵

The genus name comes from Greek, meaning “**not wetting**”, referring to the fronds ability to shed water without becoming wet.

latifolium is a word Latin ‘**lati- broad, wide** and **folia- leaved**’ components

HABIT⁶

It is a fern belonging to Adiantaceae family.

-The rhizome is long-creeping, often branched, upto 0.4 cm thick, densely scaly all over; scales lanceolate, about 2×0.5mm, uniformly pale brown, apex acuminate, margin sparsely fimbriate.

-Stipes arranged in two alternate rows, upto 1cm apart, about 25×0.2 cm, abaxially rounded, adaxially grooved, black, stiff, glossy, glabrous below, gradually become pubescent above. Lamina broadly ovate, about 22×20 cm, bipinnate, apex acute, base broadly cuneate.

-Primary pinnae one or two half pairs, alternate, up to 4 cm apart, slightly ascending, distinctly stalked; largest pinna up to 15×6 cm, oblong- lanceolate, acute; pinnules up to 12 pairs per primary pinna, basal 2-4 pairs slightly reduced, alternate up to 1.5 cm apart, shortly stalked or sessile.

-Pinnae dark green, glabrous above and below; long, narrow, pale brown hairs and

scales densely distributed all over the costa and rachies; texture herbaceous.

-Sori oblong or reniform, distributed all along the upper margin and unexcised part of the lower margin, the dark brown reflexed margin incurved to form pale brown, thin, fimbriate indusium which protect the basal and lower side of the sori and thus indusium is seated between the sorus and the lower surface of the pinnule.

PHARMACOGNOSY⁷

Macroscopic

The rhizome is long-creeping covered with pale brown scales. The stipe is brown to black. The pinnules are oblong to triangular; the margin of pinnules are minutely serrated. The reniform to oblong sori are marginal.

Microscopic

T. S. of petiole shows outer thick walled epidermis which is single layered, cuticularised and brown in colour. Ground tissue is formed of outer 5-7 layered sclerenchymatous cells followed by inner 6-7 layered parenchymatous cells with tannin contents. The ground tissue is delimited by a single layered, thick walled endodermis followed by unilayered pericycle. Stipe receives a central vascular strand and the xylem is triarch and exarch. The xylem is arranged like the “**skull of a bison**”; two groups of protoxylem are arranged near the “**horns**” and one group at the base; metaxylem seen at the centre; xylem is surrounded by the phloem.

CULTIVATION & PROPAGATION^{8,26}

Grows wild in moist places and under shade near swamps.

Easily by crown division. Firstly, trim off to almost ground level most of the older

rachies and remove withered fronds. Then dig up and divide the rhizome by cutting through with a garden shade or sharp long-edged knife and finally replant the divisions into individual pots, being careful not to plant their crown below soil level, as it is from this point that new fronds will emerge Broadleaf maidenhair can also be propagated from spores. Collect the ripe spores from under spore-bearing pinnules and sow on the surface of a humus rich sterilized soil. Keep the growing medium always moist by covering with a plastic bag over the pot. Germination should take place within 6 weeks at a temperature of 60-70 degrees F, then transplant the tiny clumps of plantlets when desired.

CHEMICAL CONSTITUENTS^{9,10}

Tannins, Phenols, Xanthoproteins, carbohydrates, carboxylic acid, steroids, alkaloids, triterpenoides, coumarins, saponins and catechins.

PHYTOCHEMICAL ANALYSIS:

Both Aqueous and ethanolic extract of *Adiantum latifolium* has alkaloids, triterpenoides, tannins, steroids, phenolic compounds, saponins and inorganic constituents like Iron, Potassium, chloride and Nitrate.

RESEARCH WORKS:

1. Anatomical studies of selected species of *Adiantum* L. in Kerala

Resmi S1*, Thomas VP, Sreenivas VK

2. New Additions of fern flora to Kolli hills, eastern ghats, Tamilnadu, India

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VARIOUS SOURCES AND THEIR IDENTIFYING FEATURES⁶

Part of the plant	<i>Adiantum lunulatum</i>	<i>Adiantum caudatum</i>	<i>Adiantum capillus veneris</i>	<i>Adiantum aethiopicum</i>	<i>Adiantum latifolium</i>

AYURVEDA PERSPECTIVE:

Synonyms^{2,11-22}:

Based on morphology: Chitrapada, Dharttarashtrapadi, Ghritamandalika, Godhangri, Godhapadika, Hamsapadika, Hansaghri, Hansavati, Kirapadika, Raktapadi, Sutapadika, Tamrapadi, Tridala, Tripadi, Tripadika, Triparnika which explains the similarities of root with that of swan, lizard and other insects, has brown colour stripes and which has trifoliate leaves.

Based on Guna karma: Kiramata, Kitamari (The fern shows Krimighna activity), Madhusrava, Padangi, Sancharini (Spreading nature), Shitangi (grows on moist places).

Hamsapadi possesses Katu rasa; Guru, snigdha guna; Sheetha veerya; Madhura vipaka and Kaphapittashamaka property.

Gana: Acharya Charaka mentioned in Kanthya Mahakashaya²⁴ and in Madhura skandha; Acharya Sushruta mentioned in Vidarigandhadi gana⁵.

Karma^{2,11-22}: Vrana ropana, Bhutaghna, Dahahara, Raktaprasadana, Rasayana and Vishahara.

Rogagnata^{2,11-22}: Apasmara, Bhrama, Vrana, Visarpa, Daha, Atisara.

PARTS USED: Whole plant.

POSOLOGY: Churna:- 1-3gms.

FORMULATIONS OF HAMSAPADI^{23,24}:

Madhuparnyadi taila, Manasamitra vataka, Muktapanchamruta rasa, Swarnabhupati rasa, Kalakuta rasa.

Stipes	10-15cm long, , polished dark chest nut-brown	5-10 cm long, dark chest-brown, tomentose.	10-23cm long, blackish	15-23cm long, dark-chest-brown, polished	20-25cm long, brown to black
Fronds	simply pinnate	simply pinnate	Bipinnate	3-4 pinnate	Bipinnate
Pinnae	Subdimidiate	Dimidiate, nearly sessile	Dimidiate, a short terminal pinna and numerous erect-patent lateral ones on each side	Lower pinnules-deltoid	Dimidiate, Pinnules oblong-triangular, sometimes slightly falcate, more or less sessile.
Sori	continuous lines along the edge	Roundish or transversely oblong on the edge of the lobes	Roundish or obreniform, placed in the roundish sinuses of the crenations.	several roundish or transversely oblong patches in rounded hollows of the outer edge.	Oblong or reniform, distributed all along the upper margin and unexcised part of the lower margin.
Rhizome	Erect or suberect	Erect	Long creeping	Wiry, long creeping, much branched.	Long creeping
Photos	<i>A. lunulatum</i>	<i>A. caudatum</i>	<i>A. capillus veneris</i>	<i>A. aethiopicum</i>	<i>A. latifolium</i>
					

DISCUSSION

Adiantum latifolium, a botanical source for Hamsapadi and it has myriad sub species like *Adiantum lunulatum*, *A. caudatum*, *A. capillus veneris* and *A. aethiopicum*. In Charaka samhita Hamsapadi is mentioned under Kanthya mahakashaya and Madhura skandha²³. In Sushruta samhita mentioned under vidarigandhadi gana⁴. Chakrapani identifies Triparni as Hamsapaadi in Charaka samhita. But here the word triparni might have been attributed to Hamsapadi because of similarity of its fronds to the feet as Paravata/pigeon²³. Paravatapadi, one of the synonym of Hamsapadi is also a controversial drug. The description for Parvatapadi given by Dalhana as another variety of Hamsapadi with a reddish tinge. The Raja nighantukara considers Hamsapadi as Tripadi. According to Bapalal vaidya, Hamsaraja is now a days known as Hamsapadi identifying it as *Adiantum capillus veneris*. But some commentators have equated Hamsaraja with Hamsapadi. Bapalal vaidya comments on Hamsaraja being *Adiantum capillus veneris* and Hamsapadi as *Adiantum lunulatum*²⁵. Chunekar, commentator of Bhavaprakasha Nighantu has opined all species of *Adiantum* can be taken as a source plant for Hamsapadi¹.

Various synonyms explains the morphology and the habitat of the drug Hamsapadi. They are Hamsapadi means the frond is similar to feet of swan; Raktapadi/Tamrapadi means the frond has reddish tinge; Shitangi which grows on moist places; Sancharini means spreading nature of the plant and Triparni i.e the Pinnae are branched. All the above

features are seen in the drug *Adiantum latifolium*.

CONCLUSION

Based on the morphological similarity of the fronds of *Adiantum lunulatum* Burm. to the feet of swan, the fern has been taken as authentic source for Hamsapadi. *Adiantum latifolium* lam. is also resembles with morphology explained for Hamsapadi i.e frond is similar to feet of swan, young pinnae is having reddish tinge, frond is branched etc. *Adiantum latifolium* lam., a genuine source from western Ghats is considered as source plant for Hamsapadi.

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