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Review Article

A CRITICAL REVIEW OF *POTAKI (BASELLA ALBA)* IN AYURVEDIC TEXTS WITH RECENT STUDIES

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ABSTRACT

Potaki (Basella alba) commonly known as Malabar spinach, is a soft stemmed perinneal vine. It is an edible vine in the family Basellaceae. It is found in tropical Asia and Africa where it is widely used as a leaf vegetable. It is known under various common names like Vine spinach, Climbing spinach, Creeping spinach, Buffalo spinach and Ceylon spinach among others. It grows well under full sunlight in hot, humid climates and in areas lower than 500 metres above sea level. Typical of leaf vegetable, Malabar spinach is high in vitamin A, C and Iron. It is low in calories by volume, but high in protein per calorie. The succulent mucilage is particularly rich source of soluble fiber. In the Indian system of medicine, the plant has immense potential in androgenic activity, antioxidant, nephroprotective, anti-inflammatory and antibacterial activity. The plant has been known to be a demulcent, a diuretic and an emollient action. The entire plant is used in Chinese medicine where it is claimed to reduce fever and neutralise poison. To cure human disease, medicinal plants have been a major source of therapeutic agents since ancient times. The revival of interest in natural drugs started in last decade mainly because of the wide spread belief that natural medicine is healthier than synthetic products. As per WHO, 80% of the population in the world relays on the traditional medicine for treatment of various disease. Therefore evaluation of rich heritage of traditional medicine is essential. In this regard one such plant is *Basella alba.*

INTRODUCTION

Potaki (Basella alba), belongs to the family Basellaceae, the order Centrospermae. The plants contain specific pigment red-violet betacyanins common name, betalains. *Basella alba* is an edible perennial vine in this family too. A native of tropical Asia and Africa, it is now widely cultivated as a pot herb. It is a fast growing, soft-stemmed vine.

The literary review of the *Potaki* was started right from the *Vedas* upto recent research works to obtain thorough knowledge of drug. On comprehensive review of Ayurvedic classics it was found that *Kebuka* is described in *Charak samhita*, *Sushruta Samhita*, *Bhava Prakash Nighantu, Kaidev Nighantu, Dravyaguna Vijnana, Ayurvediya aushdhi nighantu, Madan Pal Nighantu.*

LITERATURE REVIEW

Properties of *Potaki*[1-4]

Ayurvedic texts	*Rasa*	*Guna*	*Virya*	*Vipaka*	Action	Uses	References
Charak samhita	*Madhura*	*Snigdha*	*Shita*	*Madhura*	*Shlesmavardhn, madaghni*	*Vrishya*	*Sutra sthan. (26/93)*
Sushruta	*Madhura*	*Snigdha*	*Shita*	*Madhura*	*Vata Pitta, Nasaka, Kapha Janaka*	*Balya, Vrishya, Sharaka*	*Shaka Varga 46/256 pg 205*
Kaidev Nighantu	*Madhura*	*Snigdha Picchil*	*Shita*	*Madhura*	*Vata Pitta, Nasaka, Kapha Janaka*	*Balya, Vrishya, Sharaka, Nidra Janak, Sukhra Janak*	*Oshadhi Varga 656-659 pg 121*

Ayurvediya aushdhi nighantu	*Madhura, Kashaya*	*Guru Snigdha, Picchil*	*Shita*	*Madhura*	*Vata Pitta, Nasaka, Kapha Janaka*	*Stanyaja, Bala, Vardaka, Medohara, Sthulyakara, Nidra, Alasya kara*	*Pg 327*
Bhava Prakash Nighantu	-	*Snigdha*	*Shita*	-	-	*Udardha Nashaka, Viban Nashaka*	*Shaka Varga 9 /8-9 pg665*
Madan Pal Nighantu	-	*Snigdha Slesmal Picchil*	*Shita*	-	*Vata Pitta, Nasaka, Kapha Janaka*	*Rakta Pitta Nashaka, Madavikar Nashaka, Nidra Kara*	*ShakaVarga Pg 149*

Dosha Karma *Vata- Pitta, shamak, Kapha Janaka*[1]

Botanical Classification

Classical Name : *Potaki*

English Name : Malabar spinach

Latin name : *Basella alba*

Family : Basellaceae

Synonyms:

Sanskrit : *Upodika, Potaki, Maalvaa, Amritvallari*
Hindi : *Phooi*
Telugu : *Bachhali*
Marathi : *Mayalu*
Tamil : *Vaslakkirai*
Bengali : *Pui Shak*
Oriya : *Poi Saaga*
Sinhala : *Vel Niviti*
English: : Malabar spinach, Malabar nightshade, Red vine spinach, creeping spinach

Morphology

It is a fast growing, succulent, branched, soft-stemmed, twining herbaceous vine, reaching 10 m in length.

Stem : Green
Leaves: : Green in colour, glossy surface, somewhat fleshy, ovate or heart-shaped, 5 to 12 cm long, stalked, tapering to a pointed tip with a cordate base.
Flowers: : The inconspicuous bisexual pinkish white or violet cluster flowers are borne on spikes or branching peduncles. Spikes are axillary, solitary, 5 to 29 cm long. Flower type is hermaphrodite about 4 mm long.
Fruit & Seed : Fleshy, stalk less, ovoid or nearly spherical, 5 to 6 mm long and purple when mature, It is a simple true fruit with many seeds

Habitats

A native of tropical Asia and Africa, it is now widely cultivated as a pot herb. Its occurance in forests and shady places is rather rare, it is mainly confined to the drier regions.

Plants part used

Roots, stem, Leaves, matured fruits

Properties and Actions

Pramehaghna, Agni, Vrna, Raktapitta and Visha Shamana, Kaphaja, Shukraja, Stanyaja, Bala Vardaka, Madahara, Sthulyakara, Nidra Alasya kara, Ruchikara, Truptikara, Vishtambhakara, Vidbedhana, Akanthya, Vrunhana.

Uses

- According *to Charaka Samhita, Potaki* prescribe for in retention of urine and faeces. In case *Ama* is digesting but still the patient suffers from diarrhea passing stool with retention, pain, mucus and tenesmus in small quantity but frequently the patient should be fed with the soup of *Potaki*.
- *Caraka* said that *Potaki* can be used for alleviates necrosis.
- *Caraka* says that, *Potaki* cooked with sesame paste causes diarrhea and in *Susruta Samhita* mentioned *Potaki* cures piles, which helps easy elimination of urine and faeces.

Chemical composition

Leaf : The chemical composition of the leaf extract include: proteins, fat, vitamin A, vitamin C, vitamin E, vitamin K, vitamin B9 (folic acid), riboflavin, niacin, thiamine and minerals such as calcium, magnesium, phosphorus and iron. Kaempherol is the flavonoid present in *Basella* at a concentration of 1. 4mg/100g[5]. It contains Basellasaponins amino acid such as Arginine, Leucine, Isoleucine, Lysine, Threonine and Tryptophan[6], Peptide, Phenolic compounds in various extracts[7].
Fruits : *Basella* fruit contains Gomphrenin derivative which is Betalain pigment[8]. The seeds were found to be rich in Oleic acid[9]. The fatty oil from seeds was found to contain Palmitic, Oleic, Linoleic and Linolenic acid. The proteins revealed presence of Lysine, Threonine, Valine, Methionine and

Leucine[10].

Seeds : Rich in Oleic acid

Nutritional value

Excellent source of calcium and iron. Good source of vitamins A, B and C. Daily consumption of *Basella* has a positive effect on total-body vitamin A stores in men.

Medicinal properties

a. Leaves and stem

- *Basella rubra* Leaf used to prevent continuation of bleeding after childbirth[11].
- Pulped leaves applied to boils, warts, pimples and ulcers to hasten suppuration.
- Sugared juice of leaves is useful for catarrhal afflictions[12].
- Leaf-juice mixed with butter, is soothing and cooling when applied to burns and scalds[12].
- The leaf juice is a demulcent, used in cases of dysentery.
- Stem and leaves are used as mild laxative, diuretic and antipyretic.
- In India have been used Basella leaves and stem for anticancer such as melanoma, leukemia and oral cancer.
- Ground leaves of *Basella alba* are rubbed on the human hand to introduce the whole preparation into the animal vagina every morning for the treatment of sterility[13].

Leaves are used in constipation, poultice for sores, urticaria, balanitis, gonorrhea, antiviral and dyspepsia. It is also used in poultice local swellings, intestinal complaints etc[14].

- The mucilaginous liquid obtained from the leaves and tender stalks of plants is popular remedy for headaches.
- The leaf extracts (methanolic extract and aqueous extract) of *Basella were* investigated for *in-vitro* anti-inflammatory activity by human red blood cell membrane stabilization method (HRBC)[15].
- *Basella* significantly increased red blood cell count, white blood cell count, packed cell volume, hemoglobin concentration and platelet count. However, the extract significantly reduced the activity of the liver enzymes such as ALP, ALT and AST. Totally, adding *B. alba* leaves as part of daily diet may reduce anemia and maintain good health[16].
- A study of STZ-induced diabetic rats fed with *Basella rubra* showed the leaf pulp of *B. rubra* possesses a strong hypoglycemic effect[17].

b. Roots

- In *Kheri* district of Uttar Pradesh, the root of *Poya (Basella*.) is used as an anti-fertility agent after menstrual periods[18].
- Root and leaves has been used for the removal of placenta, membranes after birth, stomach pains and increase milk production[19].

c. Fruits and seeds

- The seeds are used as abortifacient[20].
- The fruit provides dark violet color for food colorant[21].

Whole plant

- Used for Malnutrition, Fistulae, Pustules, Inflammatory tumors, Syphilitic ulcers, Cooling, Digestive disorders.
- Used for the treatment of anemia[22].
- Sap is applied to acne eruptions to reduce inflammation.
- The plant is febrifuge; its juice is a safe aperient for pregnant women and a decoction has been used to alleviate/ease labour[23].
- *Basella* mucilage has been used in Thai traditional medicine as topical application for irritant, bruise, ringworm and labouring.
- In India, it has been used for antipruritis and burn and has been used in Bangladesh for acne and freckle treatment[7].
- *Basella alba* is administered orally for the treatment of anal prolapsed or hernia[28].
- *Basella alba* has been used for the treatment of Anemia in women, coughs, cold, cold related infections[24].
- Maceration is taken orally for infertility, pelvic inflammatory disease, Orchitis, Epididymytis, threatened abortion, spurious labour[25].
- Their fiber content provides bulk in the diet and this helps to reduce the intake of starchy foods, enhances gastrointestinal function, prevents constipation and may thus reduce the incidence of metabolic diseases like maturity onset, diabetes mellitus and hypercholesterolemia. They are also potent antibiotics, antihypertensive and blood building agents and improve fertility in females when eaten in soups. Useful in controlling oxidative stress during pregnancies complicated by intrauterine growth retardation[26].
- The methanolic extracts exhibited marked antimicrobial activity against gram positive and gram negative bacteria and fungi. *Basella alba* showed good inhibitory activity against *Aspergillus niger.* A study of the aqueous,

ethanolic and petroleum ether extracts of the leaves of Basella rubra exhibited antimicrobial activity against all test organisms except P aeruginosa. The ethanolic extract showed maximum effect against E coli[27].

- Antioxidant and ant mutagenic activities of plant extracts act as functional foods for cancer prevention. Antioxidant activity was expressed as the ability of each extract to scavenge the free radicals 1, 1-diphenyl-2-picrylhydrazyl (DPPH)[28, 29].
- *Basella alba* is a plant used in traditional medicine in the West Cameroon region to treat sexual asthenia and infertility in man. *Basella alba* possesses a good anti-inflammatory activity and shows a dose depending activity.

Recent Studies [30, 31]

1. Antioxidant analysis of betacyonin extracted from Basella alba fruit : Basella alba fruit with dark blue skin and deep red violet flesh is a potential source of natural colorant. Betacynain extracted from Basella alba fruit exhibited excellent antioxidant activity. It was therefore suggested that betacyanin could be beneficial in scavenging free radicals.
2. Methanol extract of Basella alba stimulate estrodiol production and aromatase mRNA by leydig cells at 10 µg/ml. The traditional use of B. alba in the treatment of male infertility and sexual asthenia could be due to its capacity to stimulate not only androgens production, but also oestrogens, thus maintaining the androgen estrogen balance necessary for normal male reproductive function.

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