

## A REVIEW ON VACHA: AN EFFECTIVE MEDICINAL PLANT

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**ABSTRACT**

Vacha (*Acorus calamus*) belongs to the family Acoraceae; it is a high-value medicinal plant that grows almost all over India. It is a semi-evergreen perennial herb with arching tapered reed-like leaves, minute yellow-green flowers, and scented rhizomes. Medicinal usage has been reported in traditional systems of medicine, such as Ayurveda wherein the rhizome of Vacha is widely utilized for the treatment of various ailments such as epilepsy, headache, slurred speech, eye disorder, insomnia, loss of memory, etc. Its therapeutic uses are reported to be described in Ayurvedic textbooks like *Charak Samhita*, *Sushruta Samhita*, etc. Studies reveal that Vacha rhizomes contain an aromatic essential oil which has significant anticonvulsant activity. Vacha roots

are efficient to treat memory loss, Alzheimer's disease, tremors, anxiety, depression, and pain disorder of neurological origin. It contains various chemical constituents; the major constituent of oil of Vacha is a phenylpropanoid called  $\beta$ -asarone, possess carcinogenic properties and therefore the Ayurvedic system makes use of shodhit (detoxified) *Vacha* in their formulations. Vacha or Sweet flag is a semi-aquatic, perennial, aromatic herb of aquatic habitats in temperate to subtemperate regions. The present work briefly documented the phytochemistry, properties and shodhana of Vacha.

**KEYWORDS:** Vacha, *Acorus calamus*, Shodhana,  $\beta$ -asarone

## INTRODUCTION

*Acorus calamus* Linn. (Acoraceae) or sweet flag or calamus is a semi-aquatic, perennial, widespread plant with creeping rhizomes; widely utilized in the traditional systems of medicine.<sup>[1]</sup> In Ayurveda, it is known as Vacha and since ancient times, the rhizome of this plant has been used for its beneficial role as a brain tonic (Medhya).<sup>[2]</sup> The word Vacha in Sanskrit means which offers good speech or improves the power of speech. Recent studies on Vacha also reported its tranquilizing, antimicrobial, antidiarrhoeal, neuroprotective, antioxidant, antihelminthic, anti convulsant, anti-inflammatory and analgesic effects. In the rhizomes of Vacha, aromatic oil is present which is used for medicinal purposes since ancient times and is extracted commercially.<sup>[3],[1]</sup> The volatile fragrant oil yielded by the alcoholic extraction of the rhizomes contains a constituent called  $\beta$ -asarone, which is reported to be toxic or carcinogenic; making its use restricted.<sup>[4]</sup> *Acorus calamus* is reported to exhibit polyploidy.<sup>[5]</sup>  $\beta$ -asarone content in Vacha is reliant on the ploidy level of the plant. The greater is the ploidy level; more is the  $\beta$ -asarone content. In North America, the diploid variety of plants is found which is free from  $\beta$ -asarone. The plant in Europe is of triploid variety and contains 9-13% of  $\beta$ -asarone. In India, tetraploid variety is found containing about 75% of  $\beta$ -asarone. Hence, the Ayurvedic system of medicine utilizes *Shodhit* or detoxified Vacha which has undergone the Sodhana process.<sup>[4]</sup> Vacha was used as a rejuvenator for the brain and nervous system in the Vedic era. The dried and cut leaves efficiently work as insect repellent during food storage. The small doses of this herb treat anorexia and acidity problems while large doses cause nausea and vomiting. It is applied topically to treat the skin eruptions, rheumatic pains, neuralgia, etc.<sup>[6]</sup> The Pharmacognostical properties of Vacha are portrayed through different synonyms like.<sup>[7],[3]</sup>

Shadgrantha	Having six nodes
Uragandha	Having Strong odor
Lomasha	Having small hair
Aruna	Reddish brown rhizomes
Shadparvika	Having multiple nodes and internodes
Golomi	Rhizome having hair (like cow's hair)
Jatila	Dense hairy rhizome

### Etymology

Multiple names have been associated with the sweet flag which proves its rich history and utilization by various cultures in the past. The term 'flag' refers to the drooping, iris-like leaves because of its similarity to *Iris* species; which are commonly known as flags, since the

late fourteenth century, in English. The name 'sweet' refers to the pleasant aromatic fragrance of the plant.<sup>[8],[9]</sup> The genus *Acorus* is derived from the word *Acoron* (coreon which means the pupil of the eye) and the species name *calamus* is taken from the Greek word Calamos (a reed).<sup>[10],[11]</sup>

### Habitat

Vacha is indigenous to Eastern Europe and Central Asia. It is cultivated and found in moist marshy regions of India and Burma. It is generally present in Manipur, Kashmir, Himachal Pradesh, Uttarakhand, Karnataka, Sikkim, and Naga hills of India. In the Himalayas, it is discovered up to an altitude of 2000 m. It is richly found on the edges of streams and lakes.<sup>[1]</sup>

### Habit

Vacha is a semi-evergreen perennial and aromatic medicinal plant that grows up to 2 meters approximately; with creeping, cylindrical and widely branched aromatic rhizomes which are little shrunken and with deep longitudinal wrinkles; the leaves contain single prominent midvein and on both sides of midvein, slightly raised secondary veins and various fine tertiary veins are present. The leaves are 0.7-1.7 cm wide, the sympodial leaf is a bit smaller than the vegetative leaves. The margin is undulate or is curly edged.<sup>[12]</sup> The rhizome is of pale yellow to pinkish brown color on the outer side and white to slightly pinkish on the inner side.<sup>[11]</sup> The flowers are rarely grown if occurs then it is 3-8cm long, covered with multitudes of rounded spikes and of greenish-brown of color. The fruits are small, berry-like enclosing few seeds.<sup>[6]</sup>

### Taxonomical Classification<sup>[13]</sup>

Kingdom	Plantae
Division	Magnoliophyta
Class	Liliopsida
Order	Acorales
Family	Acoraceae
Genus	Acorus
Species	Calamus

Vernacular Names<sup>[2],[13]</sup>

Ayurvedic	Vacha
Unani	Bacch
Hindi	Bajai, Bach, Gora-bach, Vasa bach
Sanskrit	Uragandha, Ugra, Sadgrantha, Bhutanashini
English	Sweet Flag, Calamus, Myrtle grass
Gujarati	Vekhand, Ghoduvaj, Ghodavach
Bengali	Bach
Marathi	Vekhandas, Vaca
Kannada	Baje, Narru-Berua
Telugu	Vasa
Malayalam	Vayambu
Urdu	Waja-e-Turki
Punjabi	Varch, Ghodavaca
Kashmiri	Vachi, Vaigandar
Tamil	Vasambu, Pillai maruntho
Nepali	Bojho

Classification of Vacha by different Acharya in different Gana (Groups)<sup>[3]</sup>

Charaka Samhita	Virechan Varga; Lekhaniya, Triptighana, Arshoghna, Asthanopaga, Sheetaprashmana & Sangyasthan Mahakashaya; Shirovirechana Dravya, Tikta Skanda.
Sushruta Samhita	Pippalyadi, Vachadi, Mustadi Gana; Urdhavabhagahara & Shirovirechana Dravya.
Ashtanga Hridaya	Tikta Skanda, Vachadi Gana, Mustadi Gana, Vamaka Gana, Vastakada Gana, Niruha Gana.
Ashtanga Sangraha	Vamaka & Virechaka Gana, Niruha Gana, Shirovirechana Gana, Lekhaniya Gana, Hridhya, Gana, Arshoghna Gana, Sheetaprashmana Gana, Sangyasthan Gana, Vatsakadi & haridradi Gana
Dhanvantari Nighantu	Shatpushpadi Varga
Shodala Nighantu	Shatpushpadi Varga
Madanpala Nighantu	Shuntyadi Varga
Kaiyadev Nighantu	Oushadi Varga
Bhavprakash Nighantu	Haritakyadi Varga
Raj Nighantu	Pippalyadi Varga
Shaligram Nighantu	Haritakyadi Varga
Shankara Nighantu	Haritakyadi Varga
Mahaoushadi Nighantu	Mahaoushadi Varga
Brihat Nighantu Ratnakara	Vachadi, Pippalyadi & Mustadi Gana
Nighantu Adarsha	Vachadi Varga
Priya Nighantu	Shatpushpadi Varga

**Strength as per Ayurvedic Pharmacopoeia of India**

The physicochemical parameters of Vacha as per the standard protocol, API:<sup>[2]</sup>

S.No.	Physicochemical Parameters	Standards as per API
1.	Foreign matter	≤ 1%
2.	pH	--(Not Defined)
3.	Total Ash	≤ 7%
4.	Acid insoluble ash	≤ 1%
5.	Water soluble extractive	≥ 16%
6.	Alcohol soluble extractive	≥ 9%
7.	Volatile oil	≥ 2%

**Important formulations of Vacha:** Vacādi taila, Vacā Laśunādi taila, Sārasvata, Cūrṇa, Candra Prabhā Vaṭī, Sārasvatā Riṣṭa.<sup>[2]</sup>

**SHODHANA OF VACHA (DETOXIFICATION)**

Shodhana of the dravya refers to the removal of unwanted properties or impurities from a part of the plant through different pharmaceutical procedures.<sup>[7]</sup> Vacha is a valuable medicinal herb in the traditional systems of medicine as well as in modern medicine. Although it is a non-poisonous herb, Ayurveda indicates its Shodhana prior to its use.<sup>[14]</sup> Classical ayurvedic texts of Charaka and Sushruta have not any purification procedure for Vacha<sup>[15]</sup>; but it is mentioned in Chakradatta and Bhaishjya Ratnavali.<sup>[15],[7]</sup> According to these, Vacha rhizomes are allowed to boil successively in various media: firstly in Gomutra (urine of cow), then in Alambusha or Gorakhmundi kwatha (*Sphaeranthus indicus*) and finally in Panchapallava kwatha; then the rhizomes are dried, washed with Gandhodak and allowed to dry again. It is followed by Svedana prakriya (fomentation) using Surabhitoya or Gandhodak as a medium.<sup>[4],[7]</sup> The Indian States like Karnataka and Kerala perform Vacha shodhana by traditional methods like processing the rhizomes in media viz. Goksheera (Cow's milk), and Mastu (Whey of Curd) before its usage.<sup>[14]</sup> Ayurvedic Pharmacopoeia of India also mentioned that Shodhana of Vacha should be performed prior to its internal use.<sup>[2]</sup>

**PHYTOCHEMISTRY<sup>[16],[14]</sup>**

The calamus (vacha) roots and rhizome contain 1.7-9.3% of volatile oil. The rhizome of calamus contains.

- ✓ β-Asarone
- ✓ β - Gurjunene
- ✓ (Z)-Asarone
- ✓ (E)-Asarone

- ✓ Sesquiterpenes/ Non Sesquiterpenes
- ✓ Linalool
- ✓ Eugenol
- ✓ Elemol

The roots of calamus also contain water soluble poly-saccharides

- ✓ Galactose- 3%
- ✓ Xylose- 2%
- ✓ D-galacturonic acid- 85%

### AYURVEDIC PROFILE OF VACHA<sup>[2]</sup>

Rasa (Taste)	Kaṭu (Pungent), Tikta (Bitter)
Guna (Properties)	Laghu (Light or easy to digest), Tīkṣṇa (sharp or fast acting), Ruksha (dry)
Virya (Potency)	Uṣṇa (hot)
Vipaka (Metabolism)	Kaṭu (pungent)
Prabhava (Action)	Medhya (Brain tonic), Dīpanī (Appetizer), Kṛimihara (Anthelmintic), Kaṇṭhya (Effective for throat), Kaphahara (Alleviates kapha), Vātahara (Alleviates vata), Mala Mūtraviśodhanī (Clears mala and urine), Vāmak (Emetic)

### PHARMACOLOGICAL ACTION

Various pharmacological properties of Vacha are<sup>[7]</sup>

Deepana	Appetizer
Pachana	Digestive
Vamaka	Emetic
Medhya	Brain Tonic
Sanjnasthapana	Restores lost consciousness

**Antidote:** Fennel seeds, Lemonade can be used as antidotes in case of Vacha poisoning.

### DOSAGE AND ADMINISTRATION

Vacha is used in various dosage forms. The dosage of some preparations is as under.<sup>[16]</sup>

VACHA ROOT POWDER	
Infants/Children	2-8mg/kg body weight
Adults	125-500mg/kg body weight
Twice a day with honey, milk, or water. The best time to take is after meals.	

<b>VACHA ROOT ASH POWDER</b>	
<b>Infants/Children</b>	<b>5-10mg/kg body weight</b>
<b>Adults</b>	<b>500-1000mg/kg body weight</b>
Twice a day with water.	
The best time to take is after meals.	

<b>VACHA ROOT EXTRACT</b>	
<b>Infants/Children</b>	<b>5-10mg/kg body weight</b>
<b>Adults</b>	<b>25-50mg/kg body weight</b>
Twice a day with water.	
The best time to take is after meals.	

## CONCLUSION

Vacha is an incredible medicinal plant that has been utilized since Vedic periods in order to treat various ailments like epilepsy, schizophrenia, weakened memory, cough, etc. The present study explored the Ayurvedic properties, uses, shodhana, and phytochemistry of Vacha. This herb plays a major role in the prevention and treatment of various disorders and there is a need for further more studies on Vacha in order to reveal its additional potential.

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