INTERNATIONAL JOURNAL OF
Clinical and Pharmaceutical Innovations
An International Peer Reviewed Open Access Journal

Review Article

ISSN (Print): Applied
ISSN (Online): Applied

2026, Volume 1, Issue 1, Page No: 18-22.

MEDICINAL PROPERTIES OF VACHA-A CONCEPTUAL STUDY

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Article Info: **Received:** 17 February 2026, **Revised:** 07 March 2026, **Accepted:** 27 March 2026

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Citation:
Dr. Rajesh Kumar Sain*[1], Prof. Dr. Ajay Kumar Sharma[2] (2026). Medicinal Properties Of Vacha-A Conceptual Study. International Journal of Clinical and Pharmaceutical Innovations, 1(1), 18-22.

ABSTRACT
In Ayurveda, Unani, and traditional medicine systems, vacha (Acorus calamus Linn.), also referred to as sweet flag, is a well-known medicinal plant. It is considered a Medhya Rasayana (brain tonic) in Ayurveda and is particularly prized for its effects on the nervous system. The medicinal potential of Vacha is enhanced by the presence of bioactive substances like α-asarone and β-asarone in its rhizome. Vacha has historically been used to treat ailments like anxiety, epilepsy, and sleeplessness as well as to improve memory, intelligence, speech, and cognitive abilities. Additionally, it has digestive, carminative, anti-inflammatory, antibacterial, and antioxidant qualities that make it helpful for gastrointestinal conditions like flatulence, indigestion, and appetite loss. Vacha's usage in respiratory conditions is further supported by its expectorant and bronchodilator properties. The clinically confirmed effects of herbs and herbal medications, such as their anti-inflammatory, analgesic, antipyretic, immunomodulatory, and adaptogenic properties, have sparked public interest. Additionally, the misuse of synthetic drugs, which raises the risk of bad medication reactions, has led people to seek safer cures in nature. Regular use of Vacha, one of the *Rasayana dravyas*, is claimed to endow one with a sharp mind and a beautiful voice. Vacha is very important in herbal medicine because of its many pharmacological properties, but to guarantee safety and effectiveness, careful dosing and processing are crucial.

KEYWORDS: Vacha, Acorus calamus, medicinal properties, Neuroprotective, Cognitive enhancement, Antimicrobial, Anti-inflammatory, Herbal medicine.

1. INTRODUCTION

The use of herbs for their therapeutic or medical value is known as herbal medicine, sometimes called botanical medicine or herbalism. A plant or plant part that is prized for its savory, fragrant, or medicinal properties is called a herb. Numerous chemical substances that have an impact on the body are produced and found in herb plants. The botanical description of the medicinal herbs first appeared during the time of Nighantus. The Ayurvedic medication Vacha (Acorus calamus L.) is highly influential and well-known for its medhya karma (that which improves memory & intelligence).[1] This plant's rhizome has been suggested as a brain tonic for those with poor memory (API). Vacha means "that which improves speech or enhances the power of speech" in Sanskrit. This tall perennial wetland monocot plant belongs to the Araceae family and is frequently referred to as sweet flag. It is quite prevalent on the shores of lakes and streams as well as in Manipur and the Naga Hills. It can be found in all parts of India, both in the

wild and under cultivation. It has memory, intelligence, and power. In today's competitive and demanding world, poor memory, poor retention, and delayed recall are frequent issues.[2] Vacha (Acorus calamus Linn.), an indigenous drug of India belongs to family Araceae. It is delineated under various therapeutical groups like „*Lekhaneeya", „Triptighna", „Arshoghna dashemani" etc., by Acharya Charak*[3], *„Pippalyadi", „Vachadi" etc., ganas by Acharya Sushruta*[4] *and „Mustadi", „Vatsakadi" etc., gana by Vagbhata*.[5] The Pharmacognostical characters of Vacha are described through various synonyms like „*Shadgrantha*‟ (Having six nodes), *Ugragandha*‟ (Having strong aroma), *Lomasha*‟ (Having small hairs), *Golomi*‟ (Having small hairs like cow) etc. It has important pharmacological properties like *Deepana* (Appetizer), *Pachana* (Digestive), *Vamaka* (Emetic), *Medhya* (brain tonic), *Kanthya* (Good for throat), *Sanjnasthapana* (Restores lost consciousness), *Vedanasthapana* etc. Vacha holds a special place in Ayurveda because it is a major Medhya drug with the ability to enhance the emphasis on *Shodana* (purification process) of Vacha using various media such as *Gandhodaka* (decoction of six aromatic herbs), *Mundi Kwatha* (decoction of Sphaeranthus indicus Linn), and *Gomutra* (cow's urine).[6]

2. CONCEPTUAL STUDY

2.1 Vernacular names

Vacha is commonly known as "*Shadgrantha, Golomi, Ugragranthi, Sataparvika, Jatila*" in Sanskrit, "*Bach*" in Hindi and Bengali, "Sweet flag" in English, "*Agri-turki*" in Persian, "*Godavaj*" in Gujarat, "*Vaj*" in Bombay, "*Vekhand*" in Marathi, "*Vasa*" in Telugu, "*Vashambu*" in Tamil, "Vayambu" in Malayalam, "Baje" in Kannada, "*Ekhanda*" in Konkan, "*Vacha, Bacch*" in Unani, "*Bojho*" in Nepali and "*Shobu*" in Japanese.[7]

2.2 Classical reference

Acharya Charaka has categorized *Vacha* in *Lekhaniya, Arshoghna, Triptighna, Asthapnopaga, Shirovirechana, Sanjnasthapana, Sitaprashamana Mahakashaya*. Charaka enumerated *Haimvati* (Shweta Vacha) under *Mulini Varga*.[8] In Sushruta samhita, Vacha has been found in *Pippalyadi, Mustadi and Vachadi gana*.[9]

2.3 Taxonomical classification

Kingdom: Plantae
Subkingdom: Tracheobionta
Super division: Spermatophyta
Division: Magnoliophyta
Class: Liliopsida
Subclass: Arecida
Order: Arales
Family: Araceae
Genus: Acorus
Species: Calamus

2.4 Varieties

According to Bhavprakash there are four varieties of Vacha is found. These are as follows

- ***Ghona Vacha***(Acorus calamus Linn)
- ***Bala Vacha*** (Paris polyphylla Sm.) (also known as Majar ka Phool on basis of their flower colour i.e. White, Blue, Red)
- ***Maha Vacha***(Zinziber zerumbet Rosc. ex Smith)
- ***Dwipantar Vacha*(**Smilax china Linn)

2.5 Properties

- *Rasa : Katu, Tikta*
- *Guna : Laghu, Tikshna*
- *Virya : Ushna*
- *Vipaka : Katu*

- ***Karma: Dosha Karma****: VataKaphahsama, Pittavardhak.*
- ***Samanya Karma:*** *Dipaniya, Medhya, Kanthya, Krmihara, Vamaka, Mala-Mutravisodhanl.*

2.6 Botanical description

The tall, perennial wetland monocot Vacha (Acorus calamus Linn.) belongs to the Araceae or Acoraceae family and grows to a height of 1-4 feet. It has a spreading root stock and is a fragrant marsh herb. A single plant joined by a long underground rhizome is most likely the source of the seemingly many plants observed above ground in a population.[10]

- **Rhizome:** Shallow, branched, sturdy, knobby rhizomes make up the root system. Along these rhizomes, tufts of basal leaves appear periodically, and coarse fibrous roots form beneath. The plant uses its rhizomes to proliferate. The rhizome is smooth, long, indefinately branching, and either pale green or pink. The rhizome has a bitter taste but is white pink on the inside and has a lovely citrus scent.
- **Leaves:** The sword-shaped, upright basal leaves resemble iris leaves. The edges of them are smooth and flattened. There are few, distichously alternating leaves that range in width from 0.7 to 1.7 cm, with an average of 1 cm. Acorus calamus has shorter sympoidal leaves than vegetative leaves. The leaf bears a single, noticeable midvein, followed by numerous, tiny tertiary veins and slightly elevated secondary veins on both sides. It has an undulating or curly edge. The number of conspicuous leaf veins, such as Acorus calamus Linn, is how botanists differentiate between Acorus species. has just one.
- **Flowers:** Plants hardly ever flower or bear fruit, but when they do, the cylindrical, greenish brown flowers are 3 to 8 cm long and covered in numerous spherical spikes. The inflorescence is made up of a spathe that resembles a leaf and a spike-like spadix that emerges from the center of the spathe and is heavily covered in green and yellow flowers. The spadix can grow to a length of 4.9 to 8.9 cm throughout its expansion. Depending on the latitude, flowers bloom from early to late summer.
- **Fruits:** The fruits are found to be small and berry like with few seeds.

2.7 Chemical constituents

In addition to choline, flavone, acoradin, galangin, acolamone, isocolamone, and lutcolin-6,8 c-diglucoside, the dried rhizome of Acorus calamus contains yellow aromatic volatile oils with asarone as the primary constituent and trace amounts of sesquiterpenes and their alcohols.[11] Phenylpropanes, monoterpenes, and thermolabile sesquiterpenoids are the main chemical components of sweet flag essential oils. The scent of the volatile calamus oil, which ranges from pale yellow to pale brown, has been described as "woody-spicy with increasingly sweet after notes and great tenacity" and is similar to "dried milk or sweet leather, slightly creamy-nutty." It has also been likened to the aroma of a shoe repair shop or milk truck (Arctander 1960). The chemical molecule (Z,Z)-4, 7-decadienal is the source of its distinctive scent. An alcohol extract of A. calamus var. calamus included 243 volatile components, 45 of which were new records from sweet flag, along with 67 hydrocarbons, 35 carbonyl compounds, 56 alcohols, eight phenols, two furans, and four oxido compounds.

3. MEDICINAL PROPERTIES

Table no 1: Karma (Action) of Vacha in various Nighantu.

Karma	**D.N**	**Sho.N**	**M.N**	**K.N**	**B.P**	**R.N**	**Sha.N**	**Maha. N**	**P.N**
Vamaka			+	+	+	+	+	+	+
Vanhikara			+	+	+	+	+	+	+
Mala Vishodhan	+			+	+			+	
Mutra Vishodhana	+			+	+			+	
Kaphaghana	+	+		+	+	+	+		+
Vataghna	+	+	+	+	+	+	+		+
Bhootaghna			+		+	+	+	+	+
Jantughna	+			+	+			+	
Kanthya	+								
Medhya	+	+		+			+		
Krimighna	+						+		
Ayushya	+						+		
Amapachaka				+			+		
Vrishya							+		
Swaradayaka			+	+				+	
Vatanuloman									+
Jivaniya				+					
Rakshoghna				+					
Dipana	+			+				+	
Smritivardhak									
		+							

Table no 2: *Rogaghnata* (Therapeutic indication) of Vacha in various Nighantu.

Roga	**D.N**	**Sh.N**	**M.N**	**K.N**	**B.P**	**R.N**	**Sha.N**	**Maha.N**	**P.N**
Vibandha	+			+	+			+	+
Adhamana	+			+	+			+	+
Shoolanashak	+	+	+	+	+			+	+
Apasmara			+	+	+			+	+
Unmada			+	+	+	+	+	+	+
Hridya Roga	+			+	+			+	+
Granthi						+	+		
Shotha						+	+	+	
Vataja Jwara						+	+	+	
Atisara						+	+		

- D.N-Dhanwantari Nighantu; S.N-Sodhala Nighantu; M.N-Madanapala Nighantu, R.N-Raj Nighantu; K.N-Kaiyadeva Nighantu; B.P.N-Bhavaprakasha Nighantu; Sa.N-Shaligram Nighantu; Ma.N-Mahaoushad Nighantu; P.N-Priya Nighantu.

PHARMACOLOGICAL ACTIONS

- **Nootropic Activity**

The neuropsycho-pharmacological impact of the polyherbal formulation Bramhi Ghrita (BG) on memory and learning processes in mice using the Morris water maze paradigm and in rats using the elevated plus maze. Acorus calamus is present. Its impact on memory and learning processes has been examined. In addition to acting on the formulation of memory enhancers, *brami*

grita may be useful as a supportive adjuvant in the treatment of memory impairments.[12]

➢ **Anti-diabetic Activity**

Normal rats were used for the oral glucose tolerance test (OGTT). STZ (40 mg/kg, intraperitoneally) caused diabetes in male albino rats. Diabetic rats were given 200 mg/kg of AC extract orally for 21 days in order to measure different biochemical markers and assess the anti-hyperglycemic effect. The blood glucose levels were significantly restored, according to the results. Blood glucose, lipid profile, glucose 6-phosphatase, fructose 1, 6 bisphosphatise levels, and hepatic marker enzymes all decreased after 21 days of treatment as compared to the diabetic control. The levels of tissue glycogen, glucose-6-phosphate dehydrogenase, and plasma insulin were considerably higher than those of the diabetic control. Similar regeneration by extract that had previously been necrosed by STZ was revealed by concurrent histological investigations of the pancreas.[13]

➢ **Anti-Obesity Effect**

The rhizome's β-asarone molecule was studied for its ability to prevent animal obesity caused by a high-fat diet (HFD). Adipose rats treated with β-asarone lost weight, but it also prevented metabolic changes, glucose intolerance, high cholesterol, and changes in adipokines. Through suppression of the pancreatic lipase percentage (28.73%), the in vitro study on the A. calamus aqueous extract demonstrated lipid-lowering action.[14,15]

➢ **Antihypertensive Effect**

In rats with HFD-induced hypertension, the antihypertensive effects of A. calamus were investigated separately, in isolation, and in conjunction with Gymnema sylvestre. The average systolic blood pressure (SBP) increased considerably during the four weeks of the HFD. A. calamus and G. sylvestre together considerably lowered the heart rate and SBP at a dose of 200 mg/kg. When compared to individual herbs, A. calamus and G. sylvestre showed a synergistic action that inhibited the percentage of pancreatic lipase (28.73%).[16]

➢ **Anti-Inflammatory and Immunomodulatory Effect**

On the surface of mouse myeloid leukemia cells and murine endothelium cells, respectively, the methanolic A. calamus rhizome extract (12.5 μg/mL) inhibited VCAP-1 and intercellular expression. The A. calamus aqueous rhizome extract at the maximum dose of 10 mg/mL shown negligible activity against hemolysis inhibition and the RBC membrane stabilization percentage in an in vitro anti-inflammatory investigation (Red blood cell membrane stabilization method).[17,18] The properties of interleukin (IL)-8, IL-6 RNA protein levels, interferon regulatory factor 3 (IRF3), and nuclear factor kB (NF-κB) activation were limited by an aqueous A. calamus leaf extract on HaCaT cells.[19] The cyclooxygenase (COX) and lipoxygenase (LOX)-mediated eicosanoid synthesis by arachidonic acid was assessed in N-hexane, butanolic, and aqueous fractions of A. calamus. The COX-mediated synthesis of lipoxygenase product 1 (LP1) and thromboxane B2 (TXB2) was suppressed by the butanolic fraction. The butanolic fraction suppressed the phospholipase C (PLC) pathway in platelets, most likely via acting on protein kinase C (PKC), according to an analysis of the underlying signaling pathways. Using a protein denaturation experiment, the essential oil extracted from A. calamus showed 69.56% inhibition at a concentration level of 300 μg/mL.[20,21]

➢ **Anti-seizures Activity**

to assess the effectiveness of Acorus calamus aqueous extract (AEAC) on seizures caused by chemicals and electricity in albino mice. In the acute study, either normal saline, sodium valproate, or AEAC was administered sixty minutes before the experiment; in the chronic study, they were administered twice daily for ten days, with the final dose administered one hour before the animal was exposed to either maximal electrical shock (MES) or pentylenetetrazole (PTZ). Acute treatment of AEAC reduced the duration of tonic hind limb extension in MES-induced seizures in a dose-dependent manner that was similar to that caused by sodium valproate. The test medication lengthened the duration of seizures and mortality while decreasing latency in PTZ-induced seizures. The test medication significantly shortened the duration of tonic hind limb extension and the clonus phase of MES-induced seizures after repeated administration.[22]

4. DISCUSSION

Ayurveda describes *Vacha* (Acorus calamus Linn.) as a *Medhya Rasayana*, a significant medicinal herb used for respiratory, digestive, mental, and speech ailments. Ayurveda states that Vacha primarily calms *Kapha and Vata Dosha* and possesses *Katu and Tikta Rasa, Ushna Virya, and Katu Vipaka*. It is recommended for conditions like Apasmara, *Unmada*, *Agnimandya*, and Kasa-Shwasa and enhances *Medha, Smriti, and Vak Shuddhi.* Its efficacy in treating digestive and metabolic diseases is explained by its *Deepana–Pachana and Lekhana* qualities. From the modern pharmacological perspective, Vacha exhibits carminative, neuroprotective, cognitive-improving, anxiolytic, anticonvulsant, antibacterial, anti-inflammatory, and antioxidant properties. Bioactive substances like α-asarone and β-asarone, which affect neurotransmitter function, lower oxidative stress, and improve digestive secretions, are primarily responsible for these effects. Its historic usage in treating gastrointestinal and respiratory disorders, enhancing memory, and reducing anxiety is supported by scientific research. The Ayurvedic emphasis on Shodhana, proper formulation, and controlled dosage is supported by current research, which also shows that β-asarone may be dangerous at greater levels. Vacha thus becomes a valuable medicinal substance with broad therapeutic potential when Ayurvedic principles and

contemporary scientific facts are combined, as long as it is used carefully and under the right supervision.

5. CONCLUSION

Vacha (Acorus calamus Linn.) is one of the key medicinal plants used in Ayurvedic traditional medicine to cure various illnesses and preserve health. The herb Vacha (Acorus calamus L.), which is a member of the Araceae family, is widely utilized in Indian medicine. Slurred speech, headaches, oedema, skin conditions, eye conditions, colic, piles, indigestion, acid reflux, heart illness, and ear conditions are among the traditional medical conditions for which the herb is beneficial. Regular use of Vacha, one of the *Rasayana dravyas*, is claimed to endow one with a sharp mind and a beautiful voice.

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