

# Phytochemical and pharmacological studies of Vaj Turki (*Acorus calamus* Linn.) & Unani Description– A Review

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## ABSTRACT:

Vaj Turki (*Acorus calamus* Linn.) is a marshy perennial herb and rhizomes which has been traditionally used as medicine, against different diseases viz; *Nisyan* (dementia), *Zofe Dimagh* (Alzheimers disease), *Humma* (fever), *Zeequn Nafs* (asthama), *Sual Muzmin* (chronic cough), *Ziabetus* (ziabetes), Dyslipidemia, *Quroohe Muzmina* (chronic ulcer) and mainly for digestive problems such as Dyspepsia (*Zofe Hazm*, *Sue Hazm* and *Tukhma*). A large number of chemical constituents such as phenyl propanoids, sesquiterpenes, monoterpenes as well as xanthone glycosides, flavones, lignans, steroids obtained from the *Vaj* have been proved to show various pharmacological activities such as antioxidant, immunomodulator, anti-inflammatory, nootropic, antipyretic, anti-asthmatic, hypoglycaemic, hepato-protective, cardioprotective, cytotoxic activity etc. The aim of this review is to provide information regarding Unani description in classical texts and scientific studies at current scenario which will motivate the research scholars on the basis of current scientific updates in their field of research.

**Key Word:** *Vaj Turki*, *Acorus calamus*, Unani medicine, Traditional Medicine

## INTRODUCTION:

*Acorus calamus* is well known medicinal plant commonly known as Vaj Turki belongs to the family of Araceae. Rhizome of this plant is used for medicinal purposes in Unani as well as Ayurveda since ancient time [1]. The Araceae family also known as Arum family contain 115 genera and 2,000 species, of which about 25 genera and over 140 species has been reported in India [2]. All the herbs of the family are rhizomatous or tuberous. It is commercially available in both peeled and unpeeled forms. This perennial herb is commonly found on the banks of streams and in damp marshy places [3]. The genus *Acorus* is derived from the word “*Acoron*” meaning the pupil of the eye and the “*calamus*” is derived from the Greek word *Calamos* meaning reed [4]. The drug is adulterated with siliceous earth, ground marsh mallow root and cereal flowers [5]. Commercially available *Acorus calamus* are being adulterated with the rhizomes of *Alpinia galangal* and *Alpinia officinarum* in the local market of Calcutta under the name of *bachh* and *ghorbuch* [6].

Hippocrates (460- 377 B.C.) used it medicinally, and in early herbals of the first century Dioscorides and Pliny referred to a plant called *acoron*, which appears to be sweet flag. Theophrastus (371-287 B.C.) mentioned *calamus* in his works, and Celsus reported its occurrence in Indian markets just about two thousand years back [7]. In *Materia Medica* of Hindoostan 1813, it has been mentioned that any druggist who refuses to open the door of his selling in the middle of the night to a parent in need should be penalized, as it was a chief remedial aid for children's stomach complaints and colic in India. The first record of its crop growing was in 1574 by the Austrian botanist Clusius, who obtained a rhizome from Asia Minor and propagated it in Vienna. Its fragrant leaves were used in medieval period on the floors of castles, churches and cottages to help cover odours and keep away insects consequential from poor sanitation [8].

## HABITAT AND DISTRIBUTION:

It is found all over India and Ceylon, in marshes, natural or cultivated, uphill the Himalayas up to 6,000 ft. in Sikkim. It is abundantly found in the marshy tracts of Kashmir and Simoor but commonly in Manipur and Naga Hills [9, 10, 11, 12].

## BOTANICAL DESCRIPTION:

A semi-aquatic rhizomatous perennial herb, rhizome creeping, much branched, as thick as middle finger, cylindrical or slightly dense, light brown or pinkish brown on the outside, white and spongy inside [9]. Leaves 0.9-1.8 meter long and 1.7-3.8 cm width, bright green, distichous, ensiform, base equitant, thickened in the central point, borders wavy. Flowers light brown, densely packed, sessile, cylindrical spadix 5-10 by 1-3.2 cm

diam, obtuse, slightly curved green. Sepals as long as the ovary, anthers yellow, fruits oblong turbinate berries with a pyramidal top, seeds free, hanging from the apex of the cells [9,11,12].

**MACROSCOPIC CHARACTERS OF ACORUS CALAMUS:**

Rhizome is woody, branched, light brown, cylindrical to flat and 9-15 mm in diameter with distinct nodes and internodes. Nodal regions are broad with leaf scars and hair like fibres. Internodes are 8-10 mm in length, ridged and furrowed. Under surface is provided with zigzag line of circular root scars. Transversely cut surface is cream in colour with pinkish tinge and differentiated into central and peripheral regions [13].

**TAXONOMICAL CLASSIFICATION:**

Kingdom: Plantae,

Division: Tracheophyta, Class:

Magnoliopsida,

Order: Acorales ,

Family: Acoraceae

Genus: Acorus,

Species: *Acorus calamus*

Binomial name: *Acorus calamus* Linn [14]

**Common name:**

Calamus root, sweet flag rat root, sweet sedge, flag root, sweet calomel, sweet cane [14].

**Vernacular name;**

Arabic : Vaj, Oudul vaj, Oudul zanj, Zanjabeelul Ajam, Bengali : Bach, English : Sweet Flag, Calamus, Sweet root, Hindi : Bach, Malayalam : Vashampa, Marathi : Vekhand, Persian : Baraj, Karonak, Sanskrit : Vacha, Tamil : Vashambu, Telugu : Vasa, Urdu : Bacha, Unani : Vaj-e-Turki, Vaj [9-12, 15, 16].

**Hasase Mustamela (Parts used):**

Dried roots [17-22].

**Mizaj (Temperament):**

Hot 2<sup>0</sup> and Dry in 2<sup>0</sup> [17-23].

**AFAAL (PHARMACOLOGICAL ACTIONS):**

*Mulattife Akhlate ghaliza* (demulcent to morbid humours), *Mufatteh* (deobstruent), *Muhallile Awarame Balghami* (resolvent to phlegmatic swelling), *Muhallile Awarame Tihal* (resolvent to splenic swelling), *Dafe Tasannuje Meda wa Amaa* (antispasmodic for stomach and intestine), *Dafe zaheer* (antidiarrhoeal), *Hazim* (digestive), *Mujaffife ratubate meda wa dimagh* (siccativ to the secretion of stomach and brain), *Muqawwie hafiza* (memory enhancer), *Musakkin* (sedative), *Qaate* (lytic), *Kasir riyah* (carminative), *Jali* (detergent), *Mudir bol* (diuretic), *Mudir haiz* (emmenagogue), *Muqawwie baah* (aphrodisiac), *Muqawwie aasab* (nervine tonic), *Mukhrij kiram sikum* (wormicidal), Stimulants, emetic, nauseant, stomachic, aromatic, expectorant, carminative, antispasmodic, nervine tonic, sedative, aphrodisiac, laxative, diuretic, antihelminthic, emmenagogue, antilbilious, and anti-inflammatory [9-15, 17- 24].

**MAWAQE ISTEMAL (MEDICINAL USES):**

The drug is used in stomach disease, liver disease, toothache, urinary disease, and constipation [18, 19]. Decoction of *Vaj Turki* is used for dysurea, pneumonia, bronchitis, pain in liver and constipation [25]. Ibne sena described that it is effective in hernia, intestinal erosion and pain [16]. It removes phlegmatic and morbid fluid from brain, stomach and other parts of body and due to hot temperament it is used in neurological disorders [21, 23, 24]. It is useful in vitiate conditions of hoarseness, colic flatulence, dyspepsia, helminthiasis, amenorrhoea, dysmenorrhoea, otalgia, bronchitis, cough, pain in liver and chest, inflammations, gout, epilepsy, delirium, amentia, convulsions, depressions and other mental disorders, tumours, dysentery, diarrhoea, haemorrhoids, intermittent fever, skin diseases, numbness and general debility [9, 12, 26].

**Mazarrat (Harmful effects):**

*Vaj Turki* is contraindicated for *Amraze Haar* and hot temperament patients [19, 22, 23].

**Muslehat (Correctives):**

Saunf (*Foeniculum vulgare*) [19, 22, 23], Sikanjabeen for hot temperament patient [22-24].

**Badal (Substitutes):**

Equal part of *Zerah kirmani* [16, 17, 19, 22, 23], 2/3 part of *Zarawand* [17, 19, 22] and 1/3 part of *Reward Chini* [16,22].

**Miqdare Khurak (Dose):**

3.5 masha (3.5 gm) [23].

**Murakkabaat (Formulations):**

*Majoon Vaj, Majoon Baladur, Majoon Nisyan, Mufarreh Kabeer, Anqaruya Kabeer, Anqaruya Sagheer* [27,28].

**PHYTOCHEMICAL STUDIES:**

Volatile Oil (principal constituents of the Volatile oil are Asamyl alcohol, Eugenol and Asarone), also contains a bitter principle Acorin (Glucoside) [28], Starch and Tannin, volatile essential oil acorin, a bitter principle acoretin, calamine (useful in dysentery), starch, mucilage. The dried rhizome yields 1.5-2.7 per cent of a neutral, yellow aromatic, essential oil having an agreeable odour. The fresh aerial parts yield about 0.123% of the volatile oil; the unpeeled roots, however, give a much better yield from 1.5-3.5% [15]. Acorin, a glucoside is a honey-like liquid, very bitter and aromatic, soluble in alcohol, chloroform and ether, splitting into sugar and volatile oil. Acoretine is a resin-like body yielded by reduction of ethereal oil and sugar. Calamine is a crystalline alkaloid soluble in alcohol and chloroform. The valuable essential volatile oil of *Acorus calamus* is yellowish brown and is found to be composed of aryl aldehyde, free normal heptylic and palmitic acid, eugenol, esters of acetic acid, palmitic acids, pinene camphene, sesqui-terene, calamine 2.5% and a small quantity of phenol; Eugenol 0.3%; methyl Eugenol 1.2%; Calanenenol 5.3% and Calameone 2.2%”, the crystalline body named Calameone asarone [3,15]. The oil obtained from the Indian *A. Calamus* was studied by Rao Sudborough and Wasron (1925), and they found that this oil does not contain the lower boiling constituents such as pinene, camphene, in the commercial oil from Europe.” The oil mainly consists of asarone 82%; palmitic acid was also found in the combined condition along with small quantity of butyric acid. The properties of oil of Indian *A. Calamus* have been found as: specific gravity 1.069 at 15C; Optical rotation 16.2; saponification value 5.1; saponification value after acetylation 16.6; acid value 1.4.” [9, 11, 15].

**Identity, Purity and Strength:**

Foreign matter: Not more than 2 %, Total ash: Not more than 7 %, Acid-insoluble ash: Not more than 1 %, Alcohol-soluble extractive: Not less than 9 %, Water-soluble extractive: Not less than 16 %, Volatile oil: Not less than 2 % [28].

**PHARMACOLOGICAL STUDIES:****Antisecretory and antiulcerogenic activity:**

It is reported that ethanolic extract of rhizomes exhibit antisecretory and antiulcerogenic activity against cytodestructive agents in animal model. Another study reported that essential oil of *A. calamus* possesses sedative and analgesic properties [29].

**Anti toxicity study:**

Shah *et al.* reported that ethanolic extract of *Acorus calamus* (up to a dose of 600 mg/kg) lacked any potential toxicity, as it neither caused any lethality nor changed the general behaviour in both acute and chronic toxicity studies in rats [30].

**Antimicrobial activity:**

It is also reported that *Acorus calamus* rhizome and leaf extract revealed antimicrobial activity against fungus and yeast due to active principle  $\alpha$  and  $\beta$ - asarones which is believed to be responsible for their antimicrobial activities [31].

**Hypolipidemic activity:**

In other study it was found that the 50% ethanolic extract 200 mg/kg as well as saponins 10 mg/kg isolated from the rhizomes of *Acorus calamus* extract showed significant hypolipidemic activity whereas, the aqueous extract showed hypolipidemic activity only at a dose of 200 mg/kg [32].

**Anti spasmodic and anti diarrhoeal activity:**

Another study reveals anti spasmodic and anti diarrhoeal activity of *Acorus calamus* in mice. Also, *Acorus calamus* extract for *in vivo* jejunum isolated from the rabbit and further effect of crude extract was evaluated. It was found that extract causes spontaneous inhibition of high K (+) induced contractions resulting in spasmodic activity mediated through the calcium channel blockade [33].

**Anti-inflammatory activity:**

Purified saponins obtained from methanolic and water extracts of *Acorus calamus* leaves revealed that carrageenin induced paw oedema in Wistar rats produced a dose-dependent oedema reduction significantly, which supports its use as traditional medicine [34].

**Antidepressant activity:**

Methanolic extract of *Acorus calamus* leaves produced significant antidepressant effect which was shown by reduction in immobility period in both tail suspension test and forced swim test carried out on inbred Swiss albino mice. The extract showed antidepressant activity probably through interaction with adrenergic, serotonergic, dopaminergic, NMDA and GABA mineral systems [35].

**CONCLUSION:**

*Vaj Turki* is well known Unani drug which is described in classical text by Unani Scholar, for the treatment of various diseases. On the basis of scientific parameters actions of *Vaj Turki* has been presently proved which have been earlier described by Unani scholars. To explore hidden benefits of “*Vaj*” such type of review article will be fruitful for the researcher as a new vistas.

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