

Pharmacological Profile and Uses of Sumbul-ut-teeb (*Nardostachys jatamansi*) in Unani System of Medicine

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Publication Date: 18 January 2017

Article Link: <http://medical.cloud-journals.com/index.php/IJACTM/article/view/Med-350>



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Abstract Sumbul-ut-teeb (*N. Jatamansi* DC) is perennial herb whose rhizome and roots is mainly used as drug. It has been used in the treatment of many diseases and has several activities including anticonvulsant activity, antiparkinson's activity, tranquillizing activity, hepatoprotective, neuroprotective, hypotensive, anti-diabetic activity. The objective of this review is to search literature for the pharmacological properties, phytochemical investigation and pharmacognostic studies and uses of Sumbul-ut-teeb (*N. jatamansi*) in Unani system of medicine.

Keywords *Unani medicine; Pharmacological; Phytochemical; N. jatamansi, sesquiterpenes*

Introduction

Sumbul-ut-teeb (*N. Jatamansi* DC) is perennial herb whose rhizome and roots is mainly used as drug. The plant is about 10 to 60 cm in height and with stout and long woody root stocks. Dark grey rhizomes are crowned with reddish brown tufted fibers. Internally they are reddish brown in colour. These Rhizomes are 2.5 to 7.5 cm in length and are elongated and cylindrical in shape [1]. The radical leaves are elongated and spatulated, while few cauline leaves are sessile, oblong or sub-ovate. Flowers are rosy in dense cymes, with pale pink or blue in coloration [2].

Botanical classification [3]

Botanical name : *Nardostachys jatamansi* DC

Kingdom : Planate

Division : Mangnoliophyta

Class : Mangnoliopsida

Order : Dipsacales

Family	:	Valerianaceae
Genus	:	Nardostachys
Species	:	Jatamansi
Part used	:	Rhizomes, Rhizomes oil

Vernaculars [3,4]

Arabic	:	Sumbul-ut-teeb
Bengali	:	Jatamansi
English	:	Muskroot, Indian Spikenard, Spikenard
Gujarati	:	Baalchad, Kalichad, Jatamsi
Hindi	:	Balchar, Balchir, Jatamansi
Kannada	:	Jatamanshi, Jatamansi
Kashmiri	:	Bhut-jaat, Bhutijatt, Kukilipot
Malayalam	:	Jatamanchi, Jetamanshi, Jatamamshi
Oriya	:	Jatamansi
Panjabi	:	Billilotan, Balchar, Chharguddi
Persian	:	Sumbul-utteeb
Sanskrit	:	Mansi, jati, jatila Jatamansi, Janani Jatamansi, Sukshmapatri, Bhutajata,
Tamil	:	Jatamanji, Jatamanshi
Telegu	:	Jatamanji, Jatamanshi, Jatamsi
Urdu	:	Sumbul-ut-teeb, Balchar

Mahiyat (Physical property) [5,6,7]

Sumbul-ut teeb is having sharp odour, like saad (*Syperus longus*), reddish black in colour, with huge fibres, soft in touch with solid inner part; and bitter taste. Sumbul is of various types;

- 1) Balchar: It is also called sumbul-ut teeb or sumbul asafir.
- 2) Sumbul Roomi: It is also called sumbul iqliti. It is relatively a short plant; its leaves are similar to the leaves of asafir.
- 3) Sumbul juhi: It is also known as sumbul asad or sumbul suri.

Dioscorides described sumbul to be of two genuses, one is hindi and another is suri. Balchar is considered better than sumbul roomi as it has large amount of fibre and is more potent in action [5].

Parts used: Root [5,8,9]

Mizaj (Temperament): Hot1 Dry2 [5,6,7,8], Hot2 Dry2 [9,10]

Miqdare khorak (Dose): 3-5 gm [8,4]

Muzir (toxic): for kidney [6,8,10]

Afa'al (Actions) described in Unani medicine: Mudirr-i- haiz (emmenagogue) [8,10] Muhallil (resolvent) [5,7,8] Mudirr-i-boul (diuretic) [8,10] Kasir-i-riyah (carminative) [7,8,10] Muqawwi qalb (cardiotonic) [8,9] Muqawwi Dimagh (brain tonic) [5,8,9,10] Muqawwi bah (aphrodisiac) [8] Matayyib-e-dahan [8,9] Muqawwi shar (hairtonic) [5,9] Muqawwi chashm (eye tonic) [9] Mujafif quruh (cicatrizant) [5,6,9] Muqawwi sadriyya (tonic to chest and lungs) [5,6,9] Mufattih-i-Sudad al-jigar wa mida (deobstruent) [5,8] Muqawwi Mida wa jigar (stomachic and hepatotonic) [5,7,8,10] Mufattat Hisat (lithotriptic) [10] Musakhkhin (calorific) [8] Jali (detergent) [8] Mujaffif (desiccant) [8]

Istemaal (Unani Therapeutic uses)

- 1) Sumbul- ut –teeb is used as *farzaja* (vaginal suppository) for both *kasrate* tams (menorrhagia) [5,6] and *ihibas-i-tams* (amenorrhoea) [6,8] and is helpful in maintaining pregnancy [6].
- 2) Oral or local use of sumbul- ut-teeb either singly or in combination with other drugs is beneficial in *warm-i-rahim wa masana* [8].
- 3) *Aabzan* (sitz bath) with *Joshanda* (decoction) of sumbul- ut –teeb is beneficial in *warm-i-rahim*(endometritis), [5,6,7].
- 4) Paste of sumbul- ut –teeb when applied on forehead relieves headache [6].
- 5) Powder of sumbul- ut –teeb with water when taken orally alleviates abdominal pain [6].
- 6) *Joshanda* of sumbul- ut –teeb and *afsanteen* resolves the inflammation of stomach and liver [6,7,8].
- 7) All types of sumbul- ut-teeb are diuretic [5,6,7].
- 8) Sumbul- ut –teeb ameliorates *nafkh shikam* [7,8].
- 9) Sumbul- ut –teeb helps in digestion of food [6].
- 10) Sumbul- ut –teeb with *heeng* is beneficial in *asbi amraz* [6].
- 11) Sumbul- ut –teeb is beneficial in *duwar*, *ghashi*, and *zoaf-i- dimagh* [6].
- 12) Sumbul- ut –teeb is beneficial in *khafaqan* [5,7,9] and all types of *yaraqan* [5,6,7].
- 13) Sumbul- ut –teeb is *muqawwi bah* when used with sharab [6].
- 14) *Dhooni* of sumbul- ut –teeb relieves the *sudda* (obstruction) of uterus [6].
- 15) Sumbul- ut –teeb removes morbid matter from body, strengthens the body, removes obstruction and resolves the mucoid matter [6].
- 16) Powdered sumbul- ut –teeb when rubbed over teeth relieves toothache [6].
- 17) Chewing of sumbul- ut -teeb alleviates halitosis [8].
- 18) Powdered sumbul- ut -teeb when applied on body acts as anti-diaphrotic [5,6,8].
- 19) Due to its properties like *jali* and *mohasin-i- lawn*, sumbul- ut –teeb is used as face pack in chloasma [6,8].
- 20) Sumbul- ut –teeb prevents loss of eyelashes when applied over eye lids [5,6].
- 21) Sumbul- ut –teeb with salt and vinegar is beneficial in ascites [6].
- 22) Powder of sumbul- ut –teeb with honey is used as blood purifier [6].

Ethno Botanical description [3,11]

Nardostachys jatamansi DC is a small, perennial, dwarf, hairy, rhizomatous, herbaceous, endangered and most primitive species within family Valerianaceae.

Habitat and Distribution

It is native to the elevated ranges of Himalayas in Nepal but also found in high lands of Sikkim, Bhutan and Punjab [8,7,9,6]. This plant is mostly found growing between altitudes of 3300–5000 m [13].

Macroscopic Characters [14]

Colour: Dark grey rhizomes are crowned with reddish brown tufted fibres.

Odour: Highly agreeable, aromatic.

Size: Rhizomes are 2.5 to 7.5 cm in length.

Shape: Elongated and cylindrical.

Microscopical Character [3]

A transverse section of the rhizome shows a thin periderm, a large parenchymatous cortex which is rich in starch and an endodermis containing globules of volatile oil. Within a ring of collateral vascular bundles lies large pith containing scattered groups of sclerenchymatous cells.

Actions

N. jatamansi has Emmenagogue, [15,16,17,18] Antispasmodic, [15,18,19] Stomachic, [15,16,17,18] Stimulant, [15,16,17] Diuretic, [15,16,17,18] Carminative, [16] Appetite and digestion promoter, [16] Depressant of CNS, [18] Tonic, [15,16,17,18] Deobstruent, [15,17,18] Laxative, [15,16,18,19] Aromatic adjunct, [18] Antiseptic, [18] Anti-arrhythmic, [18] and Hypotensive [18] action.

Uses [3]

- 1) *N. jatamansi* is primarily used in modern medicine for cognitive and neurological function benefits.
- 2) It is used in mental disorder, insomnia, hypertension and heart diseases.
- 3) It is very effective in producing typical non-specific stress manifestation.
- 4) It is used as a carminative, as an antispasmodic in hysteria, palpitations and seminal debility.
- 5) The herb increases appetite, relieves the phlegm in cough and asthma, proves useful in hepatitis and hepatomegaly.
- 6) Jatamansi relieves symptoms like vertigo, convulsions in fever.
- 7) Jatamansi oil possesses anti arrhythmic activity and also used as a flavouring agent in the preparation of medicinal oil.
- 8) The medicated jatamansi oil is extremely beneficial for smooth and healthy hair.
- 9) It has protective effect in epilepsy, cerebral ischemia, and liver damage.
- 10) It is also recommended in scorpion sting.

Phytochemistry

N. jatamansi has been discovered with both volatile and non-volatile constituents. Sesquiterpenes and coumarins are present in considerable amount in the roots of *jatamansi* plant mainly responsible for its essential oil. Sesquiterpenes contribute to the major portion of the volatile compounds while coumarins, lignans, and neolignans alkaloids form the major components of the non-volatile extracts [3,20]. Major sesquiterpenes are jatamansone and valerone while the rest of sesquiterpenes are jatamansol, jatamansic acid, dihydrojatamansin, nardosatchone. Some minor contributors like jatamol A, jatamol B, nardosinone, jatamansinone, valeranal, seselinar dostachyins, seychelane, seychellene, coumarin and xynthogalin have also been reported [2,21,22,23]. In addition it contains epoxy iridoid esters (valepotriates), amino acids (GABA, tyrosine, arginine), alkaloids, phenolic acids, flavonoids [24], carbohydrates, tannin, steroid, sterols, mucilage, gums, terpenes and glycosides [2]. The compounds responsible for the pharmacologic activities of the plant have not been completely identified; however two main groups of valerenic acids and valepotriates would be more responsible for the plant activity. Hydrophilic valerenic acids are from sesquiterpenoids whereas hydrophobic valepotriates are from monoterpenoids [24].

Pharmacological activity

Activity on CNS: Limited results from behavioural tests revealed that an extract from *N. Jatamansi* exhibited significant antidepressant activity. The effect of acute and sub chronic administration of alcoholic extract of the roots of *N. jatamansi* DC on nor epinephrine (NE), dopamine (DA), serotonin (5-HT), 5 hydroxyindoleacetic acid (5-HIAA), gamma-amino butyric acid (GABA) and taurine on male albino wistar rats was studied. The acute oral administration of the extract did not change the level of NE and DA but resulted in a significant increase in the level of 5-HT and 5-HIAA. A significant increase in the level of GABA and taurine was observed in the drug-treated groups when compared to the controls [3,25].

Tranquilizing activities: German R et al. investigated sesquiterpene valeranone (*Jatamanson*) isolated from *Nardostachys jatamansi* DC rhizomes for tranquilizers activity in rodents and significantly prolonged barbiturate anesthesia, impaired rotarod performance, inhibited electroshock convulsions, and potentiated the hypothermic effects [26].

Neuroprotective activity: Pretreatment with an alcoholic extract of *N. jatamansi* DC dosed at 250 mg/kg for 15 days protected rats against focal ischemia caused by middle cerebral artery occlusion. The protective effect may be associated with improving glutathione content, inhibiting lipid peroxidation and activity on the Na⁺/K⁺ ATPase and catalase enzyme systems [3].

Cardio protective activity: Pre-treatment with an extract of *Nardostachys jatamansi* (500 mg/kg) orally for seven days to doxorubicin induced cardio-toxicity in rats showed a significant prevention in the lipid status with the activities of the lipid metabolizing enzymes; suggesting that the protective and hypolipidemic effect of *Nardostachys jatamansi* against doxorubicin induced myocardial injury in rats could possibly be mediated through its anti-lipid peroxidative properties. Histopathological observations were also in correlation with the biochemical parameters [27].

Effect on estrogen and hair growth: *Nardostachys jatamansi* DC is studied for the growth of hairs due to cancer treatment. The results confirmed hair growth promotion activities of the plant. In next step hair growth study was design not only to see effect of extract on hair growth but also of isolated fraction named as Nardal, Jatamansic acid, Nardin [2].

Cognition and memory improvement: Acetyl cholinesterase inhibitory activity of methanolic and successive water extracts of *N. jatamansi* DC (rhizome) was studied in vitro. It showed that methanolic extracts to be more active than water extracts. This partly substantiates the traditional use of *N. jatamansi* DC for improvement of cognition [1].

Hepatoprotective activity: 50% ethanolic extract of *N. jatamansi* DC demonstrated significant hepatoprotective activity against thioacetamide induced hepatotoxicity [28,29].

Anticonvulsant Activity: Ethanol extract of the roots of *N. jatamansi* DC was studied for its anticonvulsant activity and neurotoxicity, alone and in combination with phenytoin in rats. The results demonstrated a significant increase in the seizure threshold by *N. jatamansi* DC root extract against maximal electroshock seizure (MES) model as indicated by a decrease in the extension/flexion ratio. However, the extract was ineffective against pentylenetetrazole-induced seizures [30].

Antiparkinsonism activity: Antiparkinsonism activity in rats was studied on 6-OHDA (12 µg in 0.01% in ascorbic acid-saline) induced Parkinsonism. The increase in drug-induced rotations and deficits in locomotor activity and muscular coordination due to 6-OHDA injections were significantly and dose-dependently restored by *N. jatamansi* DC [3].

Anti-oxidant activity: The antiperoxidative property of *jatamansi* was investigated as an iron-induced lipid peroxidation model in rat liver and was observed that the extract provided protection against lipid peroxidation [3]. *N. Jatamansi* shows both in vivo and in vitro anti-oxidant activity. It has free scavenging action. Anti-oxidant activity may be attributed to the presence of flavonoids and polyphenols and which in turn may be responsible for its anti-stress effect [31].

Anti-diabetic activity: The ethanolic extract of *N. jatamansi* exhibits significant antihyperglycemic activity in experimental model of diabetic rats. It decreases glucose level significantly in diabetic and non-diabetic rats as compared to respective controls [3,32].

Antifungal: *N. jatamansi* essential oil demonstrated fungi static activity against *Aspergillus flavus*, *Aspergillus niger*, *Fusariumoxysporum*, *Mucor fragilis*, *Rhizopus stolonifer*. This oil was found to be fungi static or fungicidal to one or the other molds, depending upon the concentration [3].

Other activity: Animal studies done on *jatamansone* have reported anti-estrogenic activity. Moreover, *jatamansone* have reported anti-arrhythmic, anti-hypertensive, anti-asthmatic, nematicidal and antibacterial activities [3].

Conclusion

Sumbul- ut –teeb (*N. jatamansi*) is an essential herb with multiple uses in Unani system of medicine. It is important plant of Unani materia medica. It has so many pharmacological activities, thereby increasing its use. *Nardostachys jatamansi* DC is established medicinal plant in different therapeutic areas so the drug should be taken under various clinical trials.

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