

## Phytochemistry, Pharmacological Profile and Uses of Sumbul-ut-teeb (*Nardostachys jatamansi* DC.) in Unani System of Medicine A Comprehensive Review

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### Abstract

*Nardostachys jatamansi* DC. is an aromatic perennial herb of Valerianaceae family. It is an essential medicinal plant, native of India like Himalayas, Himachal Pradesh, Uttarakhand, Jammu and Kashmir, Southwest China, Myanmar, Nepal and Bhutan. It is a hairy small rhizomatous perennial herb. It is one of the most influential plant and used from centuries in Unani system of medicine for the treatment of various malady such as *Yarqan* (Jaundice), dyspepsia (*sue hazam*), palpitation (*khafqaan*), *Ehtebas-e Baul* (Retention of Urine), *Ehtebas-e haiz* (Amenorrhea) etc. Also used from long period in many chronic diseases therapeutically as well as orally in various form of Unani medicine. *Nardostachys jatamansi* is a traditional herb and used in multiple compound formulations in Unani system of medicine. Preliminary performed phytochemical analysis revealed that tannin, flavonoid and saponins are the major components of the plant extract. The plants containing saponins or flavonoids exhibit anticonvulsant activity whereas the flavonoids show various biological activities including antioxidant, anti-inflammatory, also exhibits hepatoprotective, hypotensive and Antidiabetic activity etc. Keeping in view the tremendous medicinal importance of the plant Sumbul-ut-teeb in Unani Medicine, this review provides updated information on its phytochemistry, therapeutic uses and pharmacological properties.

**Keywords:** Sumbul-ut-teeb, pharmacological activity, unani medicine

### Introduction

Sumbul-ut-teeb (*N. Jatamansi* DC), belongs to family Valerianaceae, it is also known as Balchar in Urdu. It is a native of the elevated ranges of Himalayas in Nepal; however also originate in high lands of Sikkim, Punjab and Bhutan. It is a perennial herb whose rhizome and roots is mainly used as drug. The plant has a height of around 10 to 60 cm and has 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. The radical leaves are spatulate and elongated, while there are few sessile, oblong or sub-ovate cauline leaves. Flowers are rosy in dense cymes, with pale pink or blue in coloration. It is act as a deobstruent (*Mufatteh*), Astringent (*Qabiz*), anti-inflammatory (*Muhallil*) etc and

used in jaundice, gastritis, asthma and retention of urine etc [1]. In the Unani system of medicine, plant has been used as hepatotonic, analgesic, cardiogenic, diuretic, antibacterial and antifungal activities. Plants roots were reported to acquire analgesic and anti-malarial activities [2]. The roots of the plant, rich in sesquiterpene and coumarin, contain essential oils. Jatamansone or valeranone is the principal sesquiterpene. Other sesquiterpenes include nardostachone, dihydrojatamansin, jatamansinol, jatamansic acid, jatamansinone, jatamansinol have been reported in the plant [2]. Hence this review article provides updated information on its phytochemistry, therapeutic uses and pharmacological properties.

**Table 1:** Vernacular names [3,7]

Languages	Vernacular Names
Arabic	<i>Sumbululaasaffir, Sumbululhind, Sunbuluttibehindi</i>
Persian	<i>Sumbuluttib</i>
Urdu	<i>Balchar</i>
Unani	<i>Nadreen, Izer maroos, Laulaneetus, Beris,</i>
Latin	<i>Nardoo,</i>
Sanskrit	<i>Jatamansi, Bhytajata, Tapaswani</i>
English	<i>Musk-root, Indian spikenard, Indian nard</i>
Hindi	<i>Balchar, Jatamansi</i>
French	<i>Nard Indian</i>
Kashmir	<i>Bhutijata</i>
Punjab	<i>Billilotan</i>
Marathi	<i>Jatamavshi</i>

Bengali	<i>Jatamansi</i>
Assamese	<i>Jatamamsi</i>
Tamil	<i>Jatamanji</i>
Nepal	<i>Haswa, Naswa, Jatamangsi</i>
Bhutan	<i>Pampe, jatamansi</i>

**Table 2:** Taxonomical classification [8, 9]

Kingdom	Plant
Division	Mangnoliophyta
Class	Mangnoliopsida
Order	Dipsacales
Family	Valerianaceae
Genus	Nardostachys
Species	Jatamansi
Botanical name	<i>Nardostachys jatamansi</i>

**Distribution**

*Nardostachys jatamansi* is an upright herb rising to a height of 60 cm, subject to the higher elevations of Nepal, India and China, to an altitude of roughly 3,000 to 5000m. It is originate in the alpine Himalayas from Bhutan to the province of Yunan (Greece) and Szechwan, Punjab to Sikkim, South West China at the height of 3000-5000 m [4, 10, 13, 30].

**Fig 1:** Plant and Root of *Nardostachys jatamansi***Unani description (mahiyat)**

Mentioned in unani classical literature according to Dioscorides Sumbul is of three types (Hindi, Romi & Jabli). In actual Sumbul is known as Sumbule-Hindi which is also known is Sumbul-ut-tib [5, 6].

Sumbul-ut-teeb is an herb it do not have flower and fruits. Its length is equal to one finger and less than one finger in width. It is yellowish or blackish green in colour it has strong characteristic odour and found mainly in most parts of India and Bangladesh. According to some people it is of two types one is black in colour and other one is red. The black one Sumbul-ut-teeb is called Ambali having a strong odour it used in various perfumes. While the red one Sumbul-ut-teeb is called Ravnali. Its order is less as compared to black one and used in preparing various majoon. The Sumbul-ut-tib which is black in colour having strong odour is the best quality [6, 10]. According to Dioscorides best quality of Sumbul-ut-teeb has certain features that are has numerous hairs, yellowish in colour and its smell resemble to Nagarmotha (*Cyperus rotundas*) [11].

**Macroscopic character**

Dried rhizome dark brown in colour, 2.5-7.5 cm long in size, cylindrical in shape, covered with reddish-brown fibers forming a network which are skeletons of sheathing leaf bases; fracture, bitter, internally reddish brown in colour, strongly aromatic, taste, acrid, slightly bitter [12, 14].

**Microscopic character**

Transverse section of rhizome shows cork consisting of 2-5 layers of cell filled with oil globules; cortex characterized by the presence of schizogenious canals; phloem form of patches of small cells; cambium ring distinct and continuous; xylem consist of vessels, scattered individually or in rows of two or three vessels with scalariform thickening, older rhizomes show one or more stallate shape rings of inter xylary and medullary cork, completely or incompletely separating the rhizome into 4-9 vascular strands by joining outer cork each separated strand encircled by a few layers of cork cell which contain oil globule [13].

**Chemical constituents**

The main active constituents of *Nardostachys jatamansi* are sesquiterpenes and coumarins. Valeranone or Jatamansone is the principal sesquiterpenes. The other sesquiterpenes includes Alpha- patcho-ulense,  $\beta$ -eudesemo, angelicin,  $\beta$ -sitosterol, calarene, jatamansone  $\beta$ -atchoulense, jatamansin, jatamansinol n-hexaco- sanyl, n-hexacosane, elemol Oroselol, valeranal, valeranone, seichelane, nardostachnol, nardostachone. volatile oil essential oil, resin, sugar, starch, ketone, jatamansic acid, jatamansone, lupelol, Malliene, Calarenol, coumarin- jatamansin, propionate, cyclohexanal ester, bitter extractive matter, gum heptacosanyl pentanoate are isolated from rhizomes [8, 15, 16].

**Part used**

Root & Rhizomes [12, 17].

**Afaal (pharmacological actions)**

- *Qabiz* (Astringent) [5, 6, 10, 20].
- *Musakhkhin* (Calorific) [6, 17].
- *Mufatteh* (Deobstruent) [6, 10, 17].
- *Muhallil* (Anti inflammatory) [5, 6, 10, 17, 19].
- *Muqawwi-e Kabid* (Liver Tonic) [5-7, 10, 17, 19, 20].
- *Muqawwi-e Dimag* (Brain Tonic) [5-7, 10, 17, 19].
- *Muqawwi-e Qalb* (Cardio Tonic) [6, 7, 10, 17].
- *Muqawwi Maida* (Digestive Tonic) [5-7, 10].
- *Muqawwi-e Badan* (Body Tonic) [6, 10].
- *Muqawwi Maida* (Digestive Tonic) [5-7, 10].
- *Muteeb-e Dahan* (Mouth Freshner) [6, 10, 17].
- *Muteeb-e Badan* (Body Freshner) [6, 10, 17, 19].
- *Muhassin-e Laun* (Glowing of skin) [6, 17].
- *Mujaffif-e Qurooh* (Desiccant of Wound) [6, 17, 19].
- *Mudir-e Baul* (Diuretic) [5-7, 10, 19, 20].
- *Mudir-e Haiz* (Ammenagogue) [6, 7, 10, 17].
- *Mufattit-e Hisat* (Lithotriptic) [6, 7, 10].
- *Mufatteh-e Sudad* (Deobstruent) [5-7, 10, 19].
- *Jail* (Detergent) [6, 17].
- *Muqawwi-e Bah* (Aphrodisiac) [6, 17].

**Istemalat (therapeutic uses)**

- *Amraz-e Jiger* (Liver disorder) [5-7, 10, 17, 19, 20].
- *Yarqan* (Juandice) [5-7, 10, 17].
- *Meda ki sozish* (Gastritis) [5, 6, 10].
- *Dard-e shikam* (Pain in abdomen) [6, 10].
- *Nafakh-e shikam* (Flatulence) [5-7, 10, 17].

- *Aanton ki sozish* (Irritable bowel) [6, 10].
- *Istisqa* (Ascitis) [6, 10, 17].
- *Tilli ke amraz* (Spleen disorders) [6, 10].
- *Amraz-e Dimag* (Brain Disorder) [6, 7, 10, 17].
- *Zauf-e qalb* (Impairment of heart function) [6, 7, 10, 19, 20].
- *Khafqan* (Palpitation) [5-7, 10, 19, 20].
- *Amraz-e Gurda* (Kidney Disorder) [5, 6, 10].
- *Dard-e gurda* (Renal colic) [6, 10, 17, 19, 20].
- *Ehtebas-e Baul* (Retention of Urine) [5, 6, 10, 19, 20].
- *Ehtebas-e haiz* (Amenorrhoea) [6, 10, 17, 19, 20].
- *Dard-e rahem* (Pain in uterus) [6, 10].
- *Waram-e rahem* (Inflammation of uterus) [5, 6, 17, 19, 20].
- *Istegrar-e hamal* (Conception) [6, 10].
- *Amraze Riya* (Lungs Disorders) [6, 7, 10].
- *Zeequn nanas* (Asthma) [6, 10].
- *Khunak* (Diphtheria) [6, 10].
- *Dard-e sadar* (Pain in chest) [6, 10].
- *Bawaseer* (Hemorrhoids) [6, 10].

### Some specific uses of *nardostachys jatamansi*

- If Sumbuluttee is mixed with alcohol and rubbed (as a *Latookh*) on hair then hair becomes long and black [6, 10].
- It Stops the fall of eyebrow when applied with mixing of *Sharab* (alcohol) [6].
- If it is soaked in *Aab-e Kishneez* and ground and applied to the eyes it is useful for the redness of eyes [6].
- *Sahib-e Jame* has quited from experienced people that the *Sumbul* is extremely useful for *Istisqa-e Lahmi* (Anasarca) [6, 10].
- *Sumbul-ut-teeb* is useful in all types of *Yarqan* (Jaundice) due to its action of *Tafteeh* (Deobstruent) [6, 10].
- *Aab-e zan* (Sitz bath) of its decoction stops the flow of materials towards the intestine [6, 10].
- If take Sumbul with the decoction of *Afsanteen* (*Artemisia absinthium*) & *Sandal* (*Santalum album*) then it will be digestive & appetizer [6].
- Beneficial in Spleen disorders if all types of *Sumbul* are taken with *Sharab* (alcohol) [6, 10].
- Beneficial in snake and scorpion bites if used with alcohol [6, 10].
- Applying and drinking it will get rid of hemorrhoids [6, 10].
- Sumbul-ut-teeb is beneficial in *duwar* (Dizziness), *ghashi* (Syncope), and *zoaf-e dimagh* (Impairment of brain function) [6].
- Use of Sumbul-ut-teeb give strengthens the body, removes obstruction and morbid matter from the body, and resolves the mucoid matter [10]. ?
- Chewing of Sumbul-ut-teeb eliminates halitosis [17].
- Sumbul-ut-teeb in powder form acts as anti-diaphrotic when applied on body [10, 11, 17].
- On application of Sumbul-ut-teeb over eyelids prevents loss of eyelashes [10, 11].
- By taking *joshanda* (decoction) of *Sumbul-ut-teeb* and *afsanteen* (*Artemisia absinthium*), resolving the inflammation of stomach and liver, also relieves the problem of *Nafakh-e shikam* (flatulence) [5, 10, 17].
- *Aab-e zan* (sitz bath) with *Joshanda* (decoction) of Sumbul-ut-teeb is beneficial in *warm-e rahem* (endometritis) [5, 10, 17].

- Use of Sumbul-ut-teeb is as *farzaja* (vaginal suppository) it beneficial in *kasrat-e tams* (menorrhagia) [10, 11], *ihtibas-e tams* (amenorrhoea) [10, 17]. And is helpful in maintaining of pregnancy [10].
- When Sumbul-ut-teeb is used with *sharab* (alcohol), it act as *Muqawwi-e bah* (Aphrodisiac) [6].
- Use of Sumbul-ut-teeb with *heeng* (Asafoetida) beneficial in *asabi amraz* (nervous diseases) [6].
- Sumbul-ut-teeb relieves toothache by rubbing the powder over teeth [6].
- Due to its action of *jali* (Detergent) and *muhassin-e laun* (Glowing of skin) Sumbul-ut-teeb is used as a facepack in chloasma [10, 17].
- When mixed the Powder of Sumbul-ut-teeb with honey then it is used as *Musaffi-e dam* (blood purifier) [10].
- When applied Sumbul-ut-teeb in Paste form on forehead then it relieves headache [10].

### Main action

*Muqawwi Kabid wa Dimag* (Liver & Brain Tonic) [17].

### Mizaj (temperament) [5-7, 11, 17]

- Hot<sup>1</sup> Dry<sup>2</sup> (according to sheikh)
- Hot<sup>2</sup> Dry<sup>2</sup>
- Hot<sup>3</sup> Dry<sup>3</sup>

### Doses in unani

1. 3.5-7 gm (average dose 4.5 gm) In compound formulation i.e Majoon, Jawarish, Itrifal etc, Sumbuluttee is used, then it is taken as a dose 1.75gm [6, 10].
2. 3-5 masha (gm) [17].

### Muzir (side effect)

Muzir e Gurda (Nephrotoxic) [6, 10, 17].

### Musleh (correctives)

- Rogan e Gul [17].
- Kateera & Bansalochan [10].
- Kateera & Tabasheer [6, 20].
- Kateera, Ispgool & Tabasheer [18].

### Badal (substitute)

Izkhar, Saleekha, Darchini, Sazaj, Sumbul e Romi, Post Beekh e Kibr [6].

Izkhar Makki, Taj & Tezpat, Post Beekh e Kibr, Sumbul e Romi, Darchini [10].

Izkhar Makki [17].

Izkhar Makki & Sazaj Hindi [18].

### Compound formulations

Jawarish fanjnosh, Barshasha, Anoshdaru, Anoshdaru Luluvi, Kohle- Roshnai, Sufoofe-Mohazzil, Roghane-Babuna Qawi, Zimade- Sumbuluttib, Ayarije-Faiqra [14].

Habbe Ayarij, Jawarish Jalinoos, Majoon Dabidulward, Dawaul Kurkum, Dawaul Misk Motadil, Khameera Aaresham Hakeem Arshad wala, Laboobe Kabir, Mufarreh Yaqooti [17].

### Pharmacological studies

1. **Hepatoprotective Activity:** It was reported that a 50 % of ethanolic extract prepared from the rhizome of *N. jatamansi* showed a significant hepatoprotective activity against thioacetamide induced hepatotoxicity.

- Also observed a reduction in raised levels of serum transaminase and alkaline phosphatase in response to thioacetamide induced liver damage. Hence the investigation provides biochemical evidence to validate the use of *N. jatamansi* as a component of some hepatotonic preparations used by Unani physicians<sup>[21]</sup>.
2. **Anticonvulsant Activity:** Ethanolic extract was documented from the roots of *N. jatamansi* As indicated by a reduction in the extension / flexion (E / F) ratio, jatamansi showed a substantial increase in the seizure threshold by root extract compared with a maximum electroshock seizure model. The extract was, however, ineffective against seizures caused by pentylenetetrazole (PTZ). root extract of *N. Jatamansi* also exhibited against rotarod test limited neurotoxicity at doses that raised the threshold for seizure. In addition, pretreatment of rats at doses of 12.5, 25, 50 and 75 mg / kg with phenytoin in combination with 50 mg / kg of *N. Jatamansi* root extract resulted in a substantial increase from 3.63 to 13.18 in the protective index (PI) of phenytoin. The dose response experiments on the serum phenytoin levels of phenytoin alone and in conjunction with *N.jatamansi* extract clearly demonstrated the synergistic activity of both drugs<sup>[22]</sup>.
  3. **Antidiabetic Activity:** It was stated that hydroalcoholic extracts of *N. Jatamansi* have strong anti-diabetic efficacy in diabetic rats induced by alloxan. The dose-related hydroalcoholic extract HAE1 (500mg / kg) exhibited substantial antihyperglycemic activity in diabetic rats compared to the dose-related extract HAE2 (500mg / kg) and also showed improvement in various diabetes-related parameters, such as body weight, lipid profile, histopathological studies and biochemical parameters<sup>[23]</sup>.
  4. **Antiulcer Activity:** It was reported that hydroalcoholic extract of *N. jatamansi* rhizomes possess an antiulcer activity. HAE (500 mg / kg) was administered orally to rats 60 minutes prior to ulcer induction by using the pyloric ligation method. In order to analyse the ulcer preventive ratio of the extract, volume of gastric secretion, pH of gastric juice, free acidity, total acidity and ulcer index were measured. *N. jatamansi* extract at the of (500 mg/kg) showed a significantly inhibited ulcer formation in Pyloric ligation models.<sup>[24]</sup>
  5. **Anticancer Activity:** It was stated that Methanolic extract of *Sumbul-ut-teeb* (*Nardostachys Jatamansi*) on (NJM/fractions) possess significant antiproliferative potential which is mediated through cell cycle perturbation and pro-apoptotic effects in MDA-MB-231 cells. In addition, this study illustrates NJM / fractions' antioxidant potential that can be due to the presence of phenols<sup>[25]</sup>.
  6. **Antioxidant Activity:** It was reported that hydroalcoholic extract of *Nardostachys jatamansi* (NJE) rhizomes possesses an antioxidant activity that was evaluated by various antioxidant assays, Including phosphomolybdenum antioxidant potential, total antioxidant activity in the emulsion systems of linoleic acid, 1,1-diphenyl-2-picrylhydrazyl (DPPH), superoxide, hydroxyl radicals, scavenging of nitric oxide (NO), metal chelating and reduction of power activity. Standard antioxidants such as butyl-ated hydroxytoluene, tocopherol, catechin, and L-ascorbic acid have been compared with these different

antioxidant activities. A colorimetric process was also used to assess the total phenolic and flavonoid content of NJE. The extract showed a high reduction and powerful free radical scavenging ability, particularly against DPPH and superoxide anions, as well as a moderate effect on NO. Moreover, the peroxidation inhibiting activity of NJE was demonstrated in the linoleic acid emulsion system<sup>[26]</sup>.

7. **Cardio-protective Activity:** It was reported that Rhizome shows efficacy against mitochondrial and lysosomal damage induced by doxorubicin in rats. It was observed that cardioprotective efficacy of *N. jatamansi* could be mediated possibly through its antioxidant effect as well as by the attenuation of the oxidative stress<sup>[27]</sup>.
8. **Antidepressant Activity:** It was reported that the ethanolic extract of root of *N. jatamansi* showed the antidepressant activity on whole body electron beam radiation induced depression in swiss albino mice, by using established models for depression<sup>[28]</sup>.
9. **Antihyperlipidemic Activity:** It was reported that ethanolic extract of *Sumbuluttib* possesses antihypertensive activity at the doses of 10 mg/kg. b.wt, 20 mg/kg b.wt. and 25 mg/kg b.wt. against adrenaline at the dose of 1 mcg/kg b.wt. in dogs. It was observed that the test drug produced fall in B.P. was noted, fall in B.P. was same in doses of 10 mg/kg. b.wt, 20 mg/kg. b.wt, while with the dose of 25 mg/kg. b.wt. more fall in B.P. was noted i.e. 160 mm of Hg to 130 mm of Hg. suggests that the jatamansi revealed hypotensive activity against adrenaline induced hypertension<sup>[29]</sup>.

## Conclusion

*Nardostachys jatamansi* is an important herb of traditional system of medicine consists of multiple remedies. *Nardostachys jatamansi* is recognized medicinal plant in therapeutic areas. The present paper states that the *Nardostachys jatamansi* has lots of pharmacological activities, thereby increasing the use of it. The different studies done on animals provide a significant effect of the different activities mentioned in traditional article *Nardostachys jatamansi* seems to be potential candidate for large scale clinical trials.

## Conflict of interest

There is no any conflict of interest.

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