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Jatamansi (nardostachys jatamansi): insight of its morphological, Ethno-pharmacological and therapeutical aspect

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Abstract

Plants have been use for the treatment, mitigation and cure of the disease since time immemorial. The natural recourses are considered as safe for human use. Ayurveda advocates the *Jatamansi* in various human ailments. In the present review article we tried to establish the morphological, ehno-pharmacological and therapeutic aspect of the *Jatamansi*. The various search engines like, Google scholar, EMBASE, pub med, pub med central are used to search the literary information and published article. We tried to put the facts that are demand of this article and explore the proficiency of the *Jatamansi* as panacea for various ailments.

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Introduction

Nowadays the use of medicinal plants and organic products are increased enormously due to its strong pharmacological activity and less adverse effects as compared to modern chemical drugs [1]. *Nardostachys jatamansi* a well-known ancient medicinal plant belongs to family Valerianaceae, distributed from Alpine Himalayas, Nepal to Sikkim at 3000-5000m of altitude [2]. This medicinal plant has been valued from centuries in Ayurveda classic texts. The rhizomes of this plant are used in Ayurveda system of medicine as antispasmodic, anti-epilepsy medicine [3]. Many pharmacological activities have been tested in preclinical and clinical trials on extract of *N.jatamansi* i.e. Hepatoprotective activity, Anticonvulsant activity and Antidiabetic activity etc. In this chapter we will discuss about the medicinal plant *N.jatamansi,* its vernacular names, classifications and chemical compositions with their structures and some pharmacological activities of this medicinal plant.

Synonyms - *N. grandiflora* DC [4]

Vernacular Names

Languages **Vernacular Names [5-8]**

Sanskrit: Jatamansi, Maansi, Bhutajata, Tapasvini, Sulomasha, Jatila, Nalada, Surabhi
Hindi:Balchhad, Jatamansi
English: Spikenard, Musk-root, Indian Valerian
Unani/ Arabic: Balchhar, Sumbul-e-Hindi, Sambul-ut-Teeb, Naardeen- e-Hindi
French: Nard Indian
Asamese: Jatamangshi
Bengali: Jatamamsi
Marathi: Jatamansi
Tamil/ Siddha: Sadamanchil

Classification

Botanical Classification [9]

Kingdom: Plantae
Division: Mangnoliophyta
Class: Mangnoliopsida
Order: Dipsacales
Family: Valerianaceae
Genus: Nardostachys
Species: *jatamansi*
Botanical name: *Nardostachys jatamansi* DC
Part used: Rhizome, Rhizome oil.

Ayurvedic Classification [10]

Caraka Samhita: Sanjnasthapana Mahakasya
Shuruta Samhita: Eladi Gana,
Bhavprakash Nighantu: Karpuradi Varga

Morphological Characteristics

Nardostachys jatamansi is a perennial, dwarf, hairy, rhizamatous herb with stem height 5 to 50 cm, densely covered fibrous or old leaf base remains [11].

Flower

found in cluster of small flowers sized about 4.5mm to 9mm, 5-lobed with ovate to oblong shaped and hairy outside. They are bisexual, bilateral symmetrical with purple-red corolla [11].

Leaves

linear or oblanceolate leaves are 15-18 cm long and 2.5 cm width with parallel venation, sessile, originated from both root stock and stem slightly pink or slightly blue in colour [12].

Fruit: small sized about 4mm in length, covered with white hairs and crowned with dentate calyx teeth [13].

Rhizome

Rhizomes are sized about 2.5 to 7cm in length, dark grey coloured, covered with reddish brown tufted fibres and having elongated or cylindrical shape. These rhizomes have aromatic odour and acrid, slightly bitter in taste. The fibres present on rhizome are the leaf base remains. Rhizomes can break easily and have reddish-brown colour from inside [14].

Chemical Constituents

Nardostachys jatamansi contains sesquiterpenes and coumarins as its major active constituents [15]. the principal sesquiterpene is Jatamansone or Valeranone [16].

Table 1: Chemical Constituents Part of plant herb

S. No	Part of plant herb	Chemical Constituents
1.	**Root**	Angelicin, Jatamansic acid, A-endesmol, B-eudesmol [17]
2.	**Rhizomes**	Jatamansone, 1-2% volatile oil, resin, sugar [18], starch, D-nardostachone [12], Seychellene, Seychelane, β-sitosterol [19, 20]
3.	**Oil of Roots**	Oroselol, jatamansin (terpenic coumarins) [21], Jatamanisol, Angelicin [22]

Photochemistry

Determination of Total Phenolic Content

Phenolic content establish as 53.06±2.2mgGAE/g of ethanolic extract and 13.87±1.3mgGAE/g of Hexane extract of *N.jatamans* [23]

Total Flavonoid Content

It was established 25.303±0.9mgCE/g of Ethanolic extract and 4.58±0.3mgCE/g of Hexane extract of N.jatamansi [23].

Physico-chemical Properties [24, 25]

- **Specific gravity**: 0.9300 to 0.9587 at 25°C
- **Refractive Index**: 1.5055 to 1.5458 at 25°C
- **Acid number**: 1.5 to 8.
- **Ester number**: 6 to 45.
- **Ester number after acetylation**: 40 to 65.
- **Solubility**: soluble in 0.4 to 1.5 vol. of 90% alcohol.

Table 2: Activity and Duration of Ethanolic extracts and Hexane extract of N.jatamansi

Name of activity	Dose and Duration	Observation
Anti-hyperlipidimic	Ethanolic extract 500mg/kg for 7 days	Effective on lipid metabolizing enzymes [26]
Anti-diabetic	Hydro-alcoholic extract of 500mg/kg for 7 days	Serum glucose level reduced [27]
Anti-microbial	500µg/ml-1000µg/ml dilution with Agar	Active against various species of bacteria and fungi [28]
Hepatoprotective	50% Ethanolic extract of 800mg/kg	Reduction of increased levels of serum transaminases and soluble phosphatase [29]
Memory Enhancement	Methanolic extract of 200mg/kg for 8 days	Enhanced the memory and improved learning power [30]
In vivo Anti-cancer	N butanol fraction of 95% Ethanolic Extract at 100-200mg/kg for 9 days	29.53% tumor growth rduction [31]
In vitro Anti-proliferative	95% Ethanolic extract	Observed growth inhibition in human cancer cells-71% in Lungs, 80% in liver, 73% in Ovarian and 90% in prostate cancer cells [31]
Anti-depressant	Ethanolic extract of 500mg/kg before Force Swimming test	Reduction in immobility time reduced from 4min to 80sec [32].
Anti-convulsant	Phenytoin at 12.5, 25,50 and 75mg/kg in combination with 50mg/kg *N.jatamansi* root extract	Synergistic action of both drugs observed [33]
Neuroprotective	Ethanolic extract of 250mg/ml for 15 days	Protected rats from focal ischemia caused by middle cerebral artery occlusion [33]

Uses in Ayurveda

These are some therapeutic uses of *N. jatamansi*, which have been described in various classical texts of Ayurveda viz.*Apasmara* (Epilespsy) [34], *Netra roga (Eye* Disorders) [35], *Kushta* (Leprosy) [36] , *Mukharoga* (Oral Problems) [37,38], *Khalitya* (Hair loss) [39] ,*Kandu*(Itching) [40].

Marketed Products

There are large variety of marketed products manufactured by using *N. jatamansi* and marketed by different brands in India, some of them as follows.

Table 3: different brands for *N. jatamansi*

Brand Name/Comapany Name	Product Name
VitaGreen	Jatamansi Brain Tonic Capsules
Vitawin	Jatamansi Brain Tonic Capsules
Cureveda	Stress Sheild Tablets
Foresta Organics	Sleep Health Capsules
Maharishi Ayurveda	Cardimap (Hypertension Management)Tablets
Kolmil Healthcare	Othofit Tablets
Naturoveda Organics	Botanostay Tablets
Vaddmaan	Renew Hair Capsules
Dr. Vaidya's new age ayurveda	Unmad Vati
Avalife	Daily Sleep Capsules
Maharishi Ayurveda	Blissful Sleep Tablets
Siddhayu	Winostress Tablets

Conclusion

The present evidences of available literature and various in vitro, in vivo as well as clinical studies are in strong favor that various pharmacological activities of *Jatamansi* are due its phyto-constituents. Due to the versatile action of the *Jatamnsi* is it the key ingredient of many Ayurvdic formulations whether it is classical or proprietary.

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