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

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Abstract

Plants have been use for the treatment, mitigation and cure of the disease since time immemorial. The natural resources 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, ethno-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.

Article History

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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 anti spasmodic, anti-epilepsy medicine [3]. Many pharmacological activities have been tested in preclinical and clinical trials on extract of N. jatamansi i.e. Hepatoprotective activity, Antiviral 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

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: Jatamansi
Marathi: Jatamansi
Tamil/Siddha: Sadamanchil

Classification

Botanical Classification [9]

Kingdom: Plantae
Division: Magnoliophyta
Class: Magnoliopsida
Order: Dipsacales
Family: Valerianaceae
Genus: Nardostachys
Species: Jatamansi
Botanical name: Nardostachys jatamansi DC
Part used: Rhizome, Rhizome oil.

Ayurvedic Classification [10]

Caraka Samhita: Sanjnakshapana Mahakasya
Shushruta Samhita: Eladi Gana,
Bhavaprakash Nighantu: Karpuradi Varga

Morphological Characteristics

Nardostachys jatamansi is a perennial, dwarf, hairy, rhizomatous 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 oblongate 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

<table>
<thead>
<tr>
<th>S. No</th>
<th>Part of plant herb</th>
<th>Chemical Constituents</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Root</td>
<td>Angelicin, Jatamansic acid, A-endesmol, E-endesmol [17]</td>
</tr>
<tr>
<td>2.</td>
<td>Rhizomes</td>
<td>Jatamansone, 1-2% volatile oil, resin, sugar [18], starch, D-nardostachone [12], Seychellene, Seychelane, β-sitosterol [19, 20]</td>
</tr>
<tr>
<td>3.</td>
<td>Oil of Roots</td>
<td>Oroselol, Jatamansin (terpenic coumarins) [21], Jatamanisol, Angelicin [22]</td>
</tr>
</tbody>
</table>

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.jatamansi [23]

Total Flavonoid Content It was established 25.30±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℃
- Refractive Index: 1.5055 to 1.5458 at 25℃
- 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

<table>
<thead>
<tr>
<th>Name of activity</th>
<th>Dose and Duration</th>
<th>Observation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Anti-hyperlipidemic</td>
<td>Ethanolic extract</td>
<td>Effective on lipid metabolizing enzymes [26]</td>
</tr>
<tr>
<td></td>
<td>500mg/kg for 7 days</td>
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</tbody>
</table>

Anti-diabetic Hydro-alcoholic extract of 500mg/kg for 7 days

Anti-microbial 500µg/ml-1000µg/ml dilution with Agar

Hepatoprotective 50% Ethanolic extract of 800mg/kg

Memory Enhancement Methanolic extract of 200mg/kg for 8 days

In vivo Anticancer N butanol fraction of 95% Ethanolic extract at 100-200mg/kg for 9 days

In vitro Anti-proliferative 95% Ethanolic extract

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 (Epilepsy) [34], Netra roga (Eye Disorders) [35], Kushta (Leprosy) [36], Mukharoga (oral Problems) [37,38], Khalita (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.

[128]

CODEN (CAS-USA): WJCMCF
Table 3: different brands for N. jatamansi

<table>
<thead>
<tr>
<th>Brand Name/Comapany Name</th>
<th>Product Name</th>
</tr>
</thead>
<tbody>
<tr>
<td>VitaGreen</td>
<td>Jatamansi Brain Tonic Capsules</td>
</tr>
<tr>
<td>Vitawin</td>
<td>Jatamansi Brain Tonic Capsules</td>
</tr>
<tr>
<td>Curededa</td>
<td>Stress Shield Tablets</td>
</tr>
<tr>
<td>Foresta Organics</td>
<td>Sleep Health Capsules</td>
</tr>
<tr>
<td>Maharishi Ayurveda</td>
<td>Cardimap (Hypertension Management)Tablets</td>
</tr>
<tr>
<td>Kolmil Healthcare</td>
<td>Othofit Tablets</td>
</tr>
<tr>
<td>Natuveda Organics</td>
<td>Botanostay Tablets</td>
</tr>
<tr>
<td>Vadhmaan</td>
<td>Renew Hair Capsules</td>
</tr>
<tr>
<td>Dr. Vaidya's new age ayurveda</td>
<td>Unmad Vati</td>
</tr>
<tr>
<td>Avalife</td>
<td>Daily Sleep Capsules</td>
</tr>
<tr>
<td>Maharishi Ayurveda</td>
<td>Blissful Sleep Tablets</td>
</tr>
<tr>
<td>Siddhayu</td>
<td>Winotress Tablets</td>
</tr>
</tbody>
</table>

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 *Jatamansi* it is the key ingredient of many Ayurvedic formulations whether it is classical or proprietary.

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