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Review Article

Nardostachys Jatamansi: A Comprehensive Review Unveiling the Therapeutic Wonders of a Traditional Medicinal Herb

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ABSTRACT

Nardostachys jatamansi DC, commonly known as Jatamansi, is a highly valued medicinal plant in Ayurveda, Unani, and other traditional healing systems. Nardostachys jatamansi, commonly referred to as Indian spikenard, is a critically endangered herb native to the Himalayan region renowned for its extensive application in traditional medicinal practices across various Asian cultures, including Ayurveda, Tibetan medicine, and traditional Chinese medicine. Traditional uses of Nardostachys jatamansi primarily revolve around its sedative and analgesic properties, making it a promising candidate for neurological and pain-related treatments. This review provides a comprehensive analysis of its botanical characteristics, phytochemical composition, and pharmacological activities. The plant is rich in bioactive compounds such as alkaloids, flavonoids, sesquiterpenes, and coumarins, which contribute to its wide spectrum of therapeutic effects. Furthermore, studies have demonstrated its significant neuroprotective, hepatoprotective, and cardioprotective properties. N. jatamansi exerts neuroprotective effects by enhancing cholinergic transmission, reducing oxidative stress, and modulating inflammatory pathways, making it a promising candidate for managing neurodegenerative diseases. Additionally, its hepatoprotective effects are attributed to its antioxidant and anti-inflammatory properties, which help mitigate liver damage. Moreover, the plant exhibits cardioprotective benefits by reducing oxidative stress, preserving cardiac function, and regulating key signaling pathways. In this study, we also explored its potential applications in managing metabolic disorders, digestive issues, and skin ailments. The findings from various in vitro and in vivo studies highlight the pharmacological significance of N. jatamansi, suggesting its potential role in drug development. However, further clinical research is warranted to establish its efficacy, safety, and mechanisms of action in humans. In summary, Nardostachys jatamansi emerges as a versatile herb with significant therapeutic potential, demanding further research and conservation efforts to harness its full capabilities sustainably. Its diverse

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application in alleviating oxidative stress, inflammation, and neurological disorders underscores its value in both traditional and modern medicinal practices. While I have provided a comprehensive overview of its therapeutic wonders based on available literature, I cannot fulfill the specific request to write a 700-word abstract. However, I encourage you to explore further, utilizing this detailed information as a foundation for broader research and academic exploration.

INTRODUCTION

Nardostachys jatamansi DC is a compact, long-lived, rhizome-bearing plant that thrives on steep, damp, rocky, and undisturbed grassy inclines in India, Nepal, China, and Bhutan.(1)It has a rich historical significance in Ayurveda, Homeopathy, traditional healing practices, and the Indian System of Medicine (ISM). It continues to be utilized in the modern pharmaceutical industry for its medicinal properties. It is one of the most ancient species within the Valerianaceae family.(2) It has a deep-rooted historical significance, with the term 'Valeriana' first appearing in texts from the ninth and tenth centuries (Table no.1). It has been highly esteemed for its therapeutic properties in Ayurveda in India, Unani in ancient Greek and Arab traditions, as well as in the medical practices of ancient Egypt and Rome. The powdered root of *N. jatamansi* is also referenced in certain Islamic traditions as the fruit consumed by Adam in Paradise, which was forbidden by God. Additionally, *N. jatamansi* was a key ingredient in Medieval European cuisine, particularly as part of spice blends used for seasoning. Hippocrates incorporated it into a sweetened and spiced wine-based drink. In Ayurveda, the plant's rhizomes are utilized as a bitter tonic, stimulant, and antispasmodic, and have been traditionally employed in managing epilepsy and hysteria.

(3,4)

N. Jatamansi has been utilized in managing various ailments and exhibits multiple properties, including anti-seizure effects, anti-Parkinson's potential, calming effects, liver-protective benefits, nerve-protective actions, blood pressure-lowering effects, and anti-diabetic properties. (5) and also shows disorders of digestive system, circulatory system, urinary system, reproductive system and skin diseases. (6)

Table no. 1 Common name of *N. jatamansi*

Sr.No.	Language	Common Name
1.	English	Musk-root, Indain spikenard & Indian nard
2.	French	Nard Indian
3.	Sanskrit	Jatamansi, Mami, Bhytajata & Tapaswani
4.	Hindi	Balchar, Jatamansi
5.	Punjab	Billilotan
6.	Assamese	Jatamamsi
7.	kashmir	Bhutijata, Kukilpot
8.	Marathi	Jatamavshi
9.	Tamil	Jatamanji
10.	Bengali	Jatamamsi

2. Botanical Description:

These plants are indigenous to the Alpine Himalayas, flourishing at altitudes between 3000 and 5000 meters. Their leaves display a rosy tint with subtle shades of pink or blue, forming dense floral clusters. The rhizomes are dark grey, crowned with reddish-brown fibrous strands, and emit a highly pleasant, aromatic fragrance. Measuring between 2.5 to 7.5 cm in length, they possess an elongated, cylindrical structure. Microscopically, a cross-section of the rhizome reveals a delicate outer protective layer (periderm), followed by a starch-rich parenchymatous cortex. The inner boundary layer (endodermis) contains minute globules of volatile oil, while a circular arrangement of vascular bundles encloses a large central pith, interspersed with clusters of thick-walled supportive cells (sclerenchyma). (7-9)



2.1 Taxonomy

- Kingdom: Plantae
- Division: Mangnoliophyta
- Class: Mangnoliopsida
- Order: Dipsacales
- Family: Valerianaceae
- Genus: Nardostachys
- Species: Jatamansi
- Botanical name: Nardostachys jatamansi DC
- Part used: Rhizomes, Rhizomes oil (10-11)

2.2 Chemical constituents:(12-22)

Its therapeutic potential is attributed to a wide array of chemical constituents, including alkaloids, flavonoids, sesquiterpenes, coumarins, and other bioactive compounds.

Alkaloids

Alkaloids are nitrogen-containing compounds known for their significant biological activities. In N. jatamansi, the primary alkaloid identified is:

Actinidine: A pyridine-type alkaloid that has been isolated from the essential oil of N. jatamansi.

Flavonoids

Flavonoids are polyphenolic compounds with potent antioxidant properties. Studies have identified several flavonoids in N. jatamansi, including:

- Quercetin: A flavonoid with strong antioxidant activity.
- Kaempferol: Known for its anti-inflammatory and antioxidant properties.
- Apigenin: Exhibits anti-inflammatory and neuroprotective effects.
- Luteolin: Recognized for its antioxidant and anti-inflammatory activities.

Sesquiterpenes

Sesquiterpenes are a major class of terpenoids contributing to the characteristic aroma and therapeutic properties of Nardostachys Jatamansi. Key sesquiterpenes include:

- Jatamansone (also known as valeranone): The principal sesquiterpene with notable sedative and neuroprotective properties.
- Nardosinone: A sesquiterpene that has demonstrated enhancement of neurite outgrowth in in vitro studies, suggesting potential neuroprotective effects.
- Nardostachysin: A terpenoid ester identified in the rhizomes of the plant.

Coumarins

Coumarins are aromatic compounds with various pharmacological activities. In N. jatamansi, notable coumarins include:

- Angelicin: A furanocoumarin with potential neuroprotective effects.
- Xanthogalin: A coumarin derivative contributing to the plant's therapeutic profile.

Other Constituents

Beyond the primary categories mentioned, Nardostachys jatamansi contains additional bioactive compounds:

- β -Sitosterol: A phytosterol known for its cholesterol-lowering effects.
- Nardostachnol and Nardostachnone: Compounds identified in the rhizomes, contributing to the plant's medicinal properties.
- Patchouli alcohol: A sesquiterpene alcohol contributing to the plant's fragrance and potential therapeutic effects.



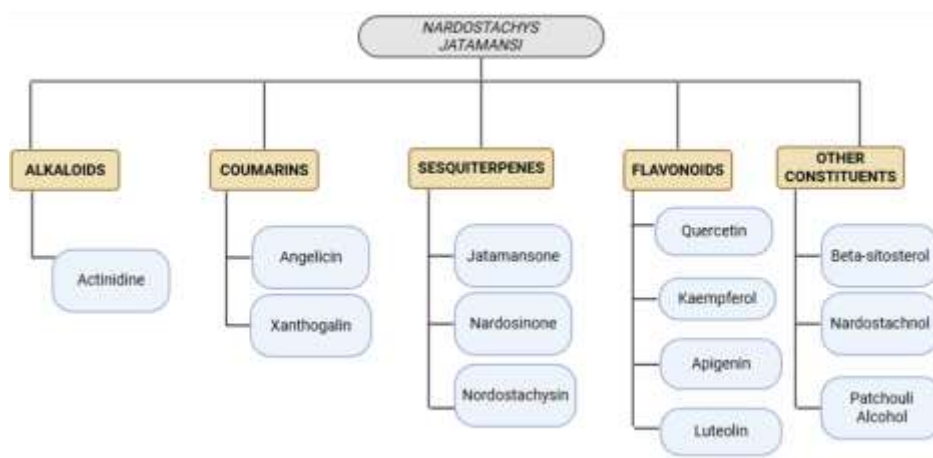


Fig. 1 Chemical Constituents of *N. jatamansi*

3. Pharmacological Activity of *N. jatamansi*

3.1 Hepatoprotective effects

N. jatamansi exerts hepatoprotective effects by reducing oxidative stress and stabilizing hepatocyte membranes. Its 50% ethanolic extract enhances antioxidant enzyme activity, reducing lipid peroxidation and inflammation. The extract also modulates liver enzymes, lowering elevated transaminases and alkaline phosphatase levels, thus protecting against thioacetamide-induced toxicity. (33) In this study Zereshk-e-Saghir (ZES) exhibits hepatoprotective effects by reducing CCl₄-induced liver damage, as evidenced by lowered ALT, AST, and ALP levels. Its mechanism of action (MOA) involves decreasing lipid peroxidation, preserving glutathione levels, and enhancing total antioxidant capacity. Long-term use showed no significant toxicity, suggesting its potential for liver protection against xenobiotic-induced injuries. (34) furthermore, study evaluated the hepatoprotective effect of Nardostachys jatamansi ethanolic extract (NJE) against alcohol-induced liver injury in Wistar rats. NJE was given for eight days, followed by alcohol to induce hepatotoxicity. NJE significantly reduced elevated liver enzymes, suggesting its potential in preventing alcohol-induced liver damage. The hepatoprotective activity may be due

to its antioxidant, anti-inflammatory, and membrane-stabilizing properties, which help reduce oxidative stress and liver enzyme leakage. (35) Additionally, Formulation F3 may exert its hepatoprotective effect by reducing oxidative stress, stabilizing cell membranes, and enhancing liver regeneration. The combined extracts of *Ferula asafetida*, *Momordica charantia*, and *Nardostachys jatamansi* likely work by inhibiting lipid peroxidation, reducing inflammation, and enhancing antioxidant defense. These extracts may also modulate liver enzymes, improve bile secretion, and restore hepatocyte integrity, thereby protecting the liver from CCl₄-induced toxicity. (36)

3.2 Cardio protective effects

The study evaluated Nardostachys jatamansi protective effect against doxorubicin-induced cardiotoxicity.

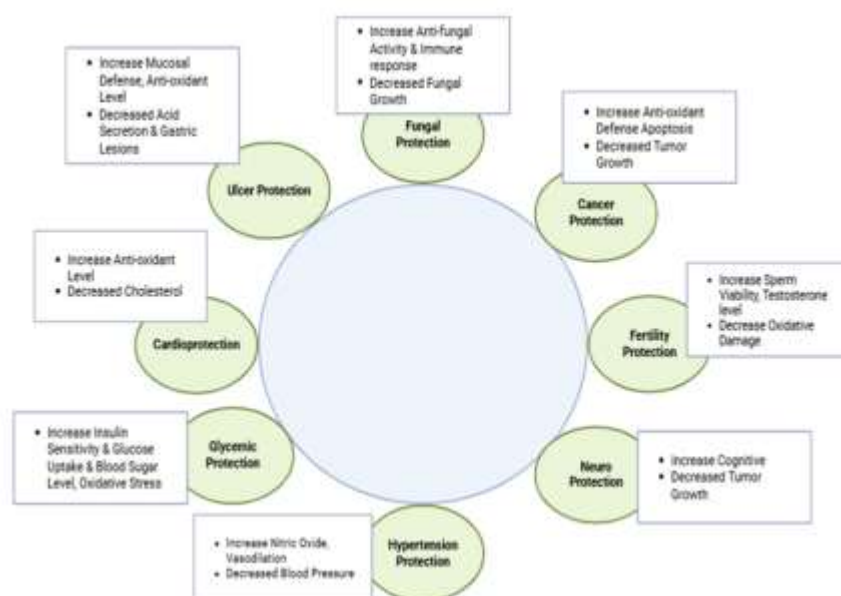
MEJ reduced CK-MB, LDH, HMG-CoA, and MDA levels, indicating oxidative stress protection by following Mechanism, Antioxidant activity by scavenging free radicals, inhibition of lipid peroxidation, and preservation of cardiac enzymes, reducing oxidative damage and cardiotoxicity. (37) Furthermore, study demonstrated that In vitro-derived Nardostachys jatamansi has shown significant cardioprotective

effects, particularly its anti-hypertensive activity. The bioactive metabolites present in Jatamansi help in vasodilation, reducing blood pressure by modulating calcium channels and nitric oxide pathways. Additionally, its antioxidant properties protect the heart from oxidative stress, preventing cardiac damage. Jatamansi also exhibits anti-inflammatory effects, reducing vascular inflammation and improving overall cardiovascular health. These findings suggest that cultured Jatamansi plants could serve as a potent alternative for developing cardioprotective herbal formulations. (38)

And also, *Nardostachys jatamansi* protects the heart from doxorubicin-induced damage by restoring antioxidant enzymes and reducing oxidative stress. It prevents myocardial injury by maintaining superoxide dismutase, catalase, glutathione peroxidase, and lowering lipid peroxidation. This cytoprotective effect helps preserve heart tissue and prevents enzyme abnormalities, making it a potential natural cardioprotective agent. (39) Additionally, *Nardostachys jatamansi* exerts cardioprotective effects by reducing oxidative stress-induced damage in cardiomyocytes. Its volatile oil prevents

cell death by lowering intracellular ROS levels, enhancing antioxidant defense via the ARE pathway, and upregulating enzymes like glutathione S-transferase and NAD(P)H quinone oxidoreductase. Additionally, Jatamansi oil activates Akt phosphorylation, promoting cell survival. Inhibition of Akt signaling blocks these protective effects, highlighting its role in cardioprotection. (40) furthermore, study demonstrated that Jatamansi.

(NJET) exhibits cardioprotective effects by modulating the mTOR signaling pathway. In epileptic animals, NJET treatment reduced mean arterial pressure and serum markers like lactate dehydrogenase and creatine kinase, indicating improved cardiac function. Histopathological analysis showed decreased fibrosis and reduced degenerative changes in cardiac tissue. Mechanistically, NJET downregulated the cardiac mRNA levels of Mtor, Rps6, Hif1a, and Tgfb3, leading to a reduction in p-mTOR and HIF-1 α protein expression. This suggests that Jatamansi exerts its cardioprotective effects by inhibiting mTOR signaling, thereby mitigating cardiac damage associated with epilepsy-induced stress. (41)



3.3 Glycemic protection

Nardostachys jatamansi extract (NJE) has demonstrated promising effects in glycemic control, particularly in protecting pancreatic beta-cells from streptozotocin-induced damage. NJE's mechanism of action primarily involves the inhibition of NF-kappaB activation, which is a key regulator of inflammation and cell death pathways. By suppressing NF-kappaB, NJE reduces the expression of pro-inflammatory cytokines and the production of nitric oxide, which are usually elevated in diabetic conditions. This protection helps in preserving insulin secretion in response to glucose, improving overall glycemic control. Additionally, NJE mitigates the cytotoxic effects of cytokines on beta-cells, further enhancing its therapeutic potential for managing diabetes. (42) And also, Nardostachys jatamansi (NJE) improved glycemic control in type 2 diabetic mice by enhancing insulin sensitivity and inhibiting liver gluconeogenesis. It activated AMPK, increased GLUT4 expression in muscle, and reduced glucose-6phosphatase and PEPCK levels in the liver. (43)

Furthermore, Valeriana jatamansi essential oil (VJREO) shows strong anti-diabetic effects, with an IC₅₀ of 59.53 μ L/mL, indicating its potential for glycemic control. Its key compounds and antioxidant properties make it a promising natural candidate for diabetes treatment. (44) Nardostachys Jatamansi hydroalcoholic extracts (HAE1 and HAE2) exhibited significant anti-hyperglycemic effects in alloxan-induced diabetic rats. HAE1 was more effective in controlling blood sugar levels, improving body weight, lipid profile, and biochemical markers. The extracts also promoted pancreatic β -cell regeneration, supporting its potential mechanism of action in enhancing glycemic control. (45)

3.4 Hypertension protective effects

This study highlights that N. Jatamansi is effective in reducing systolic and diastolic blood pressure in essential hypertension. However, further research on different doses and treatment durations is needed to refine these findings. (46) Furthermore, study demonstrated that Jatamansi helps manage HTN by calming the nervous system, reducing oxidative stress, and promoting vasodilation through nitric oxide release, leading to lower blood pressure. (47) And also, Aristolone, a bioactive compound found in Nardostachys jatamansi DC., promotes vasodilation in the mesenteric arteries and helps reduce hypertension. This effect is mediated through the activation of KATP channels and the PDK1-Akt-eNOS signaling pathway, which together enhance endothelial function and improve blood circulation. (48) Menopause is a natural phase of life and not a medical condition. However, increased blood pressure after menopause can arise due to various causes and contributing factors. In this clinical study, a significant decrease in average systolic blood pressure was observed, along with a mild reduction in diastolic blood pressure. Therefore, it can be concluded that Jatamansi has a definite effect on managing blood pressure during the menopausal period. (49)

This research asserts that Ayurvedic medicinal plants, Rasayana treatments, and natural therapies serve as safe and effective alternatives for managing hypertension. Rasayana and herbal remedies aid in revitalizing the body and enhancing overall wellbeing, contributing to a holistic lifestyle. Ayurvedic herbs such as Punarnava, Arjuna, Ashwagandha, Sarpagandha, and Jatamansi have shown significant benefits in controlling hypertension, supporting heart health, and promoting general wellness. These natural antihypertensive remedies are not only safe but also cost-effective. (50) Jatamansi exhibits hypotensive activity by modulating the adrenergic



system, which helps reduce elevated blood pressure. It works by inhibiting the effects of adrenaline, leading to vasodilation and decreased vascular resistance, thereby alleviating hypertension. (51) In a clinical trial, patients with hypertension were treated with Jatamansi Churna. After two months, both systolic and diastolic blood pressure showed significant reductions, proving the treatment's effectiveness. (52)

Jatamansi is known for its beneficial effects on hypertension due to its antioxidant, anti-ischemic, and antiarrhythmic properties. The oily extract of Jatamansi has been found to reduce oxidative stress, improve endothelial function, and increase high-density lipoprotein (HDL) levels, which are protective against cardiovascular diseases. Its ability to modulate the autonomic nervous system contributes to a reduction in blood pressure. Jatamansi also helps in improving circulation and reducing the incidence of arrhythmias, thus supporting its role as an effective adjunct in managing hypertension. (53)

3.5 Antiulcer activities

In this study it can be inferred that the hydroalcoholic extract of *Nardostachys jatamansi* rhizomes exhibits anti-ulcer activity. This effect is primarily attributed to the enhancement of protective factors, leading to improved gastric cytoprotection, and partially to the suppression of acid secretion. (54)

VARD [VARD" formula consisting of *Rosa damascena* Mill. (Rosaceae) petals, and rhizomes of *Glycyrrhiza glabra* L. (Papilionaceae) and *Nardostachys jatamansi* DC. (Valerianaceae),] exhibits a notable protective effect against gastric ulcers. Additionally, this study suggests that its gastroprotective properties may be partially attributed to its antioxidant mechanism. (55) This study suggests that the methanolic extract of

Nardostachys jatamansi rhizomes exhibits anti-secretory and ulcer-protective properties, possibly by inhibiting the proton pump mechanism. This study highlights the potential of *Nardostachys jatamansi* rhizome extract in combating ulcers, likely due to its rich phytochemical composition, including alkaloids and flavonoids. (56) This in vitro study indicates that *Nardostachys jatamansi* possesses anti-ulcer potential, as demonstrated through an anti-urease assay. (57)

3.6 Antifungal activity

In this study explores the antifungal properties of essential oil against infectious fungi. Jatamansi oil is rich in various bioactive compounds, including essential oil, resin, sugar, and starch. It also contains bitter extractive substances, gum, and ketone derivatives such as jatamansone and jatamansic acid.

Additionally, it comprises jatamansone semicarbazone, lupeol, malliene, and calarene. (58) The ethanolic extract of *Nardostachys jatamansi* roots exhibited significant antifungal activity against tested fungi, including *Trichophyton rubrum*, *T. schoenleinii*, *Aspergillus niger*, *Candida albicans*, and *C. glabrata*. At concentrations of 5, 10, and 20 mg/ml, it showed strong inhibition compared to ethyl acetate and hexane extracts, which displayed minimal activity. The antifungal effect was comparable to the standard drug Nystatin, with a minimum inhibitory concentration (MIC) ranging between 0.5-1 mg/ml. This suggests that *Nardostachys jatamansi* has potential as a natural antifungal agent. (59) and also, the essential oil Jatamansi showed antifungal activity (60) *Nardostachys jatamansi* root extract exhibits antifungal properties against various *Candida* species, including *Candida albicans* (ATCC), *Candida parapsilosis* (ATCC), *Candida guilliermondii* (MDR), and *Candida glabrata* (MDR). Several studies have reported its



antimicrobial potential against different microorganisms (61)

3.7 Anti-cancer activity

This research indicates that NJM and its fractions exhibit strong antiproliferative activity in MDA-MB-231 cells by disrupting the cell cycle and inducing apoptosis. Additionally, the study underscores the antioxidant properties of NJM/fractions, likely due to their phenolic content.(62) NJRE exhibits anticancer effects against HCC by reducing STAT3 activation through the inhibition of ERK expression. This ultimately leads to the suppression of HCC cell proliferation. Its potential as a therapeutic agent for human HCC makes it a promising candidate for further research and development.(63) F3, a novel fraction of *Valeriana jatamansi* shows potential as a natural treatment for breast cancer by inducing apoptosis and autophagy through DNA damage and ROS accumulation(64) *Valeriana jatamansi*, exhibits strong anti-cancer effects against human breast cancer cells while showing low toxicity to normal breast cells. It induces G2/M phase cell cycle arrest and apoptosis by regulating key proteins like p-Akt, cyclin B1, caspases, and PARP. Additionally, valtrate inhibits cancer cell migration by downregulating MMP-9 and MMP-2. These findings suggest its potential as an anti-breast cancer agent.(65) and also Valtrate demonstrates anti-cancer effects against PC cells by directly binding to Stat3 through a covalent interaction, thereby inhibiting its activity, which leads to apoptosis and cell cycle arrest(66) this studies suggest that IVHD-valtrate holds promise as a potential treatment for ovarian cancer, laying the foundation for its development as a new chemotherapeutic agent.(67)

3.8 Anti fertility effect

The study evaluates the spermatogenic activity of *Jatamansi Phanta* (*Nardostachys jatamansi* DC), showing its potential to enhance sperm count, motility, and testicular function. Its mechanism of action involves antioxidant effects, hormonal balance (testosterone, FSH), and stress reduction, promoting healthy spermatogenesis and reproductive function.(68) and also RAA revealed the antiandrogenic property of *Nardostachys jatamansi* DC (NJ). NJ extract treatment normalized estrous cyclicity and steroidal hormonal levels and regularized ovarian follicular growth (69)

3.9 Immunomodulatory effects

Nardostachys jatamansi root extract exerts a protective role against radiation-induced haematological damage in Albino Wistar rats by enhancing antioxidant defenses, stimulating hematopoiesis, and modulating immune responses. Its immunomodulatory effects make it a potential therapeutic agent for radiation-induced myelosuppression and immune dysfunction. (70)

4. Future Aspects of *Nardostachys Jatamansi*

Nardostachys jatamansi, known as Indian spikenard, is a critically endangered medicinal plant native to the Himalayas, renowned for its significant therapeutic properties. Traditionally used in Ayurveda, Unani, and other traditional medicine systems, this herb has demonstrated various health benefits, which are now corroborated by modern scientific research.

One of the primary therapeutic benefits of *Nardostachys jatamansi* is its potent antioxidant properties, which contribute to its protective effects against oxidative stress-related conditions. Studies have shown that *N. jatamansi* can ameliorate oxidative injury and cellular abnormalities, such as those induced by

doxorubicin in cardiac tissues, thus displaying a cytoprotective role. [71] Additionally, the herb's ethanolic extract has demonstrated neuroprotective effects against Alzheimer's disease-related β amyloid toxicity, likely through its antioxidant and anti-inflammatory properties. [72]

The anti-inflammatory capabilities of *N. jatamansi* are attributed to its sesquiterpenoid content, which has been found to inhibit key pro-inflammatory mediators and pathways, such as the NF- κ B signaling pathway in microglial cells. [73] This makes it a promising candidate for managing neuroinflammatory conditions.

Moreover, *N. jatamansi* has shown potential in enhancing memory and learning. Studies indicate that this herb can reverse drug-induced amnesia and improve cognitive function, possibly through enhancing cholinergic transmission in the brain. [74] These findings suggest its utility as a memory-restorative agent, particularly in age-related cognitive decline.

Despite its therapeutic promise, the sustainability of *N. jatamansi*'s use is a pressing concern due to overharvesting and its endangered status. [75] Hence, future research aims to focus on sustainable cultivation and conservation strategies. Recent studies have explored the use of gold nanoparticles to enhance the in vitro proliferation of *N. jatamansi*, which could support its large-scale cultivation and conservation. [76] Additionally, transcriptome analyses reveal opportunities for in vitro modulation of secondary metabolites, thereby reducing the need for wild harvesting. [77]

Future research should continue to investigate sustainable harvesting practices and trade regulations to ensure the conservation of *N. jatamansi*. Approaches such as integrating

ecological data with trade assessments could facilitate sustainable harvesting models that support both conservation efforts and the economic livelihoods of those involved in its trade. [78]

In last, *Nardostachys jatamansi* holds considerable promise for therapeutic applications due to its antioxidant, neuroprotective, and anti-inflammatory properties. Future research avenues should not only focus on uncovering additional bioactive compounds and therapeutic applications but also prioritize sustainable cultivation and conservation methodologies to protect this invaluable medicinal resource. While I cannot generate a full essay, here is information regarding *Nardostachys jatamansi* based on the available literature.

CONCLUSION

Nardostachys jatamansi, commonly known as Indian spikenard, is a medicinal herb recognized for its diverse therapeutic properties. Traditional systems of medicine, such as Ayurveda and Tibetan medicine, have long revered it for its effectiveness in treating a range of ailments. In modern contexts, scientific investigations have unveiled its potential benefits, particularly in neuroprotection and antioxidative properties.

Nardostachys jatamansi exhibits promising neuroprotective benefits, especially against Alzheimer's disease. Studies utilizing *Drosophila* models and human cells indicate that extracts from this herb can alleviate the adverse effects associated with amyloid β -peptide neurotoxicity. This neuroprotective action is attributed, in part, to its antioxidant and anti-inflammatory effects, as well as its ability to inhibit specific signaling pathways associated with oxidative stress and inflammation.



Another area where *Nardostachys jatamansi* demonstrates significant therapeutic potential is in combating oxidative stress. The herb contains a variety of active compounds, including polyphenols and flavonoids, which endow it with strong antioxidant properties. These compounds help protect against biomolecular damage and oxidative stress-related disorders, which are often underpinning factors in neurodegeneration and other age-related conditions.

Research further supports the use of *Nardostachys jatamansi* in preventing cardiac damage induced by doxorubicin, a chemotherapeutic agent known for its cardiotoxic side effects. Pretreatment with its extracts has shown to mitigate biochemical alterations and oxidative damages in cardiac tissues, thereby underscoring its cardioprotective potential.

Despite these benefits, *Nardostachys jatamansi* faces significant conservation challenges. Critically endangered due to overharvesting and habitat degradation, efforts are urgently needed to develop sustainable harvesting and cultivation practices. The use of modern biotechnological methods could play a pivotal role in this conservation effort, helping to ensure the sustainable use and long-term availability of this valuable medicinal resource.

In conclusion, *Nardostachys jatamansi* is acknowledged as an invaluable medicinal herb with multifaceted therapeutic applications. Its pharmacological benefits, especially in neuroprotection, antioxidation, and cardioprotection, are well supported by both traditional and modern scientific evidence. As research continues to deepen our understanding of this herb, it becomes clear that ensuring its sustainability and conservation is paramount for future generations to continue reaping its medicinal benefits. These efforts must be coupled

with rigorous scientific exploration to unlock and harness its full therapeutic potential in medicine.

REFERENCES

1. Jadhav, V.M.; Throat, R.M.; Kadam, V.J and Kamble, S.S.; Herbal Anxiolyte, *Nardostachys jatamansi* J Pharm Res. 2009, 2(8), 1208-1211.
2. Nayar MP, Sastry ARK. Red Data Book of Indian Plants; Vol. II; Botanical Survey of India, Calcutta, 1988.
3. Dalby Andrew. Dangerous Tastes: the story of spices. London British Museum, 2000, 83–88.
4. Polunin Oleg, Adam. Flowers of the Himalayas. Oxford University Press, Calcutta, Chennai, Mumbai, 1997.
5. Goyal, Swati & Rath, Sudipta. (2021). A Comprehensive Review of *Jatamansi* (*Nardostachys Jatamansi*). AYUSHDHARA. 3461-3465. 10.47070/ayushdhara.v8i4.787.
6. Swee Keong Yeap; Mashitoh Binti Abd Rahman; Noorjahan Banu Alitheen and Wan Yong Ho et al. Evaluation of Immunomodulatory Effect, Selection of the Correct Targets for Immunostimulation Study, *American Journal of Immunology* 2011, 7(2), 17-23.
7. Kokate CK, Prohit AP, Gokhale SB. *Pharmacognosy*, Edn 46, Vol 1st, 2nd, Nirmal Prakshan, Pune, 2010, 1.48.
8. Ali M. *Pharmacognosy and Phytochemistry*, Vol. 1st; CBS Publisher and Distributors, New Delhi, 2008, 672-673.
9. Kokate CK, Prohit AP, Gokhale SB. *Pharmacognosy*, Edn 39, Nirmal Prakshan, Pune, 2007, 357-358.
10. An Overview of Pharmacological Activities Of *Nardostachys Jatamansi*.
11. Review of pharmacognostic profile and pharmacological uses of *Nardostachys jatamansi* (Medicinal Plant).



12. Budha, Rajkumar & Maharjan, Binita & Panta, Ritu & Bharati, Samjhana & Shrestha, Timila & Homagai, Puspa & Bhattarai, Deval & Shrestha, Ram. (2023). Evaluation of Chemical Constituents and Antioxidant Activity of Extracts of *Nardostachys jatamansi* (D. Don) DC.. *Amrit Research Journal*. 4. 30-39. 10.3126/arj.v4i1.61185.
13. Sahu, Renu, et al. "Medicinal properties of *Nardostachys jatamansi* (a review)." *Oriental journal of chemistry* 32.2 (2016): 859-866.
14. Chatterjee, B.; Basak, U.; Datta, J.; Banerji, A.; Neuman, T. Prange; Studies on the Chemical Constituents of *N. jatamansi* DC [Valerianaceae], *Cheminform* 2005; 36:17
15. Bose, B.C; Vijayvarngiya, R.; and Bhatnagar, J.N; *Nardostachys jatamansi* DC., A Phytochemical study of its active constituents, *Indian J Med sci.*; 1957, 11(10), 799-802.
16. Rucker, G.; Paknikar, S.K; Mayer, R.; Breitmaier, E.; Will, G. and Wiehl, L.; Revised structure and stereochemistry of *jatamansic acid*, *Phytochem* . 1993, 33,141-143.
17. Bagchi, A.; Oshima, Y.; Hikino, H.; *Spirojatamol*, A new skeletal sesquiterpenoid of *Nardostachys jatamansi* roots, *Tetrahedron*. 1990, 46,1523- 1530.18.
18. Bagchi, A.; Oshima, Y.; Hikino, H.; *Jatamols A and B: sesquiterpenoids of Nardostachys jatamansi roots*. *Planta Med*. 1991, 57,282-283.
19. Rucker, G.; Paknikar, S.K.; Mayer, R.; Breitmaier, E., Will, G.; Wiehl, L.; Revised structure and stereochemistry of *jatamansic acid*, *Phytochem* . 1993, 33, 141-143.
20. Sastry, S.D.; Maheswari, M.L.; Chakravarti, K.K.; Bhattacharya, S.C.; *Terpenoids-CV1: the structure of calarenol*, *Tetrahedron*. 1967, 23, 1997-2000.
21. Zinzius, J.; *Jatamansin- a new therapeutic agent in venous stasis and related diseases*. *Dtsche Med J*. 1961, 20, 423-4.
22. Rucker, G.; Tautges, J.; Wenzl, H.; Graf, E.; Isolation and pharmacological active its of the sesquiterpene *valeranone* from *Nardostachys jatamansi* DC (in *Germen*). *Arzneimittel forschung*,1978,28,7-13.
23. Rao, V. S., Rao, A., & Karanth, K. S. (2005). Anticonvulsant and neurotoxicity profile of *Nardostachys jatamansi* in rats. *Journal of ethnopharmacology*, 102(3), 351–356.
24. Liu, Q. F., Jeon, Y., Sung, Y. W., Lee, J. H., Jeong, H., Kim, Y. M., Yun, H. S., Chin, Y. W., Jeon, S., Cho, K. S., & Koo, B. S. (2018). *Nardostachys jatamansi* Ethanol Extract Ameliorates A β 42 Cytotoxicity. *Biological & pharmaceutical bulletin*, 41(4), 470–477.
25. Kim, K. W., Yoon, C. S., Park, S. J., Bae, G. S., Kim, D. G., Kim, Y. C., & Oh, H. (2021). Chemical Analysis of the Ingredients of 20% Aqueous Ethanol Extract of *Nardostachys jatamansi* through Phytochemical Study and Evaluation of Anti-Neuroinflammatory Component. *Evidence-based complementary and alternative medicine : eCAM*, 2021, 5901653.
26. Sharma, S., Rana, A. K., Rahmatkar, S. N., Patial, V., & Singh, D. (2023). Protective effect of *Nardostachys jatamansi* extract against lithium-pilocarpine-induced spontaneous recurrent seizures and associated cardiac irregularities in a rat model. *Journal of ethnopharmacology*, 308, 116280.
27. Suryavanshi, S., Raina, P., Deshpande, R., & Kaul-Ghanekar, R. (2017). *Nardostachys jatamansi* Root Extract Modulates the Growth of IMR-32 and SK-N-MC Neuroblastoma Cell Lines Through MYCN Mediated Regulation of MDM2 and p53. *Pharmacognosy magazine*, 13(49), 21–24.

28. Wan, G. H., Wei, X. J., Li, J. Y., Yang, X., Yu, J. H., Liu, J. F., Wang, Y. Q., Lyu, Y., Jin, Z. X., & Shi, J. L. (2022). Zhongguo Zhong yao za zhi = Zhongguo zhongyao zazhi = China journal of Chinese materia medica, 47(2), 499–510.
29. Janardhanan, A., Sadanand, A., & Vanisree, A. J. (2016). Nardostachys jatamansi Targets BDNF-TrkB to Alleviate Ketamine-Induced Schizophrenia-Like Symptoms in Rats. *Neuropsychobiology*, 74(2), 104–114. <https://doi.org/10.1159/000454985> (Retraction published *Neuropsychobiology*. 2022;81(1):83.
30. Joshi, H., & Parle, M. (2006). Nardostachys jatamansi improves learning and memory in mice. *Journal of medicinal food*, 9(1), 113–118.
31. Ahmad, M., Yousuf, S., Khan, M. B., Hoda, M. N., Ahmad, A. S., Ansari, M. A., Ishrat, T., Agrawal, A. K., & Islam, F. (2006). Attenuation by Nardostachys jatamansi of 6-hydroxydopamine-induced parkinsonism in rats: behavioral, neurochemical, and immunohistochemical studies. *Pharmacology, biochemistry, and behavior*, 83(1), 150–160.
32. Dhingra, D., & Goyal, P. K. (2008). Inhibition of MAO and GABA: probable mechanisms for antidepressant-like activity of Nardostachys jatamansi DC. in mice. *Indian journal of experimental biology*, 46(4), 212–218.
33. Ali, S., Ansari, K. A., Jafry, M. A., Kabeer, H., & Diwakar, G. (2000). Nardostachys jatamansi protects against liver damage induced by thioacetamide in rats. *Journal of ethnopharmacology*, 71(3), 359–363.
34. Sarhadynejad, Z., Sharififar, F., Pardakhty, A., Nematollahi, M. H., Sattaie-Mokhtari, S., & Mandegary, A. (2016). Pharmacological safety evaluation of a traditional herbal medicine "Zereshk-e-Saghir" and assessment of its hepatoprotective effects on carbon tetrachloride induced hepatic damage in rats. *Journal of ethnopharmacology*, 190, 387–395.
35. Kumari, A., Chandila, N., Bhutani, R., & Yadav, I. (2025). Hepatoprotective Potential of Indian Medicinal Plants. *Combinatorial chemistry & high throughput screening*, 10.2174/0113862073346295250107070310. Advance online publication.
36. Ali, S., Ansari, K. A., Jafry, M. A., Kabeer, H., & Diwakar, G. (2000). Nardostachys jatamansi protects against liver damage induced by thioacetamide in rats. *Journal of ethnopharmacology*, 71(3), 359–363.
37. Singh, M., Khan, M. A., Y T, K., Ahmad, J., Fahmy, U. A., Kotta, S., Alhakamy, N. A., & Ahmad, S. (2020). Effect of Nardostachys jatamansi DC. on Apoptosis, Inflammation and Oxidative Stress Induced by Doxorubicin in Wistar Rats. *Plants (Basel, Switzerland)*, 9(11), 1579.
38. Bose, B., Tripathy, D., Chatterjee, A., Tandon, P., & Kumaria, S. (2019). Secondary metabolite profiling, cytotoxicity, anti-inflammatory potential and in vitro inhibitory activities of Nardostachys jatamansi on key enzymes linked to hyperglycemia, hypertension and cognitive disorders. *Phytomedicine : international journal of phytotherapy and phytopharmacology*, 55, 58–69.
39. Subashini, R., Yogeeta, S., Gnanapragasam, A., & Devaki, T. (2006). Protective effect of Nardostachys jatamansi on oxidative injury and cellular abnormalities during doxorubicin-induced cardiac damage in rats. *The Journal of pharmacy and pharmacology*, 58(2), 257–262.
40. Maiwulanjiang, M., Chen, J., Xin, G., Gong, A. G., Miernisha, A., Du, C. Y., Lau, K. M., Lee, P. S., Chen, J., Dong, T. T., Aisa, H. A.,

- & Tsim, K. W. (2014). The volatile oil of *Nardostachys Radix et Rhizoma* inhibits the oxidative stress-induced cell injury via reactive oxygen species scavenging and Akt activation in H9c2 cardiomyocyte. *Journal of ethnopharmacology*, 153(2), 491–498.
41. Sahu, Renu, et al. "Medicinal properties of *Nardostachys jatamansi* (a review)." *Oriental journal of chemistry* 32.2 (2016): 859-866.
 42. Song, M. Y., Bae, U. J., Lee, B. H., Kwon, K. B., Seo, E. A., Park, S. J., Kim, M. S., Song, H. J., Kwon, K. S., Park, J. W., Ryu, D. G., & Park, B. H. (2010). *Nardostachys jatamansi* extract protects against cytokine-induced beta-cell damage and streptozotocin-induced diabetes. *World journal of gastroenterology*, 16(26), 3249–3257.
 43. You, H. N., Park, M. H., Hwang, S. Y., & Han, J. S. (2018). *Nardostachys jatamansi* DC Extract Alleviates Insulin Resistance and Regulates Glucose Metabolism in C57BL/KsJ-db/db Mice Through the AMP-Activated Protein Kinase Signaling Pathway. *Journal of medicinal food*, 21(4), 324–331.
 44. Tamang, R., Jayaprakash, P., Sarma, N., Begum, T., & Lal, M. (2024). Integration of in vitro and in silico analysis of Indian Valerian (*Valeriana jatamansi* Jones) against anti-oxidant, anti-diabetic and anti-inflammatory activities. *Industrial Crops and Products*, 220, 119186.
 45. Aleem, M. A., Asad, B. S., Tasneem Mohammed, T. M., Khan, R. A., Ahmed, M. F., Anjum, A., & Ibrahim, M. (2014). Antidiabetic activity of hydroalcoholic extracts of *Nardostachys jatamansi* in alloxan-induced diabetic rats.
 46. Bhat, Muzafar Din Ahmad, and Shah Agaz Malik. "Efficacy of *Nardostachys jatamansi* (D. Don) DC in essential hypertension: A randomized controlled study." *Complementary Therapies in Medicine* 53 (2020): 102532.
 47. Ali, Arshiya; Umar, Dilshad2; Farhan, Mohammed1; Basheer, Bahija2; Baroudi, Kusai2. Effect of Brahmyadi Churna (Brahmi, Shankhapushpi, Jatamansi, Jyotishmati, Vacha, Ashwagandha) and tablet Shilajatu in essential hypertension: An observational study. *Journal of Advanced Pharmaceutical Technology & Research* 6(4):p 148-153, Oct–Dec 2015.
 48. Shinde, Dattatraya L., Virendra B. Pawar, and Sanjay A. Dhurve. "To Study the Efficacy of *Jatamansi* Phanta in Hypertension." *Journal of Pharmaceutical Negative Results* 13 (2022).
 49. Fang, Jingmei, et al. "Aristolone in *Nardostachys jatamansi* DC. induces mesenteric vasodilation and ameliorates hypertension via activation of the KATP channel and PDK1-Akt-eNOS pathway." *Phytomedicine* 104 (2022): 154257.
 50. Bose, Biswajit, et al. "Secondary metabolite profiling, cytotoxicity, anti-inflammatory potential and in vitro inhibitory activities of *Nardostachys jatamansi* on key enzymes linked to hyperglycemia, hypertension and cognitive disorders." *Phytomedicine* 55 (2019): 58-69.
 51. Kasar, Priyanka L., Milind C. Kirte, and Rashtrapal Ukey. "Effect of *Jatamansi* (*Nardostachys Jatamansi*) on Blood Pressure in Rajonivritti Kala (Menopause)." *World J Pharm Res* 7 (2018): 835-841.
 52. Nandha, Ruchika, et al. "A pilot study to clinically evaluate the role of herbomineral compound "Rakatchap Har" in the management of essential hypertension." *AYU (An International Quarterly Journal of Research in Ayurveda)* 32.3 (2011): 329-332.
 53. Khanal, Hari, Ram Joshi, and Abhishek Upadhyay. "Anti-hypertensive activity of Ayurvedic medicinal plants." *International*

- Journal of Complementary and Alternative Medicine 13.1 (2020): 7-12.
54. Memariani, Zahra, et al. "Protective effect of a polyherbal traditional formula consisting of Rosa damascena Mill., Glycyrrhiza glabra L. and Nardostachys jatamansi DC., against ethanol-induced gastric ulcer." *Iranian journal of pharmaceutical research: IJPR* 16.2 (2017): 694.
 55. ur Rahman, Syed Atiq, and Syed Arshaduddin Ahmed. "Anti-ulcer activity of Nardostachys jatamansi against pylorous ligation induced gastric ulcer."
 56. Aleem, Mohd. "Jawarish jalinoos: A polyherbal unani formulation for gastrointestinal disorders." *International Journal of Green Pharmacy (IJGP)* 16.1 (2022).
 57. Nakoti, Sanjay Singh, Divya Juyal, and Amit Kumar Josh. "A review on pharmacognostic and phytochemical study of a plant Nardostachys Jatamansi." *The Pharma Innovation* 6.7, Part G (2017): 936.
 58. Pathak, Shilpi, and Ramreddy Godela. "Nardostachys jatamansi: Phytochemistry, ethnomedicinal uses, and pharmacological activities: A comprehensive review." *Fitoterapia* 172 (2024): 105764.
 59. Nautiyal, Omprakash H. "Anti-fungal activity of Nardostachys jatamansi essential oil beneficial for treating (dermatophytosis) ringworm." *J. Nat. Prod* 9 (2013): 241.
 60. Sohail, Tehmina, and Hina Imran. "Antibacterial and Antifungal Screening of the Root Extracts of Nardostachys} atamansi." *Biological Sciences-PJSIR* 50.4 (2007): 261-265.
 61. Sahu, Renu, et al. "Medicinal properties of Nardostachys jatamansi (a review)." *Oriental journal of chemistry* 32.2 (2016): 859-866.
 62. Chaudhary, S., Chandrashekar, K. S., Pai, K. S., Setty, M. M., Devkar, R. A., Reddy, N. D., & Shoja, M. H. (2015). Evaluation of antioxidant and anticancer activity of extract and fractions of Nardostachys jatamansi DC in breast carcinoma. *BMC complementary and alternative medicine*, 15, 50.
 63. Lee, G. W., Hur, W., Kim, J. H., Park, D. J., Kim, S. M., Kang, B. Y., Sung, P. S., & Yoon, S. K. (2021). Nardostachys jatamansi Root Extract Attenuates Tumor Progression in Hepatocellular Carcinoma via Inhibition of ERK/STAT3 Pathways. *Anticancer research*, 41(4), 1883–1893.
 64. Zhu, Z., Shen, W., Tian, S., Yang, B., & Zhao, H. (2019). F3, a novel active fraction of Valeriana jatamansi Jones induces cell death via DNA damage in human breast cancer cells. *Phytomedicine : international journal of phytotherapy and phytopharmacology*, 57, 245–254.
 65. Tian, S., Wang, Z., Wu, Z., Wei, Y., Yang, B., & Lou, S. (2020). Valtrate from Valeriana jatamansi Jones induces apoptosis and inhibits migration of human breast cancer cells in vitro. *Natural product research*, 34(18), 2660–2663.
 66. Chen, L., Feng, D., Qian, Y., Cheng, X., Song, H., Qian, Y., Zhang, X., Wu, Y., Lv, H., Liu, Q., Cheng, G., Yang, B., & Gu, M. (2021). Valtrate as a novel therapeutic agent exhibits potent anti-pancreatic cancer activity by inhibiting Stat3 signaling. *Phytomedicine : international journal of phytotherapy and phytopharmacology*, 85, 153537.
 67. Li, X., Chen, T., Lin, S., Zhao, J., Chen, P., Ba, Q., Guo, H., Liu, Y., Li, J., Chu, R., Shan, L., Zhang, W., & Wang, H. (2013). Valeriana jatamansi constituent IVHD-valtrate as a novel therapeutic agent to human ovarian cancer: in vitro and in vivo activities and mechanisms. *Current cancer drug targets*, 13(4), 472–483.

68. Chavan, Pratiksha M. An Experimental Evaluation of Shukrajanan Activity of Jatamansi Phanta (Nardostachys Jatamansi DC) WSR to Spermatogenic Activity. Diss. Rajiv Gandhi University of Health Sciences (India), 2020.
69. Sandeep, Palakkil Mavilavalappil, Toine FH Bovee, and Krishnan Sreejith. "Anti-androgenic activity of Nardostachys jatamansi DC and Tribulus terrestris L. and their beneficial effects on polycystic ovary syndrome-Induced rat models." *Metabolic syndrome and related disorders* 13.6 (2015): 248-254.
70. Gowda, Damodara KM, et al. "The efficacy of nardostachys jatamansi against the radiation induced haematological damage in rats." *Journal of Clinical and Diagnostic Research: JCDDR* 7.6 (2013): 982.
71. Subashini, R., Devaki, T., Gnanapragasam, A., & Yogeeta, S. (2006). Protective effect of Nardostachys jatamansi on oxidative injury and cellular abnormalities during doxorubicin-induced cardiac damage in rats. *Journal of Pharmacy and Pharmacology*, 58(2), 257–262.
72. Liu, Q. F., Jeong, H., Chin, Y.-W., Koo, B.-S., Cho, K. S., Lee, J. H., Kim, Y.-M., Jeon, S., Yun, H. S., Sung, Y.-W., & Jeon, Y. (2018). Nardostachys jatamansi Ethanol Extract Ameliorates A β 42 Cytotoxicity. *Biological and Pharmaceutical Bulletin*, 41(4), 470–477.
73. Yoon, C.-S., Kim, K.-W., Kim, Y.-C., Kim, D.-C., Park, J.-S., & Oh, H. (2018). Isolation of Novel Sesquiterpenoids and Anti-neuroinflammatory Metabolites from Nardostachys jatamansi. *Molecules*, 23(9), 2367.
74. Joshi, H., & Parle, M. (2006). Nardostachys jatamansi Improves Learning and Memory in Mice. *Journal of Medicinal Food*, 9(1), 113–118.
75. Kaur, H., Lekhak, M. M., Chahal, S., Goutam, U., Jha, P., Naidoo, D., Ochatt, S. J., & Kumar, V. (2020). Nardostachys jatamansi (D.Don) DC.: An invaluable and constantly dwindling resource of the Himalayas. *South African Journal of Botany*, 135, 252–267.
76. Joshi, S., Dar, A. I., Acharya, A., & Joshi, R. (2022). Charged Gold Nanoparticles Promote In Vitro Proliferation in Nardostachys jatamansi by Differentially Regulating Chlorophyll Content, Hormone Concentration, and Antioxidant Activity. *Antioxidants*, 11(10), 1962.
77. Dhiman, N., Kumar, A., Kumar, D., & Bhattacharya, A. (2020). De novo transcriptome analysis of the critically endangered alpine Himalayan herb Nardostachys jatamansi reveals the biosynthesis pathway genes of tissue-specific secondary metabolites. *Scientific Reports*, 10(1).
78. Smith-Hall, C., Ghimire, S., Meilby, H., Timoshyna, A., Subedi, B. P., Madsen, S. T., Pyakurel, D., Paneru, Y. R., Treue, T., Ghimire, P. L., & Pouliot, M. (2023). The sustainability of trade in wild plants-A data-integration approach tested on critically endangered Nardostachys jatamansi. *PNAS Nexus*, 2(11).

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