STM JOURNALS

Journal of
AYUSH: Ayurveda, Yoga, Unani, Siddha and Homeopathy

ISSN: 2278-2214 (Online)
ISSN: 2321-6484 (Print)
Volume 13, Issue 3, 2024
September-December
DOI (Journal): 10.37591/JoAYUSH

https://journals.stmjournals.com/joayush

Review JoAYUSH

Valeriana Jatamansi in Ailment of Various Diseases: A Review

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Abstract

V. wallichii, often known as Valeriana jatamansi, *is a significant medicinal herb. The word 'Valerian', which is derived from the word 'Velo' means 'strong drug', was originally used by an Indian doctor in the ninth century. This review focus on their geographical characterization, botanical characterization, traditional uses, and their mechanism of action on various bioactivity. This review discusses the major bioactive constituents and their 2D and 3D structures.* V. jatamansi *mostly preferred humus-rich, fertile, loamy soil with slightly acidic to neutral pH (6-7). This plant has very good antioxidant activity, anti-inflammatory activity, antibacterial activity, cytotoxic activity, anxiolytic activity, and hyperactive effects. It is found growing in the vicinity of an uncontrolled forest of Netherlands, France, Britain, Belgium, Eastern Europe, Germany, and Japan. It is also found growing in parts of Pakistan, southwestern China, Burma, and South-East Asia. Usually, this herb grows well under deep shade conditions having an ideal temperature of 15–25°C with 80–90% of relative humidity***). The herb has been employed as traditional medicine in the Himalayas health systems of Ayurveda, Siddha, Homeopathy, Ethnomedicine, and the Indian System of Medicine (ISM). In future studies, we warranted that the various bioactivity of* V. Jatamansi *and their mechanism of action on various diseases are explored.*

Keywords: *Valeriana jatamansi*, traditional uses, antioxidant, anti-inflammatory, antibacterial, cytotoxic activity, anxiolytic, hyperactive, bioactivity

INTRODUCTION

Plant Name (*Valeriana Jatamansi l.*)

An essential medicinal plant is *Valeriana jatamansi* (also known as *V. wallichii)* which is a member of the family Caprifoliaceae [1]. It is minute, recurrent, and most primitive species of the Caprifoliaceae tribe [2]. It is a forest perennial herb, commonly known by different names; Indian Valerian, Muskbala, Sugandhbala and Tagar [3]. The word 'Valerian', which is derived from the word 'Velo', which means 'strong drug', was originally used by an Indian doctor in the ninth century. Although the name 'Valerian' in the Latin language refers to having pleasant or healing properties [4].

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Received Date: July 05, 2024
Accepted Date: July 30, 2024
Published Date: August 24, 2024

Citation: Palak Sharma, Balwinder Singh, Manisha, Vikas Kumar. *Valeriana Jatamansi* in Ailment of Various Diseases: A Review. Journal of AYUSH: Ayurveda, Yoga, Unani, Siddha and Homeopathy. 2024; 13(3): 1–13p.

The maximum height of the straight annual fragrant herbaceous *V. jatamansi* is 50 cm. Its blossom corresponds to the 'corymbose' variety and has a modest cluster with a white or pink tint at the pinnacle. The herb emerges above the ground inside a cluster and has exquisite green leaves on a usually split stem which is decumbent at the base. It typically has two leaf varieties, radical and demodulating, with different leaf margins, that include an entire, wavy, and fragment variant [5]. At the core of the plant, radical leaves with a

cordate shape and grooved margins appear on short stalks. At the plant's base, more long stalks appear, producing cauline leaves with an entire or pinnate leaf border. At the plant's base, more long stalks appear, bearing cauline leaves with an unbroken or septate leaf border. With several underground rhizomes and an average of 20–60 leaves per plant, the active vegetative development stage has been seen. The flowers of *V. jatamansi* exhibit actinomorphic symmetry, dimorphism, and pink blooms that grow in direct sunlight as opposed to white blossoms [6]. Female and transexual flowers can be found on different plants. A transsexual flower has both an androecium (stamens 3, epipetalous) and gynoecium (five petals), while a female bloom is pistillate and has four petals. They have an epigynous inferior ovary with a solitary ovule [6, 7]. The flower's corolla is gamopetalous (fused petal) with 'rotate' types, and the number of corollas varies between female and hermaphrodite flowers. Its fruit is oblong, compressed, hairy, dry, indehiscent, and one-seeded [8, 9], as well as being capped with a persistent pappus-like calyx [10–15] classified as an 'achene kind of seed' [6].

Figure 1. *Valeriana Jatamansi*.

Three groups, known as Triplostegieae, Patriniene, and Valerianaceae, make up the Valerianaceae family (Graebner, 1906). The Triplostegieae tribe has such a single genus, Triplostregiea, while the Patriniene tribe has two genera, *Patrinia* and *Nardostachys*. Six genera, namely *Aretiastrum*, *Asterphia*, *Belonanthus*, *Phudendron*, *Phyllis*, and *Stangea*, are present in South America, while the remaining genera are members of the Valerianaceae tribes. While there are reports of 24 species in the Valerianaceae family (Figure 1), belonging to 4 different genera, flourishing in India [15]. To identify different Valeriana species and their variants [16], employed a variety of chemosynthetic techniques. They found significant heterogeneity in both the chemical contents present and the plant form. The commercially traded spices in traditional medicines are *V. jatmansi syn V. wallichii* (Indian valerian), *V. officinalis* (European valerian) and *V. procera* (Mexican Valerian) [17]. *V. jatamansi* is an erect perennial pubescent herbaceous plant which attains a maximum height of 50 cm. [18]. Phytochemicals are non-nutritive compounds of plants that can prevent or treat various diseases and contribute to the welfare of individuals. Many phytochemicals, including tannins, glycosides, alkaloids, and phenolics are obtained from plants. These phytochemicals exhibit antioxidant, antifungal, antibacterial, anti-cancerous, anti-inflammatory, antidiabetic etc. properties, which are extensively utilized in pharmaceutical industries for therapeutic uses. Primary antioxidants directly seek out free radicals, while secondary antioxidants indirectly prevent the formation of free radicals through Fenton's reaction. Anti-oxidative activity can be described as 'constraints of decomposition of polypeptides, lipoproteins genetic material or other molecules that occur by blocking the propagation stage in an oxidative chain

reaction' [19]. With the onset of winter, *V. jatamansi* is likely to begin flowering. Flowering originates in the month of November and fully emerges in the month of March in the mid-hill of the Western Himalayan circumstances. Anemophily (by the wind) and entomophily (by insects), particularly by bees, are two ways that plants are pollinated [20]. About the Valerianaceae family, it comprises of roughly 350 species that are distributed throughout the world at higher elevations and dwell in the altitude region [21]. Most of the genera in this family are abundant in the Mediterranean region. The largest valerian population can be found in North America growing in damp meadows and subalpine forests. Every temperate and subtropical region of the planet has *V. jatamansi.*

DESCRIPTION

- *Vegetative character:* An upright perennial pubescent herbaceous plant called *V. jatamansi.*
- *Plant altitude:* 50 cm
- *Propagation:* Propagation of *V. jatamansi* plant by seed or by using portions of the rootstock.
- *Root:* The mature roots, which grow from the rhizome, were measured to be up to 25 cm long when grown in polyhouse conditions under shade. The length of the root system ranges from 6 to 10 cm [22].
- *Rhizomes:* The rhizome is a considerable underlying component with internodes as well as nodes. Internodes, which have been divided by terminals in the stolons of *V. jatamansi*, range in length from 10 to 20 cm. These nodes later produce new plants. A single rhizome generally ranges in length between 5 and 20 cm.
- *Flowering:* The bloom of *V. jatamansi* feature actinomorphic symmetry, dimorphism, and the establishment of white blooming in the shade and pink blooming in direct sunshine [6].
- *Inflorescence:* Its inflorescence is of the 'corymbose' variety and has a tiny cluster with a white or pink tint at the pinnacle.
- *Leaves:* The herb grows above ground in a cluster and has delicate green leaves on a usually split stem that is decumbent at the base. It typically has two leaf variants, radical and processing module, with different leaf margins, such as an entire, wavy, and sinuate subtype [18].
- *Synonyms:* Many varieties of Valerian exist, including *Valeriana jatamansi* var. *glabra Merr*., *Valeriana jatamansi* var. *hygrobia* (Briquet) Hand. -Mazz., *Valeriana mairei* Briq., *Valeriana spica* vahl, *Valeriana villosa* Wall, *Valeriana violofolia* Griff, and *Valeriana wallichii* DC.

Table 1. Another name of *Valeriana jatamansi* in India.

Language	**Names**
Sanskrit	Jatamansi, Natah, Tagarah
Hindi	Balchhari, Mansi, Nihani, Smak, Sumaya, Tagar
Kannada	Jatale, Naati Jatamansi, Nandu Batlu, Tagara
Tamil	Shadamangie, Takaram
Malayalam	Takaram
Marathi	Thagar Mool
Telegu	Tagara

Table 2. Plant taxonomy.

Kingdom	**Viridiplantae**
Species	Jatamansi
Order	Dipsacales
Genus	Valeriana
Family	Caprifoliaceae
Class	Asterids
Botanical name	*V. jatamansi*

BIOLOGICAL DESCRIPTION

The demand for this precious species is spreading with each passing day in pharmaceuticals as well as aromatherapy businesses, which lead to the depletion of herb abundance in the forest. The habitat of the plant *V. jatamansi* has degraded because of growing demand and depletion of resources for its root system and rhizomes for therapeutic purposes, as well as biotic interferences in its region. As a function, the herb has become practically extinct. As a result, the National Medicinal Plant Board in New Delhi, India recognized *V. jatamansi* as an endangered species and notified the Convention on International Trade of Endangered Species of its inclusion in its schedule for maintenance [6]. Furthermore, seeds or roots are usually used for their proliferation. It has been claimed that seeds lose their viability after the first year. Like this, proliferation through root multiplication encounters illnesses from white mould and root rot [12, 13]. The antioxidant, anti-inflammatory, antibacterial, cytotoxic, anxiolytic, and neuroprotective effects of this plant are all quite strong.

GEOGRAPHICAL DESCRIPTION

As a Himalayan-born plant, the species is widely cultivated from Afghanistan to China, India, Nepal, Bhutan, and Burma. In the Netherlands, France, Britain, Belgium, Eastern Europe, Germany, and Japan, it can be found growing nearby to tropical rainforest. Moreover, it appears in certain portions of Pakistan, south-western China, Burma, and Southeast Asia [23]. There have been descriptions of 16 species and 2 subspecies in India [14]. From Kashmir to Bhutan, this plant is grown a lot in the slopes between 1200 and 2000 meters above the sea level [24, 25]. In the regions of Bharmour division of Chamba, Kanda area of Karsog, and Chansil of Rohru forest division in Himachal Pradesh, it is grown voluminously. In the regions of Bharmour division of Chamba, Kanda area of Karsog, and Chansil of Rohru forest division in Himachal Pradesh, it grows generously [26]. *V. jatamansi* is an endangered species in Himachal Pradesh that is threatened locally. Typically, this plant is found growing as shrubbery-like bushes beneath the canopy of Oak (*Qurecus leucotricophora*) and Pine trees on the damp slopes of the Khasi hills in Assam, Meghalaya, and the Himalayan ranges in Himachal Pradesh and Uttarakhand (*Pinus roxburghii*). Typically, this plant thrives in deep shadow with an ideal temperature of 15 to 25°C and 80 to 90 percent relative humidity [27–29]. Most commonly, *V. jatamansi* prefers humus-rich, fertile, loamy soil with a pH range of slightly acidic to neutral (6–7). Although this herb enjoys moist conditions due to its shallow roots, it also needs a good drainage system because it cannot resist water logging conditions. Its best growth occurs on a mild slope of 5–6%. In India, researchers discovered that this herb thrived in a variety of microclimatic settings.

TRADITIONAL USES

This plant is used by the forest people as one of the essential ayurvedic elements in the creation of Shringiadikwath and Jwardikashyai, as well as in some ceremonies. It is also used to make ubtan, a semi-solid cosmetic therapy product [30]. The herb has been utilized as a traditional remedy in the Himalayan medical systems of Ayurveda, Siddha, Homeopathy, Ethnomedicine, and Indian System of Medicine (ISM) [31]. It is a significant medicinal wild herb, and its roots and rhizomes are being harvested for their valepotriates, which are incredibly beneficial against leishmaniasis, sores, seizures, jaundice, cardiovascular debilitation, persistent cough, bronchitis, highly influential frailty, chronic and unreliable fevers, skin conditions, falling hairs, renal disease, general debility, sleep betterment, and medicating [32] Lewybody dementia [33–37].

VALERIANA JATAMANSI USED IN COMMON DISEASES

In Vivo and In Vitro Studies

Anti-Inflammatory Activity (Figure 2)

The anti-inflammatory action of *V. jatamansi* has been treated with a methanolic extract from the rhizomes of the plant. In rats with carrageenan-induced paw edema, it will alleviate inflammation. It will reduce as a response of the 200 mg/kg dose's anti-inflammatory effects, reduction of inflammatory mediators, histamine, and prostaglandins.

Anxiolytic Activity

The anxiolytic activities of substance were studied from radix and rhizomes of *Valeriana jatamansi* in mice. For 10 days, male ICR mice were given oral doses of compound *V. jatamansi* at doses of 1.2, 2.4, and 4.8 g/kg, saline, and 2 mg/kg of diazepam. The effects of the treatment were then assessed using the elevated maze-plus (EPM) and light-dark box procedures.

Neuroprotective Effect

Three novel iridoids, valeriandoids A–C (1–3), and three previously reported compounds (4–6) were tested against (MPP+) to determine the methanolic extract of the dried roots of *V. jatamansi* neuroprotective potential. Guanosine served as a positive control for the 1-methyl-4-phenylpyridinium-induced neuronal death in the dopaminergic SH-SY5Y neuroblastoma. Four of these six compounds displayed mild neuroprotective effects.

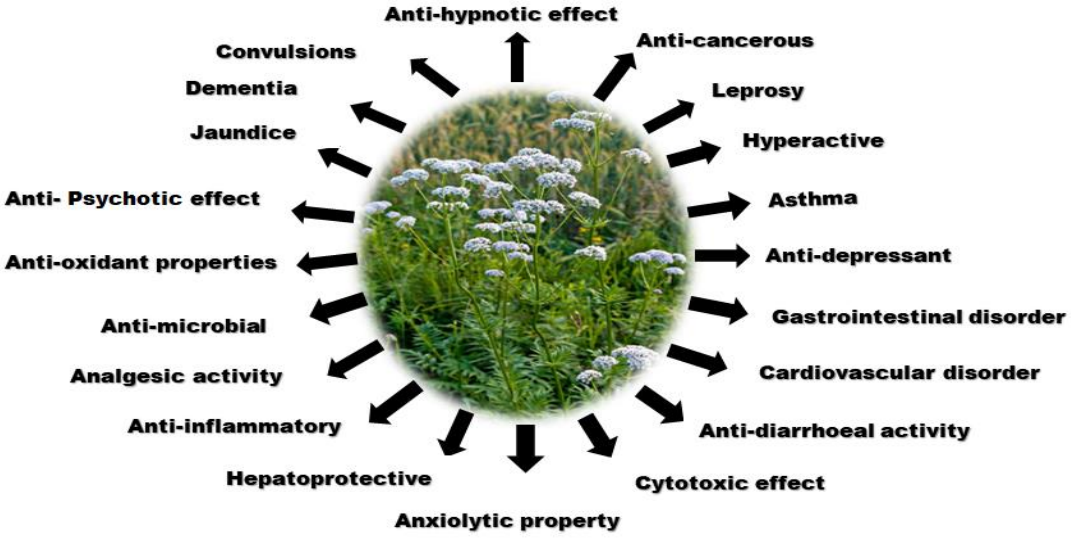


Figure 2. *Valeriana jatamansi* used in common diseases.

Cytotoxic Effect

Three valepotriate isomers, jataman valtrates Z1, Z2, and Z3, which were isolated from the air-dried entire plants of *V. jatamansi*, were the subject of an in vitro cytotoxic investigation (syn. *V. wallichii*). Using the MTT assay, it was discovered that methanolic extracts had considerable cytotoxicity against colon cancer, lung adenocarcinoma (A549), hepatoma (Bel7402), and metastatic prostate cancer (PC3M) (HCT-8). By monitoring absorbance at 570 nm with dimethyl sulfoxide as the solvent and paclitaxel as the positive control, with IC50 values of 2.8–8.3 M, the vitality of cell lines was determined.

Antibacterial Activity

V. jatamansi rhizome extracts in hexane, chloroform, and methanol were used to investigate the antibacterial activity. Antimicrobial activity against strains of *Staphylococcus aureus*, *Pseudomonas aeruginosa*, *Micrococcus luteus*, *E. coli*, *Salmonella ebony*, *Lactobacillus plantarum*, and *Staphylococcus epidermidis* was assessed for the methanolic, chloroform, and hexane extracts of *V. jatamansi*. As a new alternative treatment for urinary tract infection, the hexane extract's considerable suppression can be combined with other antibiotics.

Antioxidant Activity

The dried roots of *V. jatamansi* were extracted, and the polyphenol and flavonoid content of those extracts was determined. By using the 2,2-diphenyl-1-picrylhydrazylhydrate (DPPH) radical scavenging and ferrous chelation power assays, the antioxidant activity of the three solvent extracts of *V. jatamansi* roots and essential oil (100 g/ml) was evaluated.

Anticonvulsant Activity

Using maximal electroshock seizures (MES), a hydroethanolic extract of *Valeriana jatamansi* reduced the convulsions in Swiss albino mice.

Anti-Hypnotic Activity

The *Valeriana wallichii* aqueous extract enhances sleep quality in men. The aqueous root extract of *Valeriana jatamansi* increased brain monoamine levels and improved sleep quality in rats.

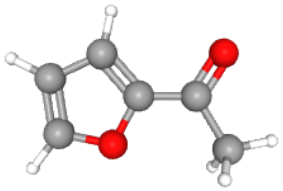
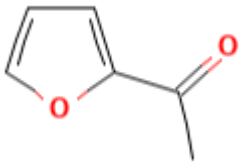
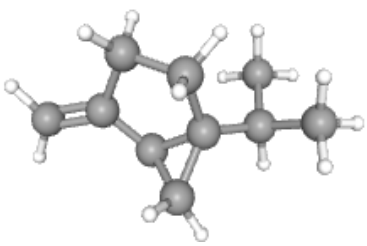
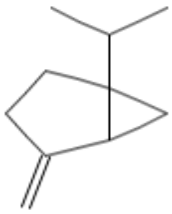
Anti-Psychotic Effect

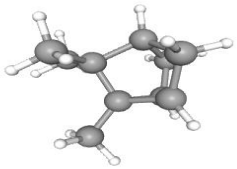
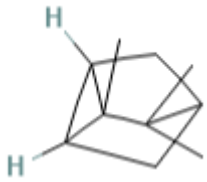
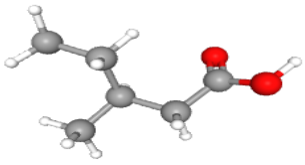
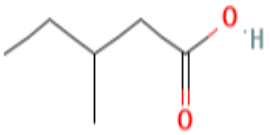
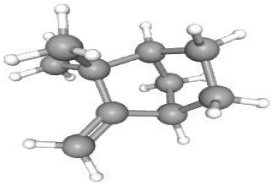
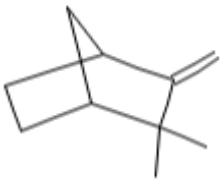
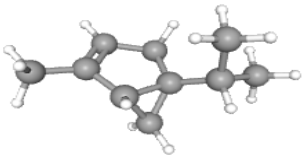
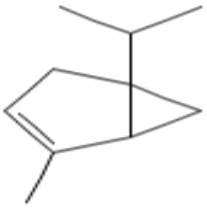
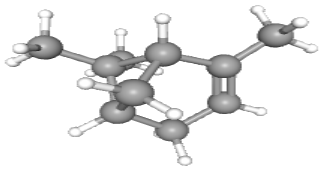
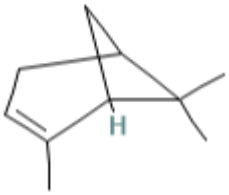
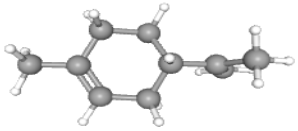
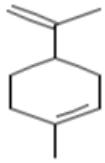
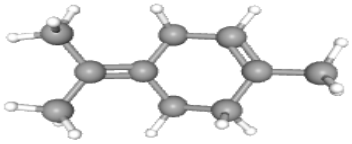
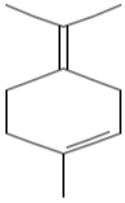
Petroleum ether extract assessed rat sleep induction by sodium thiopental, ambulatory activity, raised plus maze, and spontaneous locomotion. Rats may experience potential anxiolytic benefits from valerate, a component of the *Valeriana jatamansi* plant.

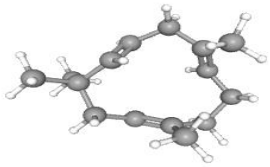
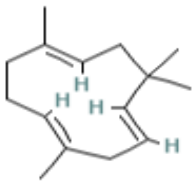
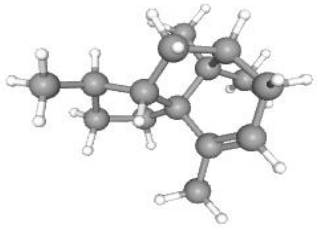
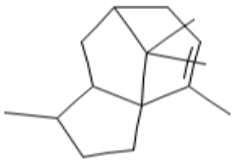
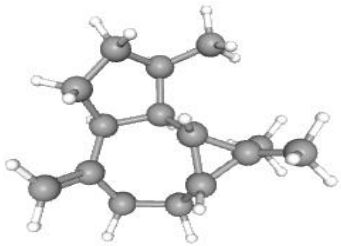
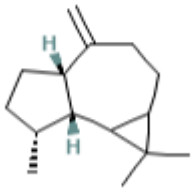
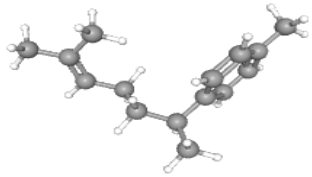
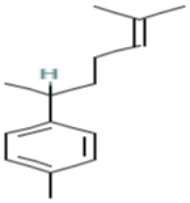
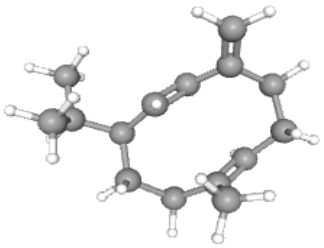
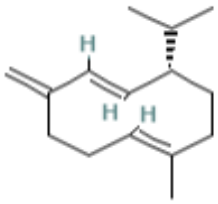
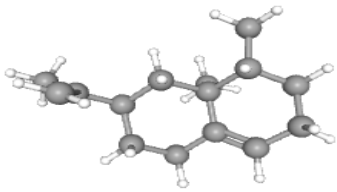
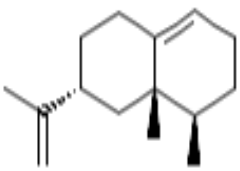
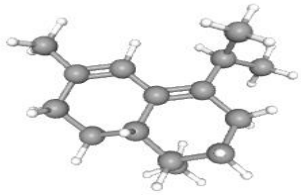
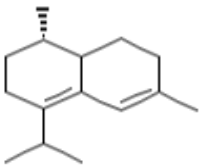
Table 3. Mechanism of action of different bioactivity from the *Valeriana jatamansi.*

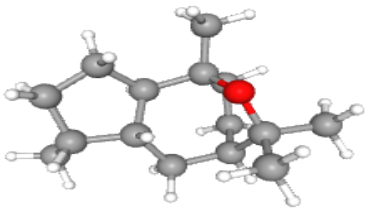
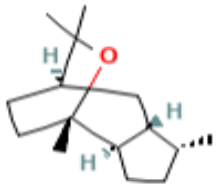
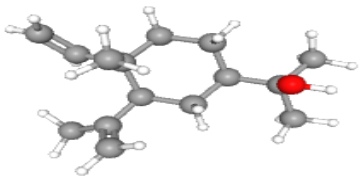
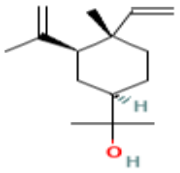
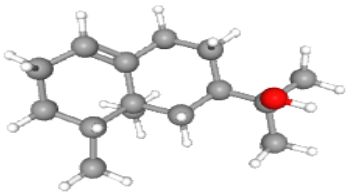
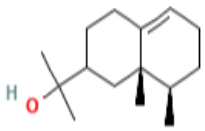
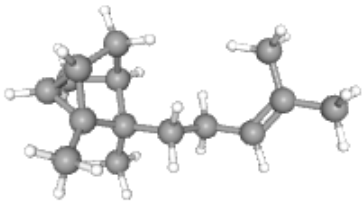
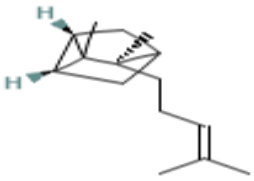
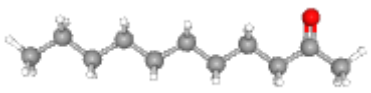
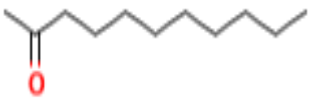
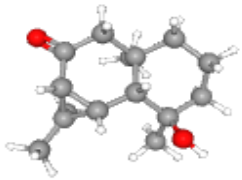
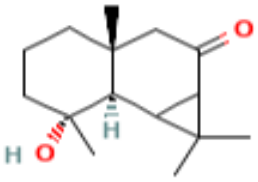
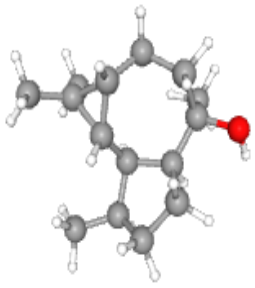
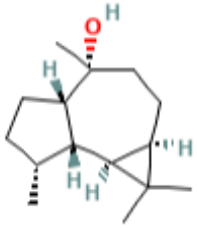
Bioactivity	**Plant Part Used**	**Mechanism of Action**	
Cytotoxicity	Roots	As the valepotriates broke down during storage, the cytotoxic action became reduced, showing a weaker effect.	[8]
Neuroprotective effect	Roots	Inhibit monoamine oxidase enzymes and dopamine neuronal uptake. They upregulation of PGC-1, resulting in improved mitochondrial function.	[38]
Antioxidant effect	Roots	Activation of heme-Oxygenase-1 (HO-1) antioxidant enzyme. It will increase mRNA expression of catalase, superoxide dismutase, and glutathione reductase.	[8]
Antiapoptotic effect	Whole plant	Inhibition of caspase apoptotic cascade. It shows direct inhibition of Poly (ADP Ribose) Polymerase.	[8]
Anti-inflammatory effect	Rhizomes	It will decrease the inflammatory mediator histamine, prostaglandins, and serotonin.	[38]
Anti-hypnotic effect	Roots	It increased brain monoamine levels and improved sleep quality.	[8]
Anti-anxiety effect	Roots & Rhizomes	It will suppress the GABA receptor.	[38]
Anti-epileptic effect	Roots	It had a minor impact on the expression of $GABA_B$.	[8]
Hepatoprotective activity	Roots	It will decrease the TG level in plasma and liver.	[8]
Tranquilizer activity	Rhizomes	It minimizes the amount of lipid peroxidation and the brains' regenerated GSH.	[8]

Table 4. Summary of different compounds of *Valeriana jatamansi* and their structures.

S.N.	**Compounds**	**3D Structure**	**2D Structure**	**Reference**
1.	2-Acetylfuran			[36, 39]
2.	Sabinene			[36, 40]

3.	Tricyclene			[36, 41]
4.	3-methyl-valeric acid			[36, 42]
5.	Camphene			[36, 43]
6.	α- Thujene			[36, 44]
7.	α-Pinene			[36, 45]
8.	Limonene			[36, 46]
9.	1,8-Cineole			[36, 47]
10.	Terpinolene			[36, 48]

11.	α - humulene			[36, 49]
12.	α-Patchoulene			[36, 50]
13.	allo-Aromadendrene			[36, 51]
14.	ar-Curcumene			[36, 52]
15.	Germacrene D			[36, 53]
16.	Valencene			[36, 54]
17.	Zonarene			[36, 55]

18.	Kessane			[36, 56]
19.	Elemol			[36, 57]
20.	Valeranol			[36, 58]
21.	Alpha-Santalene			[36, 59]
22.	Undecan-2-one			[36, 60]
23.	Maaliol			[36, 61]
24.	Ledol			[36, 62]

CONCLUSION

The medicinal herb *V. jatamansi* is widely used and known by several different names. This plant's phytochemical has both the power to diagnose and control many illnesses. This plant has anti-inflammatory, anti-cancer, anti-fungal, and antioxidant capabilities that can be used to treat various ailments. Mostly people use *V. jatamansi* as a medicinal herb. The plant has been used as traditional medicine in the Indian system of medicine, Ayurveda, Siddha, Homeopathy, and Ethnomedicine. This plant has many phytochemical constituents which is used to treat various ailment and moreover used to cure many illnesses in future with this plant. This review represents that the various phytochemical constituents are used in the cure and treatment of various diseases.

The perennial herb *Valeriana jatamansi* grows in forests and is valued for both its therapeutic benefits and wide range of folk uses. Ayurveda, Siddha, Homoeopathy, Ethnomedicine, and the Indian System of Medicine (ISM) all make substantial use of this plant, which is frequently found in the Himalayas. Geographical and biological characteristics of the plant make it special, and it may be found in many places throughout the world, including the Netherlands, France, Britain, Belgium, Eastern Europe, Germany, Japan, Pakistan, southwestern China, Burma, and South-East Asia. Numerous bioactivities of *Valeriana jatamansi*, including anti-inflammatory, antioxidant, antibacterial, cytotoxic, anxiolytic, and hyperactive properties, have been demonstrated. These qualities are ascribed to the existence of several significant bioactive ingredients, including valerenic acid, isovaleric acid, valepotriates, valtrate, and jatamansone, among others. The plant's potential therapeutic uses have been illuminated by the identification and characterization of these compounds in recent investigations.

In-depth research is necessary to fully understand the plant's mechanisms of action in a variety of ailments, despite its traditional uses and bioactivities. Future research should concentrate on identifying the exact bioactive components that cause the benefits seen, comprehending the molecular mechanisms of action, and carrying out clinical trials to support the traditional applications of this plant.

Data Availability

Not applicable. Compliance with ethical standards.

Conflict of Interest

Authors declare that they have no conflict of interest.

Ethics Approval

Not applicable.

Consent to Participate

Not applicable.

Consent for Publication

Not applicable.

Code Availability

Not applicable.

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