ISSN: 2322 - 0902 (P)
ISSN: 2322 - 0910 (O)

International Journal of Ayurveda and Pharma Research

Review Article

PHARMACOLOGICAL ACTIONS OF VALERIANA WALLICHII (*TAGARA*): A FUNDAMENTAL ANALYSIS SUPPORTING TRADITIONAL BENEFITS

Tripti Tyagi[1]*, Sakshi Sharma[2], Rajesh Sharma[3]

*[1]PG Scholar (Ayu), Department of Dravyaguna, Ayurvedic and Unani Tibbia College and Hospital Karol Bagh, New Delhi.

[2]Senior Research Officer (Ayu), Ayurveda Central Research Institute West Punjabi Bagh, New Delhi.

[3]Associate Professor (Ayu), H.O.D, Department of Dravyaguna, Ayurvedic and Unani Tibbia College and Hospital, Karol Bagh, New Delhi, India.

Article info

Article History:

Received: 29-07-2022

Revised: 14-08-2022

Accepted: 30-08-2022

KEYWORDS:

Tagara, Valeriana wallichii, ethnobotanical, neurosis, Stress.

ABSTRACT

Valeriana wallichii referred to as Indian Valeriana has a family circle Valerianaceae commonly known as "Tagara". India, Nepal, and China are home to the important variety of the Valeriana genus. It is indigenous to India and can be found between 8000-10000 feet altitudes in the Himalayan region. Valeriana is a popular ethnobotanical remedy throughout Europe for relieving stress and improving sleep. Vital Central nervous system (CNS) activity is mirrored in the genuine Ayurvedic text-based content and declared as one of the handiest treatments with inside the remedy of neurosis and is powerful in pacifying the body ache (*Vedanasathpana*), chills (*Sheetprashmana*), and headaches (*Shirah Shoolprashmana*). Additionally, it has been addressed in the *Charaka Samhita* as a remedy for snake poisoning. The rhizome and supporting tissues of valerian are used to treat insomnia, epilepsy, hypertension, and psychosomatic disorders. Important phytochemicals can reduce pain, manage stress, protect the brain from radiation, and fight off microbes. Hesperidin, the statutory potent flavonoid, 6-methylapigenin, and four new varieties of the iridoids valeriotetrates B and C, 8-methylvalepotriate, and 1,5-dihydroxy-3,8-epoxyvalechlorine A are just a few of the naturally occurring active phytochemicals in the *Valeriana wallichii*.

INTRODUCTION

'Valerianaceae' circle of relatives comprises 13 general and approximately 360 species mainly of herbs, rarely shrubs. Genera 'Valeriana' consists of over 200 spp. The *Valerian* roots of trade are derived from the European *Valeriana officinalis (Jatamansi)* and the Indian Valerian *(Tagara).* The *Indian Valerian* is the official *Tagara* in the Indian Pharmacopoeia and is derived from the dried rhizome and roots of *Valeriana wallichii*. The make use of Indian *Valerian* is extraordinarily comparable or suitable alternative to *Valeriana officinalis (Jatamansi).*

Access this article online	
Quick Response Code	
	https://doi.org/10.47070/ijapr.v10iSuppl1.2468

The family contains esters yielding isovaleric acid, alkaloids, iridoids, and about 0.3–1.0% of volatile oil; valepotriates are characteristic of the tribe *Valerianeae.* The herb consists of yellowish-brown rhizomes, 4-8cm long and up to 1cm thick, and roots up to 7cm long and 1–2mm thick. The rhizomes are unbranched and somewhat flattened dorsoventrally. The odor is valerianaceous and the taste is bitter and camphoraceous[1]. *Valeriana wallichii* is a slightly hairy, tufted perennial herb up to 15- 45cm high, rootstock horizontal, thick with descending fibers. Leaves are radical, often crowded 2.5-7.5cm in diameter, long-stalked, deeply cordate-ovate, usually toothed, or sinuate, and sharp-pointed (cauline leaves). Flowers white or tinged with pink, in terminal corymbs 2.5-7.5cm wide often unisexual; the male and female on different plants (dioecious). Fruit oblong, compressed, hairy or glabrous. Flowering and Fruiting during March-June[2-3]. *Valeriana wallichii* is found in the temperate Himalayas from Kashmir to Bhutan at 10,000ft and Khasia hills 4000-600ft, and Jantia Hills

between 1500-1800m[4]. Abundant in Western Himalayas and Afghanistan at a height of about 300-3300m[5-6]. In Himachal Pradesh, it is found in the upper reaches of Shimla, Kangra, Kulu, Kinnaur, and Sirmour. In Chamba district, is found abundantly in the Bhandalkihar area of Saloni block, Kunar area of Bharmour subdivision, Upper reaches of Tissa Block, and Mehla block[7]. *Tagar, Nata,* and *Nrip* synonyms of *Tagar* reflect its properties of destruction the poisonous effect and saving life, so preferred over other fragrances and poisonous herbs. *Vakra*, as it symbolizes the flowers is not straight. *Kutil* indicates the rhizome is twisted. *Kalanusarya, Balaka,* and *Chakra* synonyms in Ayurvedic texts are regarded via way of means of specific features and functions[8]. It is used as a bactericide, CNS depressant, hypnotic, sedative, stomachic, nervine tonic, and tranquilizer in convulsions, hysteria, insomnia, neuralgia, and neurasthenia numbness. In Unani medicinal drug additionally, used for infections of the eyes and hair, ache in joints, sicknesses of the liver, the spleen and the kidney[9,10]. Rootstock is stimulant, antispasmodic, and useful in superior ranges of fever and inflammation, epilepsy, and general debility.[11,12]

MATERIAL AND METHODS

Valeriana wallichii (Indian valerian) occurring in the Northwestern Himalayas has been utilized for a significant stretch in Ayurveda. Equivalent names, activities, restorative purposes, compound medications having *Valeriana wallichi*, the internal administration, and local applications have been recalled from *Samhita and Nighantu*. On the side of its literary and ethnomedicinal benefits, a sharp and important inquiry from PUBMED and Scopus research doors has been gathered.

Taxonomical Classification

Kingdom: Plantae (Plants)

Subkingdom: Tracheobionta (Vascular plants)

Superdivision: Spermatophyta (Seed plants)

Division: Magnoliophyta (Flowering plants)

Class: Magnoliopsida (Dicotyledons)

Subclass: Asteridae

Order: Dipsacales

Family: Valerianaceae

Genus: Valeriana

Species: wallichii

Vernacular name[13]

English: Indian valerian

Hindi: Mushkbala

Bengali: Mushkbala, Tagar, Nahani, Shumeo, Asarun

Gujarati: Tagarganttoda

Kannada: Mushkabala

Marathi: Tagarganthoda, Tagarmul

Punjabi: Balamushkbala, Mushwali, Chargodar, Sugandhabala, Bala, Balamushk

Urdu: Rishwala

Garhwali: Sumaiya

Afghanistani: Gurbalchorak, Malkak

Rasa Panchaka or Pharmacodynamic of *Valeriana wallichi*[14]

Rasa (taste)- *Tikta* (bitter), *Katu* (pungent), *Kashya* (astringent)

Guna (main quality) - *Laghu* (light), *Singadh* or *Sneha* (unctuous or oily)

Virya (potency) - *Ushna* (hot)

Vipaka (biotransformation) - *Katu* (pungent)

Dosha Karma – Kaphavatashamaka[15]

Classical Indications

Valeriana wallichii in classical textual indicated in *Mada* (intoxication), *Bhuta* (psychiatric disorders or microbial contamination), *Apsamara* (epilepsy) *Visha* (toxic and poisoning conditions), *Chakshuroga* (eye disorders), *Shiroroga* (headache), *Raktadosha* (blood impurity disorders), *Shula* (abdominal colic)[16].

Description of *Tagara* in *Nighantus*

Priya Nighantu mentioned its medicinal properties and particular habitat in the Himalayan region commonly known as *Sugandhabala, Vidyatagar,* and *Granthikandak*[17]. *Shaligram Nighantu* describes *Tagara* as *Laghu* (light) and beneficial in nervous unrest, emotional troubles, epilepsy, insanity, poisoning, eye trouble, skin diseases, and complexion dullness[18]. *Madanpal Nighantu* has made its existence in two forms- *Tagara, Varhima, Jihma, Wakrava, Nahusa* and *Nata* are the synonyms for the first variety of *Tagara*, while *Pindtagar, Cheen*, *Katu* and *Mahoroga* are the synonym for the second variety[19]. *Harita Kyadi Nighantu* has mentioned *Tagara* synonyms *Kalanusarya*, *Tagar, Kutil, Nahush*, and *Nata* for the first variety of *Tagara and Pindtagar*; *Dandhastha* and *Varhina* are named for the other type. Both types of *Tagara* are meant for curing diseases due to cold, skin diseases, obesity, insanity, and poisoning[20]. *Kaiydev Nighantu* and *Raj Nighantu* indicated *Tagara* for eyes, head troubles, epilepsy, psychiatric illness, intoxication, and poisoning conditions[21,22].

Description of *Tagara* in *Samhita*

Charak Samhita: *Tagara* mentioned in various ailments compound drugs as *Shirahshoolshamak* lep (headache reliever), *Sheetshamak lep (Shleyadi lep) Sheetaparshamna Mahakshaya* (pacific cold and chills), *Jwaraghna* (pacifies fever), *Vedanasthapana* (analgesic), *Rajyakshma chikitsa* (tuberculosis), *Ardit* (facial paralysis), *Pakshaghata* (hemiparalysis) *Unmada* (psychosomatic disorder), *Vrana, Urusthmbha, Vatarakta* (gout), *Vatavyadhi* (nerve

disorders), *Yonishool* (vaginal pain), *Visha* (snake and scorpion poisoning) *Vatarakta* (gout).

Sushruta Samhita: *Tagara* in the compound formulation is beneficial in *Vranaropana* (wound healer), *Bhagna* Chikitsa (fracture), *Vatavyadhi, Visha* (poisoning), *Netraroga or Abhishandya* (conjunctivitis),

Ashtanga Hridya: *Tagara,* as an ingredient of various herbal drugs used as *Vedanasthapana* (analgesic), *Vranya, Rajyakshma* (pulmonary tuberculosis), *Jwaraghna* (pacifies fever), *Sandhivata* (osteoarthritis), *Amavata* (rheumatoid arthritis), *Vatarakta* (gout), *Raktavikar*a (blood disorders), *Shrotoshodhka* (purifies the channels), *Netraroga or Abhishandya* (conjunctivitis), *Yonishool* (vaginal pain), *Visha* (poisoning), *Rasayana* and *Vajeekarna* (immunomodulator).

Parts Used: Root and rhizome with stolons, the fresh root is about three times more effective and if dried at 40°C then above 82°C destroys the active principle in the root.

Drug Doses: 1-3 gm and decoction-10-15ml

Toxicology: Doses higher than 100mg/kg body weights were found to be toxic in mice.

Drug Formulations: *Pippalyadyasava, Devadarishta, Karpuradyaarka, Jatiphalaadi churna, Phala ghrita, Kalyanak sarpi, Madyasava, Bhaskar churna, Agurvadya taila, Madhuparnyadi taila, Amritadya taila, Ksharagada, Kusthadiagada*[23].

Phytochemicals

Valepotriate was first isolated from *V. wallichii,* and preliminary studies have confirmed the presence of a sedation ingredient. 130 iridoids from *Valeriana* spp. have been identified, possibly contributing to their sedative, antidepressant, and antitumor activities[24]. Rhizomes and roots contain a large proportion of volatile oil (ethereal valerianic oil), 1 p.c containing esters of valerianic acid (iso valerianic acid). The volatile oil contains bornyl isovalerate, formate, butyrate, and acetate, mixed with I-pinene; I-camphene, and terpineol. Isovaleric acid, an oily liquid with a powerful valerianic odor and acrid burning taste is formed by ferment decomposition; two alkaloids, chatinine and valerianine, glucoside, and a resin have been recorded[25]. Rhizomes and roots also contain the principle active flavonoids 6-methylapigenin[26], hesperdin[27], naphthalic acid, acyl-linarin, linarin-O-2-methyl butyrate, valepotriates, dihydrovaltrate, linarin isovalerate[28]. The root of Valeriana wallichii contains alkaloids, tannins flavonoids, saponin, and glycosides in the methanolic extract[29]. Four new iridoids, Valeriotetrates B and C (1 and 2), 8- methylvalepotriate (3), and 1,5-dihydroxy-3,8-epoxyvalechlorine A (4) were isolated from the roots of *Valeriana wallichii*[30].

Pharmacological Action

Valeriana wallichii is declared an antibiotic, antiamoebic, analgesic, antipyretic, antibacterial, and mild CNS depressant activities. The root is reported as antispasmodic, diuretic, carminative.[31,32,33] Its many resemblance properties that of *Valeriana officinalis* and could therefore be administered as a nervine, sedative, and tranquilizer, particularly for those suffering from nervous overstain[34]. *Valerian* encourages sleep, improves sleep quality, and reduces blood pressure[35,36]. It is an appetizer, digestive, antispasmodic, laxative, and hepatostimulant. It reduces pain, and convulsions and nourishes the central nervous system. [37]

Research-based Therapeutic administration of *Tagara*

1. Clinical trial conducted with those affected by Essential Hypertension with *Tagara Mula churna* (*Valeriana wallichii)* 5gm with lukewarm water for 30-40 days. The results had significant results in the cases of mild hypertension[38]. Compound formulation, *Brahmyadi Ghana Vati* consisting of plants, namely *Valeriana wallichii, Bacopa monnieri*, *Acorus calamus*, *Saussurea lappa*, *Rauwolfia serpentine*, and *Nardostachys jatamansi* was administrated patients of Hypertension. Patients were divided into trial and control groups of 20 each. The trial drug is significantly effective[39].
2. P'Tabs, a composite herbal drug containing *Acorus calamus, Piper longum, Valeriana wallichii*, *Rauwolfia serpentina, Hyoscyamus reticulatus, Noardostachys jatamansi*, Vitis vinifera, and *Herpestis monnieri* were given orally in patients of insomnia and irritability. Good Relief was observed in maximum patients[40].
3. *Yashimadhu* & *Tagara* both are equally effective in Mental Adjustment Disorders through their mode of action are different[41].
4. The patients with insomnia have been treated with compound herbal formulation consisting of *Tagara* (*Valeriana wallichii*), *Shankhapushpi (Convolvulus pluricaulis)*, *Brahmi (Bacopa monnieri)*, *Musta (Cyperus rotundus*), *Ashwagandha (Withania somnifera)*, *Jatamansi (Nardostachys jatamansi)*, *Munakka (Vitis vinifera)*, *Raktachandana (Pterocarpus santalinus)*, *Parpataka (Fumaria indica)*, *Kutaki (Picrorhiza kurroa)*, *Dashmula, Amaltas (Cassia fistula)*. This has been given in the dose of 20gm twice a day as coarse powder to prepare a decoction by the *'Chaturthavashesh'* method mentioned by *Sharangadhara* for six weeks in one group[42].
5. *Valeriana wallichii,* two-month regular administration reduce stress, attenuated anxiety, depression, and enhanced adjustment but could not alter memory, attention, and concentration in

humans. Observations indicate that *Valeriana wallichii* has potential action in the regulation of the hypothalamic-hypophyseal-adrenocortical axis (HHA axis), especially during stress-related disorders in humans. *Valeriana wallichii* may be a safer alternative to benzodiazepines for the therapy of stress-related clinical disorders[43].

Evidence-based Classical Pharmacological *Valeriana wallichii* Actions

1. **Cerebral Protector:** Bilateral carotid artery occlusion followed by reperfusion produced significant cerebral infarction and impaired short-term memory, motor coordination, and lateral push response. Pre-treatments with chlorophyll and aqueous extracts of *Bacopa monnieri* and *Valeriana wallichii* markedly attenuated ischemia-reperfusion induced cerebral injury in terms of decreased infarct size, increase in short-term memory, motor incoordination, and lateral push response[44].
2. **Radioprotective activity:** An aqueous extract from *Valeriana wallichii* containing hesperidin as one of its major constituents was evaluated for its ability to protect against radiation injury in model systems like plasmid deoxyribonucleic acid (DNA) and cultured human fibroblast cells[45].
3. **Analgesic:** Weak central and a strong peripheral antinociceptive effect of *Valeriana wallichii* (maalilol chemotype) has been demonstrated and a conclusion has been drawn that essential oil exerted peripheral antinociceptive effect via inhibition of prostaglandin synthesis and central analgesic action via opioidergic pathway[46].
4. **Antispasmodic:** Antispasmodic and hypotensive properties of *Valeriana wallichii* are facilitated probably through K+ATP channel activation, which justified its usage in gastrointestinal and cardiovascular complaints and rationalizes some of the folkloric uses. In rabbit aortic preparations, plant rhizome extract produced a selective and glibenclamide-sensitive relaxation of low K+ induced contractions and produces antispasmodic and blood pressure lowering activities[47].
5. **Antidepressant activity:** *Valeriana wallichii* has the existence of three chemotypes. The study evaluated the antidepressant-like effect of root essential oil of *Valeriana wallichii* patchouli alcohol chemotype in both acute and chronic treatment studies. A significant increase in the level of norepinephrine and serotonin was found at 20mg/kg doses, while no change was observed at 10mg/kg doses and 40mg/kg doses. The extract confirmed the antidepressant effect and considerably increased norepinephrine and serotonin levels in the forebrain. The study established that the nitric oxide pathway was involved in helping the antidepressant-like effect [48-49]. Demonstration of anxiolytic activity with various GABA-A receptor agonist diazepam, which was used to evaluate the potentiation of the extract. The study suggested that a promising consumption of hesperidin reduces the effective therapeutic doses of benzodiazepines[50].
6. **Antimicrobial activity:** The crude extracts have antimicrobial activity against gram-positive Staphylococcus aureus, Staphylococcus epidermidis, and gram-negative Escherichia coli, Klebsiella pneumonia, Pseudomonas aeruginosa, Proteus mirabilis bacteria, and fungi Aspergillus niger, Candida albicans, M. furfur using agar diffusion method. The findings demonstrated the promising antibacterial and antifungal activity of *Valeriana wallichii* against major skin pathogens. It is a natural source of good therapeutic agent against a broad spectrum of skin pathogens.[51]
7. **Sleep enhancing activity:** Isolated 6-methylapigenin (MA) from Valeriana wallichii proved that it is a benzodiazepine binding site (BDZ-bs) ligand. The presence of 2S (-)-hesperidin (HN) in Valeriana describes that it has sedative and sleep-enhancing properties. MA, in turn, was found to have anxiolytic properties and was able to potentiate the sleep-enhancing properties of hesperidin[52]. Valeriana wallichii aqueous root extract has a sleep quality improving effect which may be dependent upon levels of monoamines in the cortex and brainstem. The effects of Valeriana wallichii aqueous root extract has been investigated on sleep-wake profile and level of brain monoamines in rats.[53]
8. **Anti-inflammatory and antioxidant activity:** Dopaminergic neurodegeneration in Parkinson's disease (PD) is the result of oxidative stress and inflammation and contributing factors in neurodegeneration. *Valeriana. wallichii* rhizome extract has the potential to mitigate oxidative stress and inflammatory damage in PD. The antioxidant and anti-inflammatory activity of *Valeriana wallichii* extracts found in PD-induced mice were administered orally with three different doses of plant extract for 14 days and their interactive changes were studied. It was concluded that *Valeriana wallichii* rhizome extract has the potential to improve oxidative stress and inflammatory destruction in PD[54].

DISCUSSION

Valeriana wallichii tastes unpleasant bitter, pungent, and astringent and smothers the cold because of *Ushna Virya* (hot potency) and is generally utilized in fever, epileptic fits, head inconveniences disorders *(Shiroroga)*, eye disorders *(Netra vikara)*, and blood disorders. The roots are utilized for snake and scorpion poisoning. It is additionally utilized in

hypertension because of its purposes in blood problems and acts as a *Vata* alleviator according to reference in the text. It is a great medication for sleep deprivation and irritability, so it may be very well utilized in epileptic fits and psychosomatic problems. MA and HN are new derivatives from the developing group of flavonoids with action on CNS, and their properties propose that they are promising medication leads in the field. Investigation of the neuroprotective properties of *Valeriana wallichii* containing valeric acid and it's conceivable component of activity in neuro-degeneration having a huge neuroprotective activity to improve memory and retentive property through GABA receptor. *Valeriana wallichii* rhizome can work on oxidative pressure and inflammatory destruction. Screening of pesticide action of *Valeriana* prompts the disclosure of a new specialty for pest control.

CONCLUSION

The *Valeriana wallichii* plant, a member of the *Valerianaeceae* family, is therapeutically used in Indian traditional medicine because it contains several bioactive compounds with a range of biological effects, including anticonvulsants, anti-inflammatory agents, antidepressants, and antioxidants that can be used as treatments for Parkinson's and Alzheimer's disease. Apart from these actions, *Valeriana wallichii* is a neuroprotector, antimicrobial, anti-venom for snake/ scorpion poisoning, stress reliever, analgesic, radioactive protector, and sedative for insomnia. Numerous activities in our Ayurvedic text are consistent with current scientific findings, demonstrating the validity of the text's medical applications. These results support the traditional Ayurvedic knowledge of *Valeriana wallichii's* medicinal potential. Despite significant advancements in the pharmacology and phytochemistry of plants although more conclusive studies regarding the safety, efficacy, and toxicity of extracts and pure compounds are still required to advance our understanding of the plant.

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Cite this article as:
Tripti Tyagi, Sakshi Sharma, Rajesh Sharma. Pharmacological Actions of Valeriana Wallichii (Tagara): A Fundamental Analysis Supporting Traditional Benefits. International Journal of Ayurveda and Pharma Research. 2022;10(Suppl 1):1-7.
https://doi.org/10.47070/ijapr.v10iSuppl1.2468
Source of support: Nil, Conflict of interest: None Declared

***Address for correspondence**
Dr. Tripti Tyagi
PG Scholar (Ayu),
Dravyaguna Department,
Ayurvedic and Unani Tibbia College and Hospital, Karol Bagh, New Delhi.
Email: tripti.tyagi05@gmail.com