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VALERIANA WALLICHII – A RICH AROMA ROOT PLANT - A REVIEW

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ABSTRACT

Plant extracts from medicinal plants had been used for many centuries, to treat several health disorders. The active constituent present in the plant plays a remarkable role in curing diseases. In this aspect, *Valeriana wallichii* is widely used in the indigenous system of medicine. It is also known as *Valeriana jatamansi*. Different parts of the plant root, rhizome, seed and flower have medicinal values. The root of the plant is specifically rich in aroma. The active constituents present in the plant are alkaloids, flavonoids, saponins, tannins and essential oil. The therapeutic action of the plant is due to presence of major chemical constituent flavonoids. The herb is beneficial in treating insomnia, nervous problem, snake-bite, hysteria and also as analgesics. Many pharmacological activities viz., anti inflammatory, antispasmodic, antipsychotic, antimicrobial, anthelmintic, antioxidant, cytoprotective and had been reported in different plant extracts. Based on many scientific researches this article is reviewed to reveal the therapeutic aspects of the herb for the beneficial for further research.

Keywords: *Valerian wallichii*, aromatic, flavonoids, Sleep, antioxidant.

INTRODUCTION

In recent years plant derived drugs secured importance because of their unfetuted efficacy as phytomedicines. The active compounds or compounds present in these natural products serve as templates. These active compounds isolated from various parts of the plant such as leaves, fruits, stem, roots, seeds have been shown to possess excellent medicinal value. A wide range

of plant varieties used in folklore medicine have been studied for treatment of various diseases, viz., cancer, diabetes, arthritis, infectious diseases, etc. However, still it remains an area of research interest for unveiling the medicinal value of certain plant species. Recently, use of natural products because of their reduced side effects when compared to synthetic drugs it is due to the presence of active phytoconstitutents that are present in the medicinal plants are used for treatment of various diseases. Antioxidants play an essential role in protecting the tissue damage caused by reactive oxygen species [1]. In this aspect *Valeriana wallichii* is one such plant with powered medicinal properties.

Description of the plant

Valeriana wallichii is a small 14-45cm height perennial herb[2]. Valerian is a widely used plant –based medicine. Valerian is a member of the Valerianaceae family consisting of about 250 species of Valeriana occurring throughout the world [3, 4]. Herbs are generally found to grow mostly in the mountainous (1,300-3,300m) terrain of the Himalayas [3]. Valeriana (Valerianaceae) originated from the Latin word "Valere" meaning to be in good health, a source of important phytomedicines.

Valeriana wallichii is an ingredient of herbal medicines in Indian systems of medicine [5]. The plant is popularly known as Indian valerian. Is a plant with root stock, thick branching stem, sharply pointed leaves, white of pink flowers in clusters and hairy fruit [6]. *Valeriana wallichii* is an extremely polymorphous complex of sub-species with natural dispersed throughout temperate and polar Eurasian zones [7]. Root with piliferous layer of papillosed cells, some developed into root hairs; exodermises, or a single layer of quadrangular to polygonal cells with suberized walls, and containing globules of volatile oil; cortex, parenchymatous with numerous starch granules, the outermost cells containing globules of volatile oil; endodermis, of one layer of cells with surrounding a small central parenchymatous showing a cleft or stellate granules hilum; the compound granules with 2-6 components, up to 20 m in diameter roots a pith of starch-bearing parenchyma, vascular bundles with secondary thickening and a periderm originating in the piliferous layer[7] (Mhaske *et al*., 2011). The plant occurs in short, irregular pieces about 5m long and 6-12cm in dm marked with transverse ridges and bearing numerous, prominent, circular tubercles to some of which on the under surface, thick rootlets are attached. The upper surface bears the leaves. The rhizome is hard and tough internally, it is greenish –brown in color. The odour is powerfully Valerianceous.

Geographical distribution

It is well distributed in all the temperate regions of the world. In India, it is grown in Himalayas. It is an extremely polymorphous complex of sub-species with natural populations dispersed throughout temperate and sub-polar Eurasian zone. The species is more common in damp woods, ditches and it is cultivated as medicinal plant especially in Belgium, England, France, Germany, India, Netherlands, the Russian Federation and United States of America.

Taxonomy / Botanical Classification

Synonyms: *Valeriana jatamansi*

Common names: Valerian

Family: Valerianaceae

Parts Used: Roots

Chemical (Active) Constituents

The major known active principles of this herb are valepotriates, dihydrovaltrate, isovalerinate, 6-methylapigenin, hesperidins and sesquiterpenoids. Its rhizome and root contains volatile oil (valerianic oil) which is composed of alkaloids, boryl isovalerianate, chatinine, formate, glucoside, isovalerenic acid, 1- camphene, 1-pinene, resins, terpineol and valerianine. From the rhizomes, some important compounds, such as citric acid, malic acid, maliol, succinic acid and tartaric acid have been isolated [2]. The herb has been reported to contain several bioactive flavonoids like Linarin, isovalerianate, 6 methyl apigenin and hesperidins [2]. The constituents include valepotriates (iridoids), the components of the volatile oil, including monoterpenes and Sesquiterpenes (Valerenic acids) as well as number of other constituents. Valerian products are usually standardized to valerenic acid or sometimes to valeric acid *Valeriana wallichii* consists of volatile oil (Valerianic oil) containg valerenic acid, isovalerenic acid and the terpineol. The volatile components of rhizomes of *Valeriana wallichii* consist of Sesquiterpenes (89.3%) kanokonyl acetate (42.4%) γ-curcumene (10.7%) ar-curcumene (7.2%) (Z)- β farnesene (3.2%), xanthor rhizol (4.1%), 7-epi-α-selinene (2.2%), valeranone (2.0%) and curcuphenol(1.4%). Other active constituents of *Valeriana wallichii* are sesquiterpenes, 6-methyl apigenin and hesperidinoids[5].

Traditional Uses

Valerian roots have been used for hundreds for years for its sedative and antispasmodic properties. The plant is widely known for its use in anxiety, insomnia, epilepsy and hysteria. It is considered useful as a potent tranquilizer, antispasmodic and hypotensive, stimulant and also to improve liver function in gastrointestinal disorders [9]. Historically, too, Valerian roots were known as to alleviate and low forms of fever [3]. In modern rational phytotherapy also the reputation of *Valeriana* species is mainly for treating nervous tension [3]. The plant have been used for curing nervous unrest, emotional arrest (as tranquilizer/sedative), epilepsy, insanity, snake-poisoning, eye-trouble skin diseases, as a relaxant, carminative and for complexion improvement. Valerian continuous to be a safe sedative / hypnotic choice for patients with mild to moderate insomnia and also have depressant effect on the CNS 5, 10. The plant is also used as a mild sedative.

For treatment of inflammatory conditions it has been used in indigenous system of medicine such as scorpion stings. It has been also useful in jaundice, pain conditions, neurosis, and also for cytotoxic. For the treatment of habitual constipation the rhizomes of *Valeriana wallichii* have been studied. The herb has been used successfully in traditional systems of medicine like Ayurveda and Unani against Leishmania, diseases of eye and liver, hysteria, hypochondriasis, nervous unrest and emotional arrest; it has been found useful in clearing voice and acts as a stimulant in advance stage of fever and nervous disorder, inflammatory conditions like after scorpion stings and jaundice and in pain conditions epilepsy, insomnia, neurosis, sciatica. The plant is widely used in the treatment of anxiety and depression either alone or in combination with other herbs specifically St. John's Wort.

An herbal preparation containing Valeriana wallichii has been found to be effective in dyspeptic symptoms. The plant essential oil exhibited antimicrobial activity against large number of pathogenic bacteria and potent antifungal activity against different human plant fungal pathogens [2]. Therapeutic purposes are the roots and rhizomes improves subjective experiences of sleep when taken rightly over one to two periods but long –term safety studies and lacking[4]. One of the most widely used traditional remedies for various complications associated with nervous system and digestion is *Valeriana wallichii* [11]. *Valerian* is one of the most widely used herbal medicines in the world. It was first used as a treatment of epilepsy in the late 16th century. Numerous reports by a wide variety of writers followed and *Valerian* subsequently became routinely used for the treatment of various disorders. Uses reported on and related its usefulness for hysteria, antispasmodic, anthelmintic, diuretic,

diaphoretic and emmenagogue actions to Valerian [12]. One of the most widely used traditional remedies for various complications associated with nervous system and digestion is *Valeriana wallichii* [11]. From the underground organs of several Valeriana species, Valerian is an ancient tranquillizing drug obtained[13]. In hospital based clinical setup *Valeriana wallichii* an Indian medicinal plant, has been on trial for its role in stress disorders[14].

Standardized parameters

Acid –insoluble ash: Not more than 7%

Dilute ethanol-soluble extractive: Not less than 15%

Pesticide residues

To be established in accordance with national requirements. Normally, the maximum residue limit of aldrin and dieldrin for *Valerian wallichii* is not more than 0.05mg/kg.

Heavy metals: Recommended lead and cadmium levels are no more than 10 and 0.3mg/kg, respectively, in the final dosage form of the plant material.

Radioactive residues: For analysis of stronium -90, iodine-131, caesium -134, caesium-137 and Plutonium – 239.

Chemical assays: Quantitatively by distillation determination, it contains not less than 0.5%v/w of essential oil. Content of individual constitutents including valepotriates, valerenic acids and valerenal, were determined by high performance liquid or gas – liquid chromatographic methods [8] .

Pharmacological activities of *Valeriana wallichii***:**

Valeriana wallichii is one of the widely used medicinal plants in many parts of the world including India in the management of various conditions. It has numerous pharmacological activities. The main activities of the plant are analgesic and anti inflammatory, myorelaxant and antispasmodic, psychotic activity, radioprotective activity antimicrobial activity, hypnotic activity, anthelmintic, cytotoxic and antioxidant activity.

Analgesic activity

Essential oil and alcohol extract of *Valeriana wallichii* exerted good peripheral analgesic action via inhibition of prostaglandin synthesis on acetic acid induced writhing [5].

Anti inflammatory activity

By using *in vitro* lipoxygenase inhibition assay methanolic extract and ethyl acetate fractions of *Valeriana wallichii* anti inflammatory activity was carried out [11]. Carrageenan induced hind paw edema test on the acute and chronic phase inflammation models in male wistar rats showed *in vitro* and *in vivo* anti inflammatory activity of the ethyl acetate fraction showed good activity [11].

Antispasmodic activity

The hypotensive effects of *Valeriana wallichii* are mediated possibly through K_{ATP} channel activation [15].

Psychotic activity

Petroleum ether extract evaluated ambulatory activity, elevated plus maze, spontaneous locomotor activity and sodium thiopental induced sleep in mice [16]. Valtrate, an active constituent of *Valeriana wallichii* have potential anxiolytic activity in rats[17]. In streptozotocin induced animal model of diabetes the effect of *Valeriana wallichii* on learning and memory impairment were measured by Morris maze and elevated plus maze and showed a beneficial effect [18]. Aqueous extract of *Valeriana wallichii* has quantifying effects of mild sedatives on both physiological and subjective aspects of sleep[19, 20]. The essential oil of *Valeriana wallichii* exerted antidepressant activity using forced swim test in mice at a dose of 10, 20 and 40mg/kg p.o of the plant. The aqueous extract of *Valerian wallichii* markedly attenuated ischemia-reperfusion induced cerebral injury in mice [21].

Radioprotective activity

Aqueous extract of *Valeriana wallichii*, Hesperidin one of the major constituent protected against radiation injury in plasmid deoxyribonucleic acid (DNA) and cultured human fibroblast cells[2].

Antimicrobial activity

By gas chromatography-mass spectrometry the essential oil of *Valeriana wallichii* and components of valerian were tested against Pine wood nematode *Bursaphelenchus xylophilus* [22]. With the valerian root extracts *in vitro* studies carried out against human cytochrome p4503A[4]). Chloroform fraction and hexane fraction showed good activity against *S. aureus* and *B. subtilus*[11].The plant root and the stem of *Valeriana wallichii* of different extracts viz, pet ether, chloroform, acetone, methanol and aqueous extracts showed a maximum zone of inhibition against almost all organisms (gram positive eg. *Enterococcus faecalis*,

Staphylococcus onerous and gram negative eg. *Klebsiallea pneumaniae, Escherichia coli and two fungi candida albicans and Aspergillus fumigants* in cup plate method.[7] Different root extracts like water, methanol and chloroform of *Valeriana wallichii* effective against antileishmanial activity against *L.major amastigotes* [2].

Hypnotic activity (Sleep)

In man, sleep quality improves in the aqueous extract of *Valeriana wallichii* [23]. Brain monoamine level in rats and sleep quality were improved by the aqueous root extract of *Valeriana wallichii* [9].

Anticonvulsant activity

Hydroethanolic extract of *Valeriana wallichii* decreased the convulsions using maximal electroshock seizures (MES) in swiss albino mice [12].

Anthelmintic activity

Earthworms *Pheretima postuma* was evaluated using the aqueous extract of rhizomes of *Valeriana wallichii*. The anthelmintic activity of the extract may be due to the presence of tannins that had binded with free proteins in the gastrointestinal tract of the host animal [6].

Cytotoxic activity

The valerian plant extract against the U937 cells were determined using the MTT assay. The extract showed a high content that contributed to their antioxidant activities [10, 25].

Antioxidant activity

The antioxidant activity of *Valeriana wallichii* was carried out by DPPH method[24]. The essential oil of *Valeriana wallichii* was used to determine DPPH method and chelation power assay [25]. Total phenolic content, total flavonoids content, total ascorbic acid, free radical scavenging activity, hydroxyl radical scavenging activity and peroxynitrite scavenging activity, and preventive of oxidative DNA damage were carried out by the methanol extracts of *Valeriana wallichii*[10].

Caution

Even though the plant has been used since many centuries, in Ayurveda for the treatment of insomnia, as a leishmanic agent, as an antioxidant, the plant has certain ill effects that should be used with caution. Valerian should not be taken long term as it can cause mental depression in some people. It can cause a stimulating rather than a relaxing effect, heaviness

and pain in the head stupor if taken in excess. Externally the pure oil of Valerian can be used for spinal rubs in diseases where the spinal cord needs lessened sensibility to pain and stimulation.

Other uses: Increases earthworms in the garden and it have the ability to stir up and increase phosphorous activity in the soil around it provides rich mineral content to compost.

CONCLUSION

Valeriana wallichii belongs to the family Valerianaceae commonly grown as a medicinal plant. It is highly beneficial herb since many long years. *Valeriana wallichii* has been therapeutically ethnopharmacologicaly used as a therapeutic agent for a variety of diseases as seen in this article. It has been observed that from the various parts of the plant different solvent systems were used which acts as a key factor to determine the active constituents. The flavonoids isolated from this plant may be responsible for its pharmacological activities. Plant various extracts have traditional claim for their pharmacological activities. These findings can form the scientific basis to explore other potential activities of the plant.

REFERENCES

1. Hossen S. M. M, Jahidul Islam J, Hossain S M S, Rahman M Mand Ahmed F. Phytochemical and Biological Evaluation of MeOH Extract of *Casuarina equisetifolia* (Linn.) Leaves.
2. Katoch O, Kaushik S, Sadashiv M, Kumar Y, Paban K. Agrawala, Mishra K. Radioprotective property of an aqueous extract from *Valerian wallichii*. Journal of Pharmacy and Bioallied Sciences, 2012: 4; (4).
3. Ghosh S, Debnath S, Hazra S, Hartung A, Thomale K, Schultheis M, Kapkova P, Schurigt V, Moll H, Holzgrabe U, Hazra B. *Valeriana wallichii* root extract and fractions with activity against Leishmania spp.Parasitol Res, 2011; 108 : 861- 871.
4. Tania Lefebvre, Brian C Foster. *In vitro* activity of commercial Valerian extracts against human cytochrome P450 3A4. Journal of Pharmacy and Pharmaceutical Sciences, 2004; 7 (2) : 265-273.
5. Sah S P, Mathela C M and Chopra K. Elucidation of possible mechanism of analgesic action of *Valeriana wallichii* D C. (Patchouli alcohol) in experimental animal models Indian Journal of Experimental Biology, 2010; 2010:289-293.

6. Potdar V H, Lole V D and Patil S S. *In vitro* anthelmintic activity of rhizomes of *Valeriana wallichii* D C (Valerianaceae) against Pheretimeposthuma. Indian Journal of Pharmaceutical Education and Research, 2011; 45 (1): 83-85.
7. Dynashwar K. Mhaske, Dinanth D. Patil, Gurumeet C. wadhawa. Antimicrobial activity of methanolic extract from rhizome and roots of *Valerianawallichii.* International Journal on Pharmaceutical and Biomedical Research, 2011; 2(4):107- 111.
8. Karthikeyan R, Suganthi A, SapnaShrikumar, Ravi T K. *Valeriana wallichii* traditional medicinal plant of India Pharminfonet.com.
9. Sahu S, Ray K, Kumar Y, Gupta G, Kauser H, Sanjeev K, Mishra K S, Panjwani U. *Valerian wallichii* root extract improves sleep quality and modulates brain monoamine level in rats. Phytomedicine, 2012; 19: 924- 929.
10. Kalim M D, Bhattacharya D, Banerjee A, Chattopadhyay S. Oxidative DNA damage preventive activity and antioxidant potential of plants used in Unani system of medicine. BMC Complementary and alternative medicine, 2010; 10: 77.
11. Khuda F, Iqbal Z, Zakiullah, Khan A, Nasir F. Antimicrobial and anti-inflammatory activities of leaf extracts of *Valeriana wallichii* D C. Pakistan Journal of Pharmaceutical Sciences, 2013; 26 (3): 451– 4.
12. Joseph L, Rejeesh E P, Narayan R S. Supraadditive effect of hydro ethanolic extract of *Valeriana wallichii* (Indian Valerian) root and phenobarbitone against maximal electroshock seizure in mice.
13. Marder M, Viola H, wasowski C, Fernandez S, Medina JH, Paladini AC. 6 methylapigenin and hesperidin: a new valeriana flavonoids with activity on the CNS. Pharmacology, biochemistry and behavior, 2003; 75(3): 537-45.
14. Bhattacharyya D, Jana U, Debnath P K, Sur T K. Initial exploratory observational pharmacology of *Valeriana wallichii* on stress management : a clinical report Nepal Med Coll J 2007; 9(1): 36-9.
15. Anwar H Gilani, Arif-ullah Khan, QaiserJabeen, FazalSubhan, RukhsanaGhafar. Antispasmodic and blood pressure lowering effects of *Valeriana wallichii* are mediated through K plus channel activation. Journal of Ethnopharmacology, 2005; 100 : 347-352.
16. Bhandarkar A V, Sashidhara S and Deepak. M. Comparative anxiolytic activity of petroleum extracts of *Valeriana jatamansi* from different accessions in mice. Research and reviews: Journal of Pharmacology and Toxicological studies, 2014; 2(2): 34-39.

17. Shi S, Jin- NLi Shi, Jong Liu, Yan – Li Wang, Chun – Guo Wang, Wen-Hui Hou and Jian – You Guo. The anxiolytic effects of valtrate in rats involves changes of cortisone levels. Evidence-based complementary and alternative medicine 2014, doi.
18. Nabi N U, Neeraj K, Preeti K. Effect of Valeriana wallichii DC on learning memory impairment in streptozotocin induced animal model of diabetes. International journal of universal pharmacy and bio sciences, 2013; 2(6): 476-493.
19. Leathwood P D, Chauffar D F, Heck E, Munoz-Box R. Aqueous extract of Valerian root (*Valerianaofficinalis*) improves sleep quality in man. Pharmacology Biochemistry and Behaviour, 1982; 17 (1): 65-71.
20. Leathwood P D,Chauffard F. Quantifying effects of mild sedative. J Psychiatry Research, 1983; 17 (2): 115-22.
21. Ashish K Rehni, Hardeep S Pantlya, Richa Sri and Manjeet Singh. Effect of chlorophyll and aqueous extracts of *Baccopamonniera* and *Valerian wallichii* on ischaemia and reperfusion – induced cerebral injury in mice. Indian Journal of Experimental Biology, 2007; 45: 764-769.
22. Kim J, Seo S M, Lee S G, Shin S C and Park I K. Nematicidal activity of plant essential oils and components fron Valerian (Valeriana wallichii)essential oils against Pine wood nematode Journal of Agricultural and food chemistry 2008, 56, 7316-7320.
23. Pallesen S, Bjorvatn B, Norhus IH, Skjerve A. Valerian as a sleeping aid, 2002; 10: 122(30): 2857-9.
24. Sudhashu, Rao N, Mittal S and Menghani E. Evaluation of antioxidant properties of *Valeriana wallichii* to scavenge free radicals. Asian Journal of Pharmaceutical and clinical research, 2012; 5(3): 238-240.
25. Thusoo S, Gupta S, Sudan R, Kour J, Bhagat M. Antioxidant activity of essential oil and extracts of *Valeriana jatamansi* roots. Biomed Research International 2014.