



Valeriana officinalis L.

37

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Abstract

Valeriana officinalis Linn (valerian), medicinal plant belonging to the Valerianaceae family, is widely distributed in temperate regions. As a traditional herbal medicine, the roots of *V. officinalis* have long been used for insomnia treatment, sedative, antiepileptic, and antispasmodic purposes. In addition, in the researches, it is recorded that the plant has, for example, anxiolytic, antidepressant, anticonvulsant, myorelaxant effects. Valerian is known to contain monoterpenes, sesquiterpenes, valepotriates, alkaloids, flavonoids, and lignans. The use of valerian in treatment with other antidepressants and alcohol is not recommended.

Keywords

Valeriana officinalis · Valerian · Medicinal usage · Phytochemical content

37.1 Introduction

Valeriana officinalis is a member of the Valerianaceae family. Valerianaceae is a family of annual or perennial herbaceous plants that grow in temperate regions. *V. officinalis* grows naturally in various parts of Europe and Asia. It is also cultured in some European countries due to its medicinal value (Tanker et al. 2007). The underground part is used in the treatment (PDR for Herbal Medicines 2000). The roots of *V. officinalis* have been used in the treatment of insomnia both in America and Europe for very long years (GKGM 2018). There are studies showing that it has antidepressant, sedative, anxiolytic, spasmolytic, muscle relaxant, and antiulcerogenic effects (PDR for Herbal Medicines 2000). Valerian constituents include sesquiterpenes, monoterpenes, alkaloids, flavonoids, caffeic acid derivatives, valepotriates, lignans, and amino acids (National Toxicology Program 2009a, b). While fresh valerian root contains valepotriates, the aged root contains isovalerianic acid (Tanker et al. 2007). In this study, various information about *V. officinalis*, which has medical importance, was presented.

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37.2 Botanical properties

The plant is 50 to 100 cm tall. It is androgynous and has pink to white flowers. The calyx consists of 10 revolute tips. The flowers have 10 rotary-ended calyx, 5-chambered corolla, 3 stamens, and a 3-chambered inferior ovary. The fruit is achene type. Basal leaves are oblong-ovate, subacute, pinnatisect, and stem leaves ampexicaul; upper stem leaves vary from pinnatisect to pinnatifid (FFD 2011; PDR for Herbal Medicines 2000).

37.3 Habitat

The plant grows naturally in Europe, Asia, Northeast America, and Turkey. It is cultivated in England, Europe, Japan, and the USA (FFD 2011; PDR for Herbal Medicines 2000).

37.4 Medicinal Parts

Dried underground parts and roots (PDR for Herbal Medicines 2000).

37.5 Traditional Uses

Fresh or dried roots of *V. officinalis* are traditionally used as hypnotic, hypotensive, antispasmodic, carminative, stomachic, and sedative. It has been reported that it is used as tea and infusion in migraine, insomnia, hysteria, neurasthenia, fatigue, rheumatic pains, dysmenorrhea, vomiting, and nervous stomach cramps (Barnes et al. 2007; Khan and Abourashed 2010; GKGM 2018). In addition, it is recorded that in traditional medicine, it is used as decoction as a menstrual remedy, antiperspirant, antidote, diuretic, pain reliever in epilepsy, headache, urinary system disorders, vaginal fungal infections, and sore throat (WHO 1999; GKGM 2018)

37.6 Chemical Constituent

V. officinalis is known to contain alkaloids, terpenes, organic acids, and its derivatives, valepotriates and flavones (Pilerood and Prakash 2013). It also contains compounds such as iridoids, steroids, amino acids, polyphenolic compounds, tannins, gums, and resins (GKGM 2018). Its essential oil contains monoterpenes, sesquiterpenes, and sesquiterpene carboxylic acids (ESCOP 2003). The underground part of *V. officinalis* contains mainly sesquiterpenes and secondly valepotriates. Valerinic acid is known as major component (Nandhini et al. 2018). The second main group is valepotriates. It mainly contains valtrate isovaltrate, but also includes valepotriates such as dihydrovaltrate, isovalerohydroxydihydrovaltrate, and 1-acevaltrate (WHO 1999). It also contains alkaloids such as actinidine, valerianine, and caffeic acid derivatives such as chlorogenic acid (PDR for Herbal Medicines 2000).

37.7 Pharmacological Activities

37.7.1 Anxiolytic and Antidepressant

Hattesoht et al. evaluated CNS-related effects of different valerian extracts using behavioral paradigms (mice and rats). The results showed that valerian had anxiolytic and antidepressant effects, contributing to sleep development (Hattesoht et al. 2008). *V. officinalis* root extract reduced anxiety in rats compared to ethanol control group in the elevated plus maze test (Murphy et al. 2010). Valle-Mojica et al. stated that valerian and valerenic acid had anxiolytic effects in the zebrafish. They also noted that valerian interacts selectively with metabotropic glutamate receptors (mGluR I and mGluR II) (Valle-Mojica and Ortíz 2012).

37.7.2 Anticonvulsant Effect

Rezvani et al. evaluated anticonvulsant effect of different extracts of *V. officinalis* in amygdala-kindled male Sprague-Dawley rats. The results showed that aqueous extract of valerian had anticonvulsant effect (Rezvani et al. 2010). Torres-Hernández et al. determined the anticonvulsant effects of *V. officinalis* extracts and valerenic acid in adult zebra rats. They also stated that valerian extracts increase the effect of clonazepam and phenytoin (Torres-Hernández et al. 2015).

37.7.3 Myorelaxant Effects

The myorelaxant effects of *V. officinalis* extract were investigated in mice comparison with tetrazepam. It caused a significant decrease in skeletal muscle strength with no significant effect on endurance and neuromuscular tone (Caudal et al. 2018).

37.7.4 Tension-Type Headache

Azizi et al. evaluated the effectiveness of valerian on tension-type headache in a double-blind randomized placebocontrolled trial. They stated that the valerian capsule could reduce tension-type headache (Azizi et al. 2020).

37.7.5 Cardiovascular System Diseases

Ethanol and aqueous extracts of *V. officinalis* L. root exhibited anticonvulsant, antihypertensive, and antibronchospastic effects in anaesthetized guinea-pigs (Circosta et al. 2007). There are some studies showing that valerian extract regulates blood lipid level (Chen et al. 2015).

37.7.6 Gastrointestinal Activity

It has been noted that valerenic acid, valtrate, and valeranone contained in valerian have spasmolytic effects on smooth muscle in guinea pig ileum (Wagner et al. 1972; Murti et al. 2011).

37.7.7 Insomnia Treatment

As a result of 16 studies conducted by Bent et al. covering 1093 patients, it is stated that *V. officinalis* improves sleep quality without side effects (Bent et al. 2006; GKGM 2018).

37.8 Toxicity

37.8.1 Acute Toxicity

The ethanol extract of valerian root administered intraperitoneally to mice showed low toxicity ($LD_{50} = 3.3$ g/kg) (EMEA 2007; Rosecrans et al. 1961).

37.8.2 Chronic Toxicity

Ethanol extract of valerian root was administered to rats at doses of 300 and 600 mg/kg p.o for 30 days. The blood pressures, animals weights and organs weights, hematological parameters, and biochemical parameters were examined. It was observed that the body weights of the animals receiving high doses were higher than the control groups ((EMEA 2007; Fehri et al. 1991). In another study, the ethanolic extract of valerian root at doses of 400–600 mg/kg was given intraperitoneally to rats for 45 days. It did not cause any significant changes in body weight, blood count, or urine status (EMEA 2007; Rosecrans et al. 1961).

37.9 Adverse Reactions

It has been stated that chronic use of Radix Valerianae may cause minor side effects such as headache, excitability, uneasiness, and insomnia, and in very high doses, bradycardia, arrhythmia, and intestinal immobility (Willey et al. 1995; WHO 1999). Rarely, gastrointestinal complaints can be observed. In addition, in long-term administration, restlessness, sleeplessness, mydriasis, and cardiac function disorders can be seen (PDR for Herbal Medicines 2000).

37.10 Drug Interactions

Valerian is not suitable for use with other antidepressants, benzodiazepines, barbiturates, and alcohol (PDR for Herbal Medicines 2000).

37.11 Use in Pregnancy and Lactation

Use of valerian during pregnancy or in nursing mothers is not recommended (PDR for Herbal Medicines 2000).

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