



ISSN (E): 2277-7695
ISSN (P): 2349-8242
NAAS Rating: 5.23
TPI 2023; 12(7): 149-153
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www.thepharmajournal.com
Received: 08-05-2023
Accepted: 10-06-2023

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Sweet Violet (*Viola odorata* L.) Banafsha a medicinal plant in Himalayan region of Jammu and Kashmir: A review

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Abstract

Sweet Violet (*Viola odorata*) It is a perennial herb that has a place with the family Violaceae. The root and parts that grow above the ground are used to make medicine. It is popularly known as English Violet and locally known as “Banafsha” in Kashmir region. It is used for stress, fatigue, insomnia symptoms of menopause, depression, common cold, influenza, and many other condition. This survey will gather the definitive portrayal of compound constituent’s pharmacological employment of sweet Violet (*Viola odorata* L. It is rich in many phytoconstituents such as, saponins, salicylates, alkaloids, flavonoids, saponins, tannins, phenolics, coumarins, phenolic glycosides, gaultherin, violutoside, saponins, flavonoids, and odoratine. The global demand for herbal medicinal products has increased significantly in recent decades. It is estimated that, the world’s population will be expected to reach 8.5 billion in 2030. It is an ethnobotanical herb of India. It holds a special position as a potent adaptive and aphrodisiac in Ayurvedic System of Medicine.

Keywords: Jammu & Kashmir, *Viola odorata*, multidisciplinary actions, medicinal plant, perfumed flavour

Introduction

Sweet Violet, English Violet, Garden Violet, Sweet Blue, Wood Violet, *Viola odorata*, is a charming perennial, bearing tiny, strongly scented flowers over semi-evergreen foliage. It's perfect for growing in a sheltered spot in light shade and can make good, light ground cover in a dappled woodland garden or under shrubs. A carpet of sweet violets makes fragrant ground cover in a rose bed, giving it a spectacular early flowering display leading up to the start of the rose season. Plants are easy to grow, and spread slowly.

Sweet Violet is native to Europe. It has edible flowers and also a sweet, perfumed flavour. They hail from a time when fragrance was utmost when choosing plants for a garden. The fragrance of Sweet Violet is regarded as one of the most beautiful aromas in the plant kingdom. The scent has found its way into perfumes.

Having no stem, the flowers and leaves rise directly from long, horizontal, runners. These runners or stolon’s have thin roots at the nodes. The leaves are all basal, heart shaped with rounded lobes at the base. They have teeth around the edges. The tips of the lower leaves are more rounded, while the upper leaves are more tapering to a blunt tip.

Flowering takes place in the spring, however, it develops unopened and self-pollinating closed flowers later in the summer months. The pollinated flowers form capsule fruits that hang down near the ground surface. The capsules open at ground level or just under the soil. Attracting ants, the oily outer portion of the capsules are taken and devoured by the ants. What is left behind are the seeds that had been in the capsule. Perhaps in a location where it can develop.

It is not typically found in contemporary gardens. However, it can still be found in old forgotten or neglected gardens. It flourishes in shady, mossy lawns, so these old gardens that are left unattended are the perfect location.

Both the leaves and flowers are edible. They can be candied or eaten fresh. Both leaves and flowers can be added to salads, and used to embellish desserts and iced drinks. Leaves can be cooked like spinach.

For a showy spring appearance, cut runners and prune spindly growth in the late fall.

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Plant description**Common name:** Sweet Violet**Scientific name:** *Viola odorata***Family:** Violets**Origin:** Europe**Phylum:** Plantae**Division:** Magnoliophyta**Class:** Magnoliopsida**Order:** Violales**Family:** Violaceae**Genus:** *Viola***Species:** *V. odorata* Linn.**Flowering season:** March to May**Habitat**

Woods and on shaded banks under hedges Sweet violet is a low growing Sweet Violet perennial herb, spread with stolon's. Leaves: heart-shaped, hairy and deep green in colour. Flowers: five oval petals. Blue-violet is the most common colour of the sweet violet's petals, although white or lilac also occur. It has been used in companies for making some cosmetic's and perfumes.

**Fig 1:** Sweet Violet**Geographical distribution**

V. odorata is found in Kashmir, Himalayan region of Poonch, Shopian, Pulwama, Baramulla, Kupwara and Anantnag.

Common uses

- Rich in vitamin A and C.
- Cleanses toxins.
- Anti-cancer - cancer of breast, stomach, lungs and digestive tract.
- Expectorant: respiratory ailments - congestion, and sore throat.
- Natural aspirin - help headaches, body pains, is a sedative.
- Tea with dried root is a laxative.
- Tea with whole plant treat digestive disorders.
- Poultice reduce swelling, skin infection, inflammation, hemorrhoids, skin cancer and growths.

The scent of violet flowers is distinctive with only a few other flowers having a remotely similar odour. *V. odorata* is used either alone or in mixture with other herbs for catarrhal and pulmonary troubles and for calculous affections. The

pharmacological study revealed the role of *V. odorata* in some Unani drugs for treatment of common cold, asthma, coughs and fevers.

Pharmacological applications**Antimicrobial potential**

Khatibi (1989) [15] reported the antimicrobial activity of aqueous extract of *V. odorata* (aerial part) against *S. aureus*, *B. subtilis*, *E. coli* and *S. flexneri* at a concentration of 3 mg, 2 mg and 1 mg. Ramezani *et al.*, (2012) [31] reported the antibacterial activity of aqueous extracts of different parts of *V. odorata* against *S. aureus*, *E. coli* and *P. aeruginosa* and concluded its maximum effect on *S. aureus* and minimum effect on *P. aeruginosa*. Cyclotide cycloviolacin O2 is a cyclotide isolated from dried aerial parts of *V. odorata* which efficiently inhibited the growth of *S. enteric* serovar *Typhimurium*, *E. coli*, *K. pneumoniae* and *P. aeruginosa*.

Antifebrile activity

Naveed M. (2013) [6]. To investigate the antipyretic and anticonvulsant activities of *n*-hexane fraction of *Viola betonicifolia* (*V. betonicifolia*). Khattak *et al.*, (1985) [32]

reported the *V. odorata* produced a significant oral antipyretic activity in rabbits using hexane, chloroform and water soluble extracts. Antipyretic activity was more prominent in the hexane-soluble portions of *V. odorata*.

Antidyslipidaemic siddiq

H.S., *et al.* (2012) [33] investigated the antidyslipidemic effect of the leaves of *Viola odorata* extract in the anaesthetized rats indicated that reduction in total cholesterol, triglyceride and LDL-C, while it's increased HDL-C effect which may be due to the inhibition of synthesis and absorption of lipids and antioxidant activities.

Chronic rhinosinusitis

Mulla I. *et al.* (2019) [34] investigated a prospective randomized controlled trial to evaluate the efficacy of *Viola odorata* flower decoction in chronic rhinosinusitis. 30 patients with CRS were randomly assigned to receive either test drug (10 g of *V. odorata* flower decoction administered orally on empty stomach in the morning daily) or active control drug (single nasal spray of fluticasone propionate 50 µg/spray in each nostril daily) for 30 days. The primary outcome measure was an improvement in sinonasal symptoms assessed using a 22- item sinonasal outcome questionnaire (SNOT-22). Reduction in absolute eosinophil count (AEC) and improvement in x-ray paranasal sinus were secondary outcome measures. The significance level was kept as 5%. After completing the therapy, the SNOT-22 score was significantly low in the test group compared with the control group and a significant difference was found in AEC between the groups. The SNOT-22 score remained significantly low after completion of the treatment on the 45th and 60th days compared with the control drug. Changes in x-ray paranasal sinuses were not significant between the groups. These results suggested that *V. odorata* flower was effective in reducing the symptoms of CRS. Koochek M.H., *et al.* (2002) [13] investigated anti-inflammatory property of an aqueous extract of *Viola odorata* compared with hydrocortisone. Rats were treated with extract after the introduction of lung injury by administration of formalin via nebulization. Then microscopically quantified the area of hemorrhage, thickness of the alveolar wall, rupture of the alveolar septa and alteration of the epithelial lining of the bronchioles.

Insomnia

Feyzabadi Z., *et al.* (2014) [28] was conducted an experimental study on efficacy of volatile oil of flowers of *Viola odorata* in chronic insomnia. Intranasal drop of *Viola odorata* in each nostril at night before sleeping for one month showed that improvements in sleep and Insomnia Severity Index scores were significantly ($p < 0.05$) reduced after a month.

Asthma

Qasemzadeh M.J., *et al.* (2015) [35] investigated the effect of violet syrup on cough alleviation in children with intermittent asthma. 182 children aged 2 to 12 years with intermittent asthma were randomly assigned 1:1 to receive violet syrup or placebo along with the common standard treatments in both groups (short-acting β -agonist), and the both groups were evaluated in terms of the duration until cough suppression was achieved. The duration lasting to yield more than 50% cough reduction and 100% cough suppression was significantly less in the violet syrup group compared to

placebo ($P = .001$, $p < .001$, respectively). The study was concluded that the adjuvant uses of violet syrup with short-acting β -agonist can enhance the cough suppression in children with intermittent asthma.

Anticancer activity

Helli S., *et al.* (2016) [30] investigated the effect of two different systemic doses of *Viola Odorata* on prevention of 4-Nitroquinoline-1-oxide (4-NQO) induced tongue dysplasia in rats. Fortyeight (48) male Wistar rats were divided into four groups of A, B, C and D. Group A served as the control group. The rats in groups B to D received 30 ppm of 4-NQO in drinking water for 12 weeks. Additionally, the rats in groups B and C received *Viola odorata* syrup at doses of 15 and 5 ml/kg, respectively, 3 times a week. At the end, the rats were euthanized and the tongue was removed. Histological evaluations for carcinogenesis were carried out under a light microscope showed no histological changes of the tongue base epithelia were observed in the control group. The rats in group B show mild to moderate histological changes including hyperplasia and hyperkeratosis. These incidences were significantly more apparent in groups C with moderate to severe changes ($p < 0.01$). Almost all rats in group D had hyperplasia and manifested all of the stages of dysplasia. So it was concluded as the *Viola odorata* extract has dose-dependent inhibitory effects on the development of tongue induced dysplasia.

Lindholm *et al.*, (2002) [9] reported the whole aerial part including stem; flowers and leaves of *V. odorata* are used in cancer. *Viola* was reported as pharmacological tools and possibly as leads to antitumor agents. Gerlach *et al.*, (2010) [10] reported that the cycloviolacin O2, a cyclotide from *V. odorata* showed antitumor activity and causes cell death by membrane permeabilization.

Cytotoxic activity

Lindholm (2002) [8] reported that the cycloviolacin O2 isolated from the *V. odorata* exhibited strong cytotoxic activities, which varied in a dose-dependent manner.

Migraine

Kamali M., *et al.* (2018) [26] investigated a randomized, double blind, placebo-controlled clinical trial on the effectiveness of a combination of *Viola odorata* flowers, *Rosa damascena* flowers and *Coriandrum sativum* fruits on severity, duration and frequency of migraine headaches in 88 diagnosed migraine patients. Patients were randomly divided into the intervention ($n=44$) or placebo group ($n=44$). The intervention group received a product of a combination of *Viola odorata* L. flowers, *Rosa damascena* L. flowers and *Coriandrum sativum* L. fruits in 500 mg capsules three times a day and propranolol 20 mg tablet twice a day, and the placebo group received placebo capsule (500 mg) three times a day and propranolol 20 mg tablet twice a day for four weeks. The study findings suggested that the herbal combination showed more effective in improving headaches in patients with migraine than the placebo group.

Repellency against mosquitoes

Amer and Mehlhorn, (2006) [11] reported the oils *V. odorata* which induced a protection time of 8 hours at the maximum and a 100% repellency against *Aedes*, *Anopheles*, and *Culex* mosquitoes.

Molluscicidal activity

Plan (2008) [12] reported that the crude cyclotide extracts from *V. odorata* showed molluscicidal activity comparable to the synthetic molluscicide metaldehyde.

Reduce body weight

Siddiq H.S., *et al.* (2012) [25] investigated the plant extract of *Viola odorata* in anesthetized rat showed reduction in body weight suggested the effect which may be due to the inhibition of synthesis and absorption of lipids and antioxidant activities.

Anti-inflammatory activity

Koocheck (2003) [13] reported the aqueous extract of *V. odorata* shown anti-inflammatory properties as compared with hydrocortisone. *V. odorata* extract given prophylactically was partially effective in preventing lung damage, equal to the effect of hydrocortisone in aiding the resolution of formalin-induced lung damage.

Antidiabetic

Azari Z., *et al.* (2018) [24] investigated the effect of the aqueous and hydro-alcoholic extracts of *Viola odorata* on histologic changes and biochemical parameters of the liver in diabetic adult Wistar rats. The 400 mg/kg dose of the aqueous extract and all used (100, 200, and 400 mg/kg) doses of the hydro-alcoholic extract significantly decreased serum glucose levels in the diabetic rats. The aqueous extract of violet in 100 and 400 mg/kg doses can improve the liver tissue in terms of cell count, inflammation, and congestion. Moreover, they could significantly decrease AST and ALT enzymes

Kidney and Liver disorder

Sweet violet (*Viola odorata* L.) blossoms powder (SVBP) on liver and injuries of rats injected with carbon tetrachloride (CCl₄). Thirty six mature albino rats, weighting 130-150 g per each, were used and divided into two main groups, the first group (Group 1, 6 rats) fed on basal diet and the other main group (30 rats) was injected by CCl₄ for two weeks to induce liver impaired rats then classified into sex sub groups as follow: group (2), fed on standard diet only as a positive control; groups 3, 4, 5 and 6 fed on standard diet containing 0.2, 0.4, 0.8 and 1.6% of SVBP respectively. At the end of the experiment, 28 days, liver and kidney functions as well as serum lipid peroxidation were determined. The results indicated that treatment of animals with CCl₄ caused a significant increased ($p \leq 0.05$) in liver functions (AST, ALT and ALP activities), kidney functions (urea and creatinine levels) and serum lipid peroxidation (malondialdehyde level, MDA) compared to normal controls. Supplementation of the animal diets with SVBP (0.2 to 1.6 g/100 g) prevented significantly ($p \leq 0.05$) the rise of mean serum AST, ALT and ALP activities; urea, creatinine and MDA levels. The rate of preventative was increased with the increasing of the SVBP supplementation level. It could be concluded that SVBP was effective in protecting against CCl₄-induced liver and kidney injuries. Therefore, we recommended like of that plant part, sweet violet blossoms, by a concentrations ranged 0.2-1.6% amount to be included in our daily diets, drinks and food supplementation.

Phytochemistry

The phytochemical screening of *V. odorata* extracts has

shown that plant contains flavonoids, glycosides, alkaloids, steroids, terpenes, saponins and tannins which are very important constituents when looking for pharmacologically active phytochemicals in *V. odorata*. The methanolic leaves extract of *V. odorata* was found to have total 34.4 mg/g phenolic and 22.8 mg/g flavonoid contents [14]. Jackson and Bergeron (2005) [22] revealed the presence of a glucoside in the flowers, viola-querctin and salicylic acid (natural aspirin) from the other parts of *V. odorata*. An alkaloid violine is found in roots, leaves, flowers and seeds of *V. odorata*. It is a volatile oil and forms salts with acids. Essential oil of *V. odorata* has ionine, saponins, cardiac glycoside, methyl salicylate, mucilage, vitamins A and C and alkaloids. Flowers of *V. odorata* contain 4.0% anthocyanins, 1.1% flavonoids, 0.4% glycoside, 18.0% mucilage and 8.5% ash. Rastogi (1970-1979), reported the structure of *V. odorata* elucidated two new compounds violanthin and violanin. Structure of violanthin established as delphinidin-3-[600-O-a-L-(p-coumaroyl) rhamnosyl-D-glucoside]-5-D-glucoside. It was reported that *V. odorata* contains triterpene saponins (5.2) constituted of ursolic acid as a glycone and galactose or gal % acturonic acid, trans-caffeic, protocatechuic, gentisic, p-hydroxybenzoic, 4-hydroxyphenylacetic, trans and cis coumaric, vanillic and salicylic acids isolated with two unidentified acids. Former pharmacological studies revealed the role of *V. odorata* in some Unani drugs for treatment of common cold, asthma, cough and associated ailments

Conclusion

This review paper on *V. odorata* A little perennial plant called the Sweet violets (*Viola odorata*) are wonderful plants that attract with their beauty and aroma. It is indigenous to Europe and some regions of Asia and is in the family *Violaceae*. The sweet violet's leaves and blooms contain a number of substances that have been researched for their potential as medicines. Like is used for Respiratory Health, skin conditions, Wound Healing, Anti-inflammatory Effects, Numerous phytochemicals, such as saponins, salicylates, alkaloids, flavonoids, saponins, tannins, phenolics, coumarins, phenolic glycosides, gaultherin, violutosite, saponins, and flavonoids, as well as odoratine, are abundant in *V. odorata*. These tiny flowers are frequently connected to emotions of love, passion, and nostalgia.

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