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Traditional uses, Antimicrobial potential, Pharmacological properties and Phytochemistry of *Viola odorata*: A Mini Review

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ABSTRACT

Viola odorata Linn. is belongs to the family violaceae. It is popularly known as Sweet Violet, English Violet, Common Violet, or Garden Violet and Gulbanafsa in Hindi. *V. odorata* is commonly used as remedy for coughs, sore throat, hoarseness and tonsillitis. It is valued as an expectorant, antioxidant, diaphoretic, antibacterial, antipyretic, diuretic and as a laxative. The pharmacological studies revealed the role of *V. odorata* in some Unani drugs for treatment of common cold, asthma, antimicrobial, and cough associated diseases. It is rich in many phytoconstituents such as, saponins, salicylates, alkaloids, flavonoids, saponins, tannins, phenolics, coumarins, phenolic glycosides, gaultherin, violutoside, saponins, flavonoids, and odoratine. It is an ethnobotanical herb of India. It holds a special position as a potent adaptive and aphrodisiac in Ayurvedic System of Medicine.

Keywords: *Viola odorata*, Ethnobotanical uses, Pharmacology, Antimicrobial potential, and Phytochemistry.

1. INTRODUCTION

Viola odorata Linn. is belongs to the family Violaceae. It is commonly known as Sweet Violet, English Violet, Common Violet, or Garden Violet and Gulbanafsa in Hindi. *V. odorata* is a native of Mediterranean countries and Asia Minor. From old ages it has been grown in gardens, and now it has spread to most of Europe. The sweet, unmistakable scent of this flower has proved popular throughout the generations and has consequently been used in production of many cosmetic fragrances and perfumes. *V. odorata* is commonly used as remedy for coughs and sore throat, hoarseness and tonsillitis. *V. odorata* is valued as an expectorant, diaphoretic, antipyretic, antibacterial, diuretic and as a laxative, in bilious affections [1]. It is used either alone or in mixture with other herbs for catarrhal and pulmonary troubles and for calculous affections [2].

1.1 Plant description

V. odorata is perennial herb, spreads with stolons. Leaves are orbicular-reniform to broadly ovate. Flowers have dark violet or white colour. *V. odorata* spreads with stolons. The sweet, unique scent of this flower has proved popular throughout the generations and has consequently been used in production of many cosmetic fragrances and perfumes.

1.2 Geographical distribution

V. odorata is indigenous to India and found in Kashmir, Himachal Pradesh, and Kumaon hills.

1.3 Classification

Phylum- Plantae
 Division-Magnoliophyta
 Class-Magnoliopsida
 Order-Violales
 Family-Violaceae
 Genus-*Viola*
 Species- *V. odorata* Linn.

2. TRADITIONAL USES

V. odorata is commonly used as remedy for coughs and sore throat, hoarseness and tonsillitis. The herb is valued as an expectorant, diaphoretic, antipyretic, diuretic and as a laxative, in bilious affections [1]. 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 affections². The pharmacological study revealed the role of *V. odorata* in some Unani drugs for treatment of common cold, asthma, coughs and fevers [3].

3. PHARMACOLOGICAL APPLICATIONS

3.1 Antimicrobial potential

Khan *et al.*, (2011) [4] reported that, aqueous extract of *V. odorata* (flowers) showed strong antibacterial action against *B. subtilis*, *E. coli* and *S. aureus*. Khatibi *et al.*, (1989) [5] 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) [6] 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* [7].

3.2 Antipyretic activity

Khattak *et al.*, (1985) [8] 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*.

3.3 Anticancer activity

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.

3.4 Cytotoxic activity

Lindholm *et al.*, (2002) [9] reported that the cycloviolacin O2 isolated from the *V. odorata* exhibited strong cytotoxic activities, which varied in a dose-dependent manner.

3.5 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.

3.6 Molluscicidal activity

Plan *et al.*, (2008) [12] reported that the crude cyclotide extracts from

V. odorata showed molluscicidal activity comparable to the synthetic molluscicide metaldehyde.

3.7 Anti-inflammatory Activity

Koocheck *et al.*, (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.

3.8 Antioxidant Activity

V. odorata has been reported to have antioxidant activity. The data obtained in the *in vitro* models clearly establish the antioxidant potency of all extracts [14]. The flowers of *V. odorata* were extracted with water and the suspension filtered and lyophilized for 3 days. Extracts showed antioxidant potential using scavenging of 2,2-diphenyl-1-picrylhydrazyl radical [15].

3.9 Sedative and pre-aesthetic

Monadi and Rezaie (2013) [16] reported the leaf extract of *V. odorata* has sedation and pre-anesthetic effects at dose of 100-400mg/kg.

3.10 Anti-bronchitis and cough

The whole aerial part including stem, flowers and leaves of *V. odorata* are used in bronchitis, cough, sneezing [17-18].

3.11 Kidney and liver disorders

The whole aerial part including stem, flowers and leaves of *V. odorata* are used in bronchitis, cancer, cough, fever, urinary infections, rheumatism, sneezing, kidney and liver disorders. Supplementation of the animal diets with sweet violet blossoms powder SVBP (0.2 to 1.6 g/100g) prevented significantly ($p \leq 0.05$) the rise of mean serum AST, ALT and ALP activities; urea, creatinine and MDA levels [19].

3.12 Laxative activity

The extract of *V. odorata* is shown to be safe up to of 2000 mg/kg body weight by fixed dose method. Diuretic activity of different extracts has been studied and it was found that urine output and Na^+ and K^+ level was more in case of aqueous extract at a dose level of 400 mg/kg as compared to control animals. Laxative activity of different extracts has been studied and it was found that alcoholic extracts at a dose level of 200 mg/kg and aqueous extract of *V. odorata* at a dose level of 400 mg/kg showed significant effect as laxative [1].

3.13 Antidyslipidemic and Anti-hypertensive activity

V. odorata also showed reduction in body weight and antidyslipidemic effect which may be due to the inhibition of synthesis and absorption of lipids and antioxidant activities [20].

3.14 Effective against vaginal pathogen

A combination of two aqueous extracts of, *V. odorata* (at

concentrations of 0.15625, 0.3125, 10-20 mg/cm³) significantly inhibited the growth of *Trichomonas vaginalis* cultured in (CM161) medium during periods of 24, 48, 72, and 96 hours [21].

4. 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-quercetin 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 acids²³. 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)²⁴, 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 galacturonic 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 [3].

5. CONCLUSION

The present review article was concluded that the *V. odorata* contains various phyto-constituents and different phytocomponents which are responsible for various pharmacological actions of *V. odorata*. The pharmacological investigations revealed the position of *V. odorata* in some Unani drugs for treatment of common cold, asthma, antimicrobial, and cough and associated diseases. *V. odorata* is rich in many phyto-constituents like, saponins, salicylates, alkaloids, flavonoids, saponins, tannins, phenolics, coumarins, phenolic glycosides, gaultherin, violutoside, saponins, flavonoids, and odoratine. It is an ethnobotanical herb of India. *V. odorata* has a special position as a potent adaptive and aphrodisiac in Ayurvedic and Unani System of Medicine. However, more investigations must be carried out to evaluate the mechanism of action of medicinal plants with different activities.

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