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## Traditional Uses, Biological Activities and Phyto Chemical Properties of Banafsha (*Viola odorata* Linn): A Review



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### ABSTRACT

Traditional herbal remedies are gaining a lot of importance in discussions regarding global health. *Gul e Banafsha* (*Viola odorata*) is a significant herbal medication in traditional indigenous medical practices belonging to the Violacea family. It is commonly called as Sweet Violet, English Violet, Common Violet, Florist's Violet or Garden Violet<sup>1</sup>. *V. odorata* is indigenous to India and found in Kashmir, Himachal Pradesh and Kumaon hills<sup>2</sup>. *Banafsha* yields saponins, salicylates, alkaloids, flavonoids, tannins, phenolics and coumarins<sup>3,4</sup>. The drug exhibits anti-oxidant, anti-microbial, anti-pyretic, anti-dyslipidemic, anti-hypertensive, anti-inflammatory, anti-helminthic, anti-fungal, anti-depressant, anti-tubercular, analgesic, anti-diabetic, anti-convulsant, hepatoprotective, expectorant and laxative properties<sup>1,4,5</sup>. The goal of the current review is to examine the information already available about the drug's traditional uses, particularly in Unani System, its phytochemical components and pharmacological effects. Classical textbooks and journals have been analysed along with other reliable data sources. The current study investigates the traditional uses, biological activities and Phyto chemical properties of *Banafsha* (*Viola odorata* Linn).



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## INTRODUCTION

According to recent surveys, more than 80% of people worldwide rely on the therapeutic benefits of herbal medicine<sup>6,7</sup>. World Health Organisation states “any plant or its components containing substance that can be used conventionally or can be used for pharmaceutical synthesis is classified as a drug<sup>6</sup>. Herbal medicines are naturally occurring, produced from plants with little to no industrial processing that have been utilised to treat illness within local or regional healing practices. In discussions about global health, traditional herbal remedies are receiving a lot of attention<sup>1</sup>. Currently, the pharmaceutical, cosmetic, food and fragrance sectors use about 300 species of aromatic and therapeutic plants globally. *Banafsha* is one of those important medicinal plant that is widely used to produce medications<sup>7</sup>.

*Banafsha* (*Viola odorata*) is an important drug of Unani System of Medicine belonging to family Violaceae<sup>8</sup>. It is commonly known as Sweet Violet, English Violet, Common Violet, Florist's Violet or Garden Violet<sup>1</sup>. The plant is indigenous to Europe, North Africa and Asia. In India it is found in Kashmir and other parts of Himalayan region<sup>9</sup>. It is also found in the Palani and Nilgiris hills of Tamil Nadu, the highlands of Meghalaya, Nagaland and Manipur<sup>10</sup>. It has a long history as a medical herb, dating back to 500 BC, when it was first used to treat cancer-related pain<sup>11</sup>. The plant blooms, throughout October and August, from April to July, there is flowering and fruits<sup>9,12</sup>.

The entire plant and its flowers are used as a drug. In the market, *Banafsha* comes in three different forms - dried herb aerial components (stem, leaves and flower), dried flowers (*Gul-e-Banafsha*) and dried herb aerial components without flowers (*Barg -e-Banafsha*)<sup>1</sup>. The full plant (*Kashmiri Banafsha*) and the Violet blossoms (*Gul-e-Banafsha*) are accessible as the authentic *Banafsha* on the commercial drug market of India. The plant *Viola odorata* has alkaloid, glycoside, flavonoid, antibacterial, antioxidant and pre-anaesthetic properties<sup>11,13</sup>. This plant's high level of flavonoids and phenolic compounds makes it useful for preventing the production of UV-induced oxygen free radicals<sup>14</sup>.

In Traditional System of Medicine, *Banafsha* is used in the treatment of anxiety, insomnia and to reduce blood pressure<sup>11</sup>. In Russia, Korea, Romania, and Iran many species of this genus are used in the treatment of trophic ulcers, shingles, skin eruptions, rheumatism, bronchitis and dermatitis<sup>9</sup>. It plays a significant role in the treatment of *Shahiqa* (whopping cough), *Sudā* (headache), *Shaqiqa* (migrane), *Sahr* (insomnia), *Buhha al Sawt* (sore throat)

and Sar' (epilepsy) in children and adults<sup>1</sup>. It is also beneficial in gynaecological disorders like Trichomonas Vaginalis, *Warm e Rahim, Quruh e Rahim*<sup>1,16</sup>.

## DESCRIPTION

*Viola odorata* Linn is glabrous or pubescent herb, rarely more than 15 cm. in height, arising from a root stock<sup>9</sup>. It is a perennial short plant that occasionally produces creeping runners or scions and is sometimes branched and knotted with the remains of old leaf stalks and stipules<sup>6</sup>. It may be found in a variety of environments, such as herb fields, woodlands and forests<sup>13</sup>. Plant grows in shady areas and expand across the ground's surface. The whole plant is bitter in taste, hot and pungent. The branches are extremely thin, slender and they all grow from a single root. The plant has flowers on every branch and the flowers has a pleasant smell<sup>6,17</sup>.

### Stem

Underground runner attached with rootstock, pieces about 2 mm thick<sup>10</sup>.

### Leaves

Leaves are robust, dark green and have a crenate edge, broadly ovate or cordate in shape. They range in size from 1.5 to 5 cm<sup>1</sup>. Petiole around 20 cm long, thin and wiry. Leaf is about 2 cm broad, 3 cm long, puberius, hase sinuate, border serrate and apex acuminate<sup>10</sup>.

### Seeds and Fruits

Seeds ovoid or globose<sup>3</sup>. Seeds are used for reproduction<sup>1</sup>. Fruits are in the form of capsules, round, three angled and purplish in colour<sup>1</sup>.

### Flowers

Flowers are pedicelate, hermaphrodite, zygomorphic complete ebracteate and hypogynous, calx consists of five sepals, green polysepalous and almost equal in size. 3-4 mm in length and 1.5-2 mm broad. They are mostly persistent and embriate in bud. They are appendiculate i.e., produced at the base. Corolla consists of 5 petals deep violet in colour with a bluish white base, polypetalous 0.8-2cm in length. They are hypogynous and imbricate in bud. Androecium consists of 5 stamens alternating with the petals and forming a ring like structure round the ovary and the style. Filaments are short with introse anthers. Gynoecium consists of three carpel syncarpous with unilocular ovary and

parietal placentation<sup>19</sup>. The length of the gynoecium varies from 1-1.5cm. The ovary is extremely pubescent and sessile. Style features a swelling subclavate, subtruncate shape with a beaked tip and truncate stigma<sup>7</sup>. Short spurs on the lower petals<sup>11</sup>.

### **Roots**

The rhizome is small, unbranched and has slender roots. The root is dry, tangled and roughly thick as a quill<sup>13</sup>.

### **Scientific Classification<sup>19</sup>**

Phylum- Plantae

Division- Magnoliophyta

Class- Magnoliopsida

Order- Violales

Family- Violaceae

Genus- Viola

Species- *V. odorata* Lin



**Figure: *Banafsha*<sup>18</sup>**

Vernacular names:<sup>1,3,7,10</sup>

English	Sweet violet, Violet flowers
Hindi	Banafshah
Arabic	Banafsaj, Firfeer
Persian	<i>Gul-e-Banafsha</i>
Urdu	Gul-e-Banafsha
Sanskrit	Jvarapaha, Nilapushpa, Sukshmapatra, Vanapsa
Gujarati	Bahapa, Bahaphsa
Bengali	Banafshah, Banosa
Kashmiri	Banfsha
Kannada	Violethoo
Marathi	Bugabanosa
Tamil	Vialethoo
Telegu	Vilalettu

**Table: Showing vernacular name of *Viola odorata***

***Mizaj* (Temperament)**

Cold 1<sup>0</sup> and Moist 2<sup>0</sup> (20)

Hot 2<sup>0</sup> and Dry 3<sup>0</sup> (21)

***Afa'al* (Actions)** <sup>17,22</sup>

- *Muaddil-i-Dam*
- *Munaffise Balgham* (Expectorant)
- *Mulattif* (Demulcent)
- *Mushil-i-Balgham* (Purgative of phlegm)
- *Mushil* (Purgative)
- *Muhallil-i-Waram* (Resolvent)

- *Munaqqi Maida*
- *Mudirr al-Bawl* (Diuretic)
- *Jazib* (Absorbent)
- *Muzliq* (Lubricant)
- *Mushil wa Muaddil Safra* (Purgative of yellow bile)
- *Tiryaaq* (Antidote)
- *Muhallil i-Riyah-i-Qulanj* (Resolvent of gaseous colic)
- *Musakkin-i-Atash* (Thirst quenching)
- *Muarriq* (Diaphoretic)

***Istemaal (Uses)***<sup>16,17,22,24</sup>

- *Khushunat-i-Halaq* (Sore throat)
- *Nazla* (Coryza)
- *Zukam* (Catarrh)
- *Khunaq* (Diphtheria)
- *Buhha al Sawt* (Hoarseness of voice)
- *Sual harr* (Hot cough)
- *Dhat al-riya* (Pneumonia)
- *Dhat al-janb* (Pleurisy)
- *Suzash wa Waram-i-Halaq* (Pharyngitis)
- *Suzish-i-Ain* (Irritation of eye)
- *Suzish-i-Meda* (Irritation of Stomach)
- *Waram-i-Ama* (Enteritis)
- *Dard-i-Gurdah* (Renal colic)
- *Ehtibas-i-Bawl* (Anuria)



- *Suzish-i-Mathana* (Irritation of Urinary Bladder)
- *Warm e Rahim* (Endometritis)
- *Quruh e Rahim* (Cervical ectopy)
- *Humma* (Fever)
- *Nar-i-Farsi* (Eczema)

**Miqdar Khorak (Dose)<sup>9,17,20</sup>**

- Powder: 10.5- 22.5 *Masha*
- Dry form: 7-14 *Masha*
- Fresh flower: 17.5 *Masha*
- *Joshanda*: 3.75 *Tola*

**Muzir (Adverse effect)<sup>17,21,23</sup>**

- *Mukarrib* (Restlessness)
- *Murkhi Meda* (Stomach relaxant)
- *Du'fal-Ishtiha* (Loss of appetite)
- *Khafaqan* (Palpitation)



**Musleh (Corrective)<sup>17,20,21,</sup>**

- *Gul-e-surkh*
- *Marzanzosh*
- *Anisoon*

**Badal (Substitute)<sup>17,20</sup>**

- *Barg e Khubbazi*
- *Gauzaban*
- *Gule Nilofar*

- *Mulethi*

### **Murakkabat (Compound Formulations)<sup>10,17</sup>**

- *Sharbat Banafsha*
- *Habbe Banfsha*
- *Khameera Banafsha*
- *Roghan e Banafsha*
- *Habb-e-Nuzul-ul-Ma*
- *Qurs-e-Zatul-Janb*
- *Burood-e-Banafsaji*
- *Mufarreh Yaqooti Barid*
- *Sharbat Eijaz*
- *Dayaqooza*

### **Traditional uses**

*Banafsha (Viola odorata)* has been used in India since very old times and is therapeutically used by Unani and Ayurveda System of Medicine<sup>7</sup>. In Iranian Traditional Medicine, it is known as a plant with a cold and wet temperament and has been used in hot and dry temperament ailments such as fever, excessive thirst and uremic pruritus. It is often suggested for cough, pneumonia and pleurisy<sup>25</sup>. Violet blossoms were utilised earlier to treat a variety of ailments, particularly eye illnesses and fever with shivering<sup>7</sup>. It is used to treat warm catarrh, inflammatory lung and gastrointestinal illnesses, inflammations of the head and neck, headache and sleeplessness. Furthermore, it is an essential medicinal plant that is used to cure bronchitis and common cold<sup>1</sup>.

### **Phytochemical Characteristics**

The *Viola odorata* produces saponins (Myrosin and Volin), salicylates, alkaloids, flavonoids (Rutin and Violarutinm), tannins, cyclo-violacin o1, cyclo-violacin o10, phenolics and coumarins<sup>3,4</sup>. High concentrations of the monoterpene and sesquiterpene families were found in the essential oil of *Viola odorata* flowering plants. 1-phenyl butanone (22.43%), linalool



(7.33%), benzyl alcohol (5.65%), cadinol (4.91%), globulol (4.32%) and viridiflorol (3.51%) were the main constituents. Minor components of the *V. odorata* floral oil included pulegone (3.33%), epicadinol (3.05%), terpinen-4-ol (2.31%), germacrene A (1.99%) and paramethyl anisole (1.09%)<sup>4,5</sup>.

The *Viola* is abundant in secondary metabolites such as flavonoids, alkaloids (*Viola* and *Viola quercitin*) and essential oils (ionones, dihydroionone, hydroquinone dimethyl ether and linolenic). These compounds are widely used as diuretic, anti-inflammatory, purgative properties and beneficial in abdominal pain, skin disorders and upper respiratory complications<sup>4</sup>.

The potential pharmaceutical properties of extracts derived from various components of *V. odorata* has been reported as: anti-oxidant, anti-microbial, anti-cancerous, anti-pyretic, anti-dyslipidemic, anti-hypertensive, anti-inflammatory, anti-helminthic, anti-fungal, anti-depressant, anti-tubercular, analgesic, anti-diabetic, anti-convulsant, hepatoprotective, diuretic, expectorant, insecticidal, prokinetic and laxative effects<sup>1,15,26</sup>.

#### **Anti-oxidant activity**

The crude methanolic extract of *Viola odorata* has been tested for their anti-oxidant potential at DPPH, reducing power assay, ferric thiocyanate, hydrogen peroxide scavenging protocols. Flowers of the *Viola odorata* had been extracted with water, filtered and lyophilized for three days. It was discovered that the extracted material had anti-oxidant capacity by scavenging 2,2-diphenyl-1-picrylhydrazyl radicals during extraction<sup>27,28,29,30</sup>.

#### **Anti-microbial activity**

Anti-bacterial effect on the persistence of *Viola odorata* has been established that methanolic expulsion is effective against specific pathogenic microorganisms such as *Escherichia coli*, *Staphylococcus*, *Pseudomonas aeruginosa* and *Streptococcus*. The study's finding indicates that the cyclotides from Iranian *V. Odorata* have strong anti-bacterial activity against gram-negative bacteria that cause plant pathology. A cyclotide from *Viola odorata* called Cycloviolacin O2 possesses anti-gram-negative bacteria properties<sup>7,26,27</sup>.

#### **Anti-inflammatory activity**

It has been proved that *Viola odorata's* aqueous extract is an effective treatment for inflamed lungs. When compared to hydrocortisone, the aqueous extract of *Viola odorata* demonstrated

anti-inflammatory effect. Prophylactic administration of *Viola odorata* extract was not only partially successful in preventing lung damage, but when it was compared with hydrocortisone's contribution to the resolution of formalin-induced lung damage, *Viola odorata* extract were shown to be more effective and safer than corticosteroids<sup>7,26,27</sup>.

### **Anti-pyretic activity**

The presence of iso quinoline alkaloids resulted in an anti-pyretic action. Utilising hexane, chloroform and water-soluble extracts, *Viola odorata* significantly increased the oral antipyretic efficacy in rabbits. The hexane-soluble parts of these plants showed stronger anti-pyretic efficacy<sup>26,27,31</sup>.

### **Expectorant**

The alkaloid Violin, which is used as an expectorant, is produced by roots of *Viola odorata*. Clinical research was conducted to assess how *Viola odorata* flower syrup affected the cough of asthmatic kids. 182 intermittently asthmatic children between the ages of 2 and 12 were randomly assigned to receive either 1:1 violet syrup or a placebo in addition to the usual standard therapies (short-acting  $\beta$ -agonists), with the duration of time until cough suppression was achieved in both groups being measured. This study showed that the use of violet syrup in adjacent with a short-acting  $\beta$ -agonist can improve cough suppression in children with intermittent asthma<sup>27,32,33</sup>.

### **Anti-hypertensive activity**

A vasodilator effect of the plant extract of *V. odorata* has been demonstrated both in vivo and in vitro assay. Numerous processes, including the release of  $Ca^{++}$  from intracellular storage and NO-mediated pathways, as well as the blockage of  $Ca^{++}$  inflow via membranous  $Ca^{++}$  channels, may be involved, which could account for the drop in blood pressure.<sup>7,11,13</sup>.

### **Anti-dyslipidemic activity**

The anti-dyslipidemic effects of the leaves of *Viola odorata* extract in anaesthetized rats showed a drop in total cholesterol, triglyceride and LDL, as well as an increase in HDL, which may be related to lipid production, absorption and inhibition as well as antioxidant activities. The anti-dyslipidemic action of sweet violet may be brought on by the plant's anti-oxidative properties and ability to prevent the synthesis and absorption of lipids<sup>11,26,27</sup>.

### **Hepatoprotective**

Two flavonoids, isorhamnetin and luteolin, were detected in the phytochemical analysis, used to qualitatively identify the active components using HPLC. These flavonoids are members of the class of flavanols, which is widely known for having hepatoprotective properties. Histopathological studies showed that the plant attenuated the hepatocellular necrosis and inflammation<sup>7,33</sup>.

### **Laxative effects**

The butanolic, aqueous and n-hexane fraction of the aerial parts of *Viola odorata* exhibited good laxative effect<sup>27,28</sup>.

### **Cytotoxic activity**

The acetone extract of *Viola odorata* showed chemo preventive effects against DMBA-induced skin cancer in mice. In addition, a macrocyclic peptide isolated from *Viola odorata*, called cycloviolacin O2, exhibited in vitro cytotoxic activity against ten different cancer cell lines, including myeloma, leukaemia, small-cell lung cancer, lymphoma and renal adenocarcinoma. It gave better results than the antitumor drugs which are currently in clinical use<sup>6,34</sup>.

### **Anti-depressant activity**

An experimental study was conducted to evaluate the antidepressant effect of hydroalcoholic extract of *Viola Odorata* in mice. 114 male albino mice were randomly divided into 4 groups as control (10ml/kg, i.p), fluoxetine (20mg/kg, i.p), imipramine (30mg/kg, i.p) and, *Viola Odorata* extract (50, 100, 200, 400 mg/kg, i.p), respectively. The antidepressant-like activity was performed by behavioural tests as forced swimming test (FST), tail suspension test (TST) and open field test. The *Viola Odorata* extract (100 to 400 mg/kg) reduced immobility time in both FST, TST (P0.05) showed that the acute doses of the *Viola odorata* w similar to fluoxetine to cause anti-depressant effects<sup>1,35</sup>.

### **CONCLUSION**


*Gul e Banafsha* have been used for a variety of indications since the beginning of time. It has been the topic of quite a few phytochemical, experimental and clinical studies. Experimental research has proven its anti-oxidant, anti-microbial, anti-cancerous, anti-pyretic, anti-

dyslipidemic, anti-hypertensive, anti-inflammatory, anti-helminthic, anti-fungal, anti-depressant, anti-tubercular, analgesic, anti-diabetic, anti-convulsant, hepatoprotective, diuretic, expectorant, insecticidal, prokinetic and laxative effect. The majority of traditional medicine claims have been confirmed through scientific research. To investigate the entire therapeutic potential of this plant, and to make it a regular medication, deeper clinical research appear worthwhile. *Banafsha* has been studied extensively for its anti-oxidant, analgesic, anti-pyretic, anti-inflammatory, expectorant, hepatoprotective, anti-dyslipidemic, and cytotoxic properties. Other properties such as anti-tubercular, anti-diabetic and anti-hypertensive characteristics demand further higher clinical research.

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