

# INTERNATIONAL JOURNAL OF UNANI AND INTEGRATIVE MEDICINE



E-ISSN: 2616-4558  
P-ISSN: 2616-454X  
IJUIM 2021; 5(2): 73-78  
Impact Factor (RJIF): 6.3  
Peer Reviewed Journal  
Received: 02-03-2021  
Accepted: 05-04-2021

#### Fouzia Bashir

Research Associate, Central  
Council for Research in Unani  
Medicine, Janakpuri, New  
Delhi, India

#### Jamal Akhtar

Research Officer, Central  
Council for Research in Unani  
Medicine, Janakpuri, New  
Delhi, India

#### Nighat Anjum

Research Officer, Central  
Council for Research in Unani  
Medicine, Janakpuri, New  
Delhi, India

#### Shah Alam

Research Associate, Central  
Council for Research in Unani  
Medicine, Janakpuri, New  
Delhi, India

#### Corresponding Author:

##### Fouzia Bashir

Research Associate, Central  
Council for Research in Unani  
Medicine, Janakpuri, New  
Delhi, India

## Banafsha (*Viola odorata* L.), an important drug of Unani System of Medicine with recent advances

Fouzia Bashir, Jamal Akhtar, Nighat Anjum and Shah Alam

#### Abstract

The various traditional systems such as Unani, Ayurveda and Siddha use several plant species to treat different ailments. Banafsha (*Viola odorata* L.) is an important medicinal plant used in the Unani system of medicine due to its multiple therapeutic properties. Vast description of this herb is present in Unani classical literature regarding its therapeutic actions such as *Munafith-i-Balgham* (expectorant), *Munawwim* (hypnotic), *Daf-i-Hummā* (antipyretic), *Musakkin-i-Atash* (Thirst Quenching), *Mulayyin* (Laxative) etc. Various phytochemical analyses have also shown presence of different alkaloids and chemicals in this herb proving its medicinal importance. Also parts of this herb have been studied in animals for its pharmacological properties and few pharmacological properties have been also studied in clinical trials confirming the description present in Unani literature. Based on the knowledge present in Unani literature, research should be conducted on untouched medicinal aspect of this herb.

**Keywords:** Banafsha, Unani system of Medicine, *Viola odorata* L.

#### Introduction

Recent studies reveal that more than 80 per cent of the world's population relies on herbal medicine for its therapeutic effects [1]. In India, the treatment of various diseases by native plants has provided a lot of remedy to cure many ailments of humanity [2]. As per WHO, 'any plant or its components containing substance that can be used conventionally or can be used for pharmaceutical synthesis is classified as a drug' [3]. In the current scenario, around 300 species of aromatic and medicinal plants are used worldwide in the pharmaceutical, cosmetics, food and fragrance industries [4]. One of the medicinally important plant used for the purposes of obtaining drugs is Banafsha. The drug has been in use in India since very old times and is therapeutically been used by Unani and Ayurveda system of medicine. Banafsha is available in market in three varieties, dried aerial parts of the herb (flowers, stems, and leaves), dried flowers (Gul-e-Banafsha) [5], and dried aerial parts without flowers (Barg-e-Banafsha). Leaves are broadly ovate-cordate, tufted and crenate [6]. In Indian commercial drug market, the genuine Banafsha is available in two forms, the first is violet flowers (Gul-e-Banafsha) and the other is whole plant (Kashmiri Banafsha). Flowers and whole plant are used as a drug [7].

#### Scientific classification

(United States Department of Agriculture (USDA)) [9]

Kingdom	:	Plantae
Subkingdom	:	Traceobionta
Super division	:	Spermatophyta
Division	:	Mangoliophyta
Class	:	Mangoliopsida
Subclass	:	Dilleniidae
Order	:	Violales
Family	:	Violaceae
Genus	:	<i>Viola</i> L
Species	:	<i>Viola odorata</i> L.

#### Vernaculars

Unani	:	Abu, Banafsha, Banafsaj, Kakosh, Fareer [10], [11]
Arabic	:	Banafsaj, Farfer [10]
Persian	:	Kokash [10], Gul-e Banafsha [5]

Hindi	:	Banafsha <sup>[10]</sup>
English	:	Violet, Sweet violet <sup>[6]</sup>
Sanskrit	:	Banapasha <sup>[12]</sup>
Bengali	:	Banafshah, Banosa <sup>[6]</sup>
Siryani	:	Makenaas <sup>[10]</sup>

### Habitat and Distributions

It grows enormously in summer season in the hills of Himalaya, especially Kashmir and Nepal at an altitude of more than 5000 ft <sup>[19]</sup>. Hilly areas of Kashmir and Nepal <sup>[13]</sup> Kangra and Chamba, at altitudes of 1500-1800 meters. <sup>[6]</sup> North temperate zones <sup>[7]</sup> Pakistan (real habitat) <sup>[10]</sup> Iran, Iraq, Afghanistan, Mediterranean region and Caucasiav areas. It is represented by 1 genus (*Viola*) and 17 species in Pakistan. <sup>[14]</sup>



Fig 1: Flowers of Banafsha

### Botanical description

The plant of *Viola odorata* Linn. Is a creeping weed with no stem. Plant is rarely more than 15 cm in height. In north India, plant grows only in winters. Cool and moist climate is very helpful for growing the plant. The whole plant is bitter in taste, hot and pungent <sup>[8]</sup>. It is an herb which arises from a root stock having a height of rarely more than 15 cm <sup>[6]</sup>.

### Flower

Flowering occurs from April - May. Flowers are nodding and deep violet in colour with a bluish white base <sup>[6]</sup>. It can be yellow, white, purplish, blue or pink in colour <sup>[12]</sup>. Flowers have long filiform stalks. These are solitary axillary, pedicelate, hermaphrodite, zygomorphic, hypogynous and sweet scented. Flowers are 3-4 mm in length and 1.5-2.00 mm broad. They are tasteless and are mostly persistent and appendiculate (produced at the base). Corolla consists of 5 deep violet-coloured petals. The anterior petal forms the base for landing the insects at the time of pollination and holds the honey secreted by the process's spurs of the connectives of the two lower petals. Androecium is consisting of five stamens which alternate with the petals and form a ring like structure around the ovary and style. Filaments are short with introse anthers. Gynaecium is syncarpous with three carples, unilocular ovary and parietal placentation. Pollen grains are spherical in shape, smooth; thin walled and have a single germ pore. Size of pollen grains is approximately 28.40µ <sup>[6]</sup>.

### Root

Root is dry, knotty and as thick as quill. Propagation occurs by seeds <sup>[12]</sup>.

### Description of Drug in Unani

Plant grows in shady areas. Flowers are violet in colour and have strong fragrance <sup>[10]</sup>. Height is of one Balisht (Hand) to one half Balisht. Branches are very thin. Flowers have a good fragrance. Branches are thin and all the branches arise from a single root. Each branch bears a single flower. There are many types of flowers but the most common are blue or sky blue in colour. The flower of Kashmiri Banafsha is smaller in size. Flowering occurs in winter season. Flower of the plant Banafsha which is blue in colour and have fragrance, is used generally <sup>[13]</sup>. The whole plant is used as drug <sup>[15]</sup>. It is of two types one is Bustani and the other is wild <sup>[13]</sup>. Every branch of the plant bears flowers <sup>[16]</sup>. Plant grows over the surface of the ground <sup>[17]</sup>.

### Part used (Hissa mustamela)

Root and Flowers <sup>[6, 10]</sup>

### Mizaj (Temperament)

Cold 1<sup>0</sup> and moist 2<sup>0</sup> <sup>[10]</sup>

Hot 1<sup>0</sup> and Dry 1<sup>0</sup> <sup>[6], [18]</sup>

### Afa'al (Pharmacological actions in Unani Medicine)

- Mushil-i-Balgham (Purgative of Phlegm)
- Mulattif (Demulcent) <sup>[13]</sup>
- Muhallil-i-Waram (Resolvent)
- Munaqqi Maida
- Mudirr al-Bawl (Diuretic) <sup>[10]</sup>
- Mushil (Purgative)
- Munawwim (Hypnotic) <sup>[10], [13]</sup>
- Jazib (Absorbent)
- Muzliq (Lubricant)
- Mushil wa Muaddil Safra (Purgative of yellow bile)
- Muaddil-i-Dam
- Tiryaq (Antidote)
- Muhallil i-Riyah-i-Qulanj (Resolvent of gaseous Colic)
- Musakkin-i-Atash (Thirst Quenching)
- Muarriq (Diaphoretic)
- Mulayyan (Laxative) <sup>[10], [13]</sup>

### Istemaal (Uses as per Unani Medicine)

- Zukam (Catarrh)
- Khushunat-i-Halaq (Sore throat)
- Buhha al Sawt (Hoarseness of voice)
- Sual harr (Hot cough) <sup>[10], [13]</sup>
- Ehtibas-i-Bawl (Anuria)
- Suzish-i-Ain (Irritation of eye)
- Waram-i-Ama (Enteritis)
- Suzish-i-Mida (Irritation of Stomach)
- Humma (Fever) <sup>[13]</sup>
- Dhat al-riya (Pneumonia)
- Dhat al-janb (Pleurisy)
- Dard-i-Gurdah (Renal colic) <sup>[13]</sup>
- Nar-i-Farsi (Eczema)
- Amrad-i- Itfal (Ailments of Infants)
- Suzish-i- Mathana (Irritation of Urinary Bladder) <sup>[10]</sup>
- Suzish wa Waram-i-Halaq (Pharyngitis) <sup>[13]</sup>
- Nazla (Coryza) <sup>[13]</sup>
- Khunaq (Diphtheria)
- Umm al-Sabyaan
- Ishal-i Safrawi (Bilious Diarrhoea) <sup>[10]</sup>

**Miqdar e Khuraq (Dose)**Powder - 10.50- 22.50 Masha (gm) <sup>[13]</sup>10 - 20 gm <sup>[6]</sup>Joshanda - 3.75 Tola <sup>[13]</sup> 6 Masha <sup>[18]</sup>**Muzir (Adverse effects)**Murkhi Meda (Stomach relaxant), Zof e ishteha (weakens of appetite), for Qalb (heart), Khafaqan (Palpitation) <sup>[10], [13], [15]</sup>**Musleh (Corrective)**Aneesoon, Marzanjosh <sup>[13]</sup>**Badal (Substitute)**Aslussoos, Gul e Neelofer, Gaozaban, <sup>[10], [13]</sup>Barg e Khubbazi <sup>[13]</sup>**Murakkabat (Compound Formulations)**Khameera Banafsha, Sharbat Banafsha, Habbe Banfsha<sup>[17]</sup>,Itrifal-e-Sana, Itrifal-e-Zamani,<sup>[19]</sup> Roghan-e-Banafsha,<sup>[20]</sup>

Habb-e-Sil, Majoon-e-Antaki, Mufarreh-Motadil, Mufarreh

Yaqooti Barid, Sharbat Eijaz, Dayaooza, Habb-e-

Ghariqoon, Qairooti Muhallil, Qarooti Bazar-e-Qatan,<sup>[5]</sup>

Habb-e-Nuzul-ul-Ma, Qurs-e-Zatul-Janb, Burood-e-

Banafsaji, Qairooti-e-Akhzar, Qairooti-e Arad-e-Baqila,

Qairooti-e-Babuna Wali, Qairooti-e-Karnab, Qairooti-e-

Mamool,<sup>[21]</sup> Yashbi, Mufeed Joshanda, Sadri, Raughan-e-Benazeer, Sharbat Nazla, Habb-e-Yarqan <sup>[22]</sup>.**Evidence Based Pharmacological Activities****Acute toxicity studies**

The aerial parts of *V. odorata* were studied for its toxicity. Crude methanolic extract and its n-hexane fraction were proved safe at the doses of 500, 1000 and 2000 mg/kg in BALAB/c mice. This genus may be concluded safe at higher doses for clinical uses. <sup>[14]</sup>

**Cough suppression activity**

In a clinical trial, the effect of *Viola odorata* flower syrup on cough of children with asthma was evaluated. 182 children aged 2 to 12 years suffering with intermittent asthma were randomly given 1:1 violet syrup or placebo along with the common standard treatments (short-acting b-agonist) in both groups evaluated in terms of the duration until cough suppression was achieved. This study displayed that the violet syrup as an adjuvant with short-acting agonist can enhance the cough suppression in children with intermittent asthma <sup>[23]</sup>.

**Antipyretic Activity**

*Viola odorata* showed antipyretic activity in rabbits at the doses of 3% suspension prepared in 0.25% agar when administered at a constant dose volume of 5ml/kg (150 mg/kg) <sup>[24]</sup>.

**Anti-inflammatory activity**

Aqueous extract of *V. odorata* tested for anti-inflammatory properties as compared with hydrocortisone in rats by induction of lung injury by formalin via nebulization. In this study it was found that *V. odorata* extract given prophylactically was effective partially in preventing lung damage and could possibly be used as an alternative for corticosteroids in management of inflammatory conditions of the lung <sup>[25]</sup>.

**Antioxidant activity**

Extracts of four medicinal and aromatic plants for antioxidant potency employing six various established *in vitro* system including *H. officinalis* L. aerial parts, *C. speciosum* flowers, *V. odorata* and *B. hyrcana* leaves. With regard to IC<sub>50</sub> values (µg/ml), the order in DPPH radical-scavenging were CS (585.6) > HO (311) > VO (245.1) > and BH (113.1) <sup>[26]</sup>.

Inhibitory potential of the dichloromethane, ethyl acetate, ethanol, and aqueous extracts of *V. odorata* was investigated against tyrosinase (TYR) and cholinesterase by microplate assays. Ethanol extract inhibited TYR (80.23 ± 0.87% at 100 µg mL<sup>-1</sup>), and none of them were able to inhibit cholinesterase. Extracts were able to scavenge no radical more (31.98 ± 0.53–56.68 ± 1.10%) than other radicals tested, and displayed low to moderate activity. HPLC reveal substantial amount of vitexin rutin and vitexin, three flavonoids (rutin, isovitexin, and kaempferol-6- glucoside) were also isolated from the ethanol extract. This is the preliminary report on TYR inhibitory activity of VO <sup>[27]</sup>.

The violet petals showed higher total phenolic, flavonoid and anthocyanin content in comparison with red and yellow ones. Aqueous extract of violet pansy can be considered as a suitable candidate to serve as a radical scavenging agent <sup>[28]</sup>.

**Antimicrobial activity / Antibacterial activity**

Cyclotides isolated from the Iranian *V. odorata* plant was evaluated for its antimicrobial activities, radial diffusion assays, minimal inhibitory concentration (MIC) and minimal bactericidal concentration. Data analysis showed that MIC of semi purified cyclotides as 1.6mg ml<sup>-1</sup> against *Staphylococcus aureus*, gram-positive bacteria <sup>[29]</sup>.

In another study, dried aerial plant part extracted in petroleum ether, acetone, methanol and water by Soxhlet apparatus was evaluated for its antibacterial activity by agar well diffusion method and the minimum inhibitory concentration (MIC) (two-fold serial dilution method) and Erythromycin as a positive control. Methanol extract displayed more activity than other extracts, zone of inhibition exhibited against tested microorganisms was 16 mm to 24 mm respectively and MIC values were recorded between 3.12 mg/ml to 12.5 mg/ml for all the organisms. Aerial parts of *V. odorata* displayed potent antibacterial activity against respiratory bacterial pathogens *Haemophilus influenza* MTCC 3826, MTCC 2474, *Staphylococcus aureus*, MTCC 1144, *Streptococcus pneumonia*, MTCC 655 and *Streptococcus pyogenes*, MTCC 442, *Pseudomonas aeruginosa* <sup>[30]</sup>.

Potent bactericidal activity against gram negative bacteria was found in a study. Cycloviolacin O<sub>2</sub> also displayed bactericidal activity against the Gram-negative species *Klebsiella pneumonia* and *Pseudomonas aeruginosa* <sup>[31]</sup>.

*Methanolic* and *aqueous extract* of *V. odorata* flower showed moderate activity against salmonella typhi, salmonella typhi murium and salmonella paratyphi A. Aqueous extract was found to be more bactericidal than methanolic extract <sup>[32]</sup>.

**Anti-tubercular activity**

Pure constituent's extract of *V. odorata* was evaluated against *Mycobacterium tuberculosis* H37Rv and clinically isolated MDR-TB (*M. avium*, ATCC 25291). Results suggested *V. odorata* contained active compounds against *M. tuberculosis* H37Rv and *M. avium*, which can be used as a lead for developing anti-TB drug <sup>[33]</sup>.

**Hepato-protective study**

*V. odorata* aqueous and methanolic extract (250 mg/kg and 500 mg/kg) was given to mice with paracetamol induced toxicity. Results displayed that extract significantly ( $p < 0.01-0.001$ ) reduced increased levels of serum hepatic enzymes and total bilirubin. Histopathological studies also suggested that it attenuated the hepatocellular necrosis and inflammation. HPLC on the extract displayed presence of hepatoprotective flavonoids (isorhamnetin and luteolin) [34]. Sweet violet blossoms powder (SVBP) was also found effective in protecting against CCl<sub>4</sub>-induced liver toxicity. phytochemicals of plants were able to prevent or inhibit CCl<sub>4</sub> hepatotoxicity displayed by liver serum enzymes-lowering activity and decreasing rate of the formation of MDA in serum [35].

**Diuretic activity**

Diuretic activity of n-hexane, butanolic, methanolic and aqueous extract of *V. odorata* aerial parts at dose level of 200 and 400 mg/kg body weight, displayed diuretic activity and urine output was more for aqueous extract at a dose level of 400 mg/kg as compared to control group of animals. The study suggests that the diuretic activity of *V. odorata* may be due to presence of flavanoids glycosides in test extracts [36].

**Anti-hypertensive and dyslipidemic activity**

An *in vivo* and *in vitro* assay indicates vasodilator effect of the plant extract of *V. odorata*. It may be mediated through multiple pathways like inhibition of Ca<sup>++</sup> influx via membranous Ca<sup>++</sup> channels, its release from intracellular stores and NO-mediated pathways, which possibly explain the fall in BP. The plant also showed dyslipidemic effect [37].

**Hypnotic activity**

Clinically the efficacy of *V. odorata* was evaluated in chronic insomnia. The study displayed that *V. odorata* can have significantly positive effect on inducing sleep. Improvements in sleep and Insomnia Severity Index (ISI) scores were also significantly greater in patients receiving *V. odorata* drop after a month [38].

**Anti-HIV activity**

Attempts to investigate and isolate several bio-actives from *V. odorata* such as beta sitosterol, stigmasterol and lupeol showed that it is a potential source of anti-HIV agents. VO can have a role in future in this regard as drug or therapeutic targets [39].

**Pancreatic lipase inhibitors activity**

*V. odorata* harbors endophytic community, and these endophytes extracts were evaluated for the lipase inhibitory activities. Seven endophytes extract exhibited lipase inhibitory activity with IC<sub>50</sub> < 10 µg/mL. The VOLF4 endophyte (*Aspergillus* sp.) extract displayed promising lipase inhibitory activity (IC<sub>50</sub> 3.8 µg/mL) and can be used to develop a potential anti-obesity drug [40].

**Cytotoxic Activity**

In an *in vitro* study *Viola odorata* significantly decreased cell survival in triple negative human breast cancer cells (MDA-MB-468) [42]. The effect of higher dose of *Viola odorata* extract on mitosis and meiosis of *Vicia faba* shows that it has a clastogenic effect on root tip cells as well as

buds [41].

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 O<sub>2</sub>, exhibited *in vitro* cytotoxic activity against ten different cancer cell lines, including myeloma, leukemia, small-cell lung cancer, lymphoma and renal adenocarcinoma. It gave better results than the antitumor drugs which are currently in clinical use [42].

**Neuroprotective Activity**

*V. odorata* and *V. tricolor* protect neuronal cells against serum/glucose deprivation induced cell death in an *in vitro* model of ischemia and neurodegeneration, which is at least in part, by their antioxidant activities [43]. Another study also explored the potential effect of *Viola odorata* extract on reducing infarct volume and neurological defects in MCAO stroke model [44].

**Laxative Activity**

Butanolic and aqueous extracts of *Viola odorata* showed good laxative effect in rats [45].

**Phytochemical Constituents**

Phytochemically, different groups of compounds have been isolated from various species of genus *Viola* like cyclotides, flavonoids, alkaloids and triterpenoids [46]. The GC-MS analysis of active fraction revealed the presence of Pentane 2,3,4-Trimethyl (45%), N-Hexadecanoic acid (28.85%), 10-Undecyn1-ol (14.43%) and Pentadecanoic acid (8.14%) [47]. The flowers contain a coloring matter and small amount of a volatile oil, three acids (one red, another colorless, and a third salicylic acid), and an emetic principle called as violin, probably identical with emetine, violaquercitrin, closely related but not identical with, quercitrin or rutin, and sugar. The violin is supposed to be found in all parts of the plant. The flowers contain a glucoside and methyl salicylic ester [48]. Phytochemical analysis of methanolic extract of *Viola odorata* revealed the presence of flavonoids, glycosides, alkaloids, steroids, saponins and tannins [48, 49]. A new structurally related ionone-like compound known as 3-(2',4',6',6'- tetramethylcyclohexal',4'-dienyl) acrylic acid has been isolated from aerial parts of *Viola odorata*, with significant bioactivity. The ionones, dihydroionones, ionols and epoxy ionones are some few representative groups of compounds.

**Conclusion**

The present review explores the medicinal importance of Banafsha described in Unani texts. Based on these findings, it can be understood that the Banafsha (*Viola odorata* Linn) is effective in treatments of various ailments and recommend that further phytochemical, clinical and advance research should be done on this very promising traditional medicinal plant for the welfare of mankind. Also, in animal and human studies it is found to have various properties but still there is need for further research on untouched medicinal aspect of this herb.

**References**

1. Kamboj VP. Herbal medicine. Current Science 2000;78(1):35-9.
2. Tiwari S. Plants: A rich source of herbal medicine.

- Journal of natural products 2008;1(0):27-35.
3. Kumari S, Shukla G, Rao AS. The present status of medicinal plants-Aspects and prospects. International Journal of Research in pharmaceutical and biomedical sciences. 2011;2(1):19-23.
  4. Robber JM, Tyler VS. Pharmacognosy, Pharmacobiotechnology. Baltimore 1996, 1-14.
  5. The Unani Pharmacopoeia of India. Part I Vol. II. New Delhi: GOI Ministry of Health and Family Welfare, Dept. of AYUSH 2007, 41.
  6. Standardization of single drugs of Unani medicine. Part II, First ed. New Delhi: CCRUM 1992, p.148-53.
  7. Dymock W, Warden CJH, Hooper D. Pharmacographia Indica. New Delhi: Srishti Book Distributors; 2005;1:140-41.
  8. Kirtikar KR, Basu BD. Indian medicinal plants. Second ed. Dehradun: International Book Distributors. 2008;1:207-09.
  9. *Viola odorata* L. USDA [Internet]. [Cited on 30-4-21]. Available from: <https://plants.usda.gov/>
  10. Baitar I. Al-jam' e ulmufradat al-adviya wa alaghziya, New Delhi: CCRUM 2000;I:287-89.
  11. Khare CP. Indian medicinal plants. New Delhi: Springer (India) Private Limited 2007, p.706.
  12. Prajapati ND, Purohit SS, Sharma AK, Kumar T. A handbook of medicinal plants. Jodhpur (India): Agrobios 2009, p.540-41.
  13. Ghani Khazain al-adviya N. 1st edition, New Delhi: Idara Kitab-us-Shifa 2010, p.397-98.
  14. Muhammad N, Saeed M, Aleem A, Khan H. Ethnomedicinal, phytochemical and pharmacological profile of genus *Viola*. Phytopharmacology 2012;3(1):214-26.
  15. Khan Muheet-e-Azam MA. (Urdu translation). Part I. New Delhi: CCRUM; 2012. p. 771-74 16.
  16. Hakeem MA. Bustan al-mufradat. New Delhi: Idara Kitab-us-Shifa 2002, p.138-39.
  17. Qarabadeen Sarkari, 2nd edition, New Delhi: CCRUM; 2006, p. 24.
  18. Nabi MG. Makhzan mufradat wa murakkabat (M'arroof bihi Khawas al-adviya). New Delhi: CCRUM 2007. p.69.
  19. The Unani Pharmacopoeia of India. Part II Vol. II, First edition. New Delhi: GOI Ministry of Health and Family Welfare, Dept. of AYUSH 2010, 8.
  20. Anonymous. The Unani Pharmacopoeia of India. Part II, First edition. New Delhi: GOI Ministry of Health and Family Welfare, Dept. of AYUSH 2009;I:120.
  21. Anonymous. National formulary of Unani medicine. Part-II. New Delhi: Ministry of Health and Family Welfare, Govt of India 2007. p.17, 54, 136-37.
  22. Anonymous. National formulary of Unani medicine. Part-VI. New Delhi: Ministry of Health and Family Welfare, Govt of India 2011, 23, 37, 43, 67, 125.
  23. Qasemzadeh MJ, Sharifi H, Hamedanian M, Gharehbeglou M, Heydari M, Sardari M, et al. The effect of *Viola odorata* flower syrup on the cough of children with asthma: a double-blind, randomized controlled trial. Journal of evidence-based complementary & alternative medicine 2015;20(4):287-91.
  24. Antil V, Kumar P, Kannappan N, Diwan A, Saini P, Singh S. Evaluation of the analgesic activity of *Viola odorata* aerial parts in rats. Journal of Natural Pharmaceuticals 2011;2(1):24.
  25. Koochek MH, Pipelzadeh MH, Mardani H. The effectiveness of *Viola odorata* in the prevention and treatment of formalin-induced lung damage in the rat. Journal of herbs, spices & medicinal plants 2003;10(2):95-103.
  26. Ebrahimzadeh MA, Nabavi SM, Nabavi SF, Bahramian F, Bekhradnia AR. Antioxidant and free radical scavenging activity of *H. officinalis* L. var. *angustifolius*, *V. odorata*, *B. hyrcana* and *C. speciosum*. Pak J Pharm Sci 2010;23(1):29-34.
  27. Erdogan Orhan I, Senol FS, Aslan Erdem S, Tatli I, Kartal M, Alp S. Tyrosinase and cholinesterase inhibitory potential and flavonoid characterization of *Viola odorata* L. (Sweet Violet). Phytotherapy Research 2015; 29(9):1304-10.
  28. Skowrya M, Calvo MI, Gallego MG, et al. Characterization of Phytochemicals in Petals of Different Colours from *Viola* × *wittrockiana* Gams. and Their Correlation with Antioxidant Activity. Journal of Agricultural Science 2014;6(9):93-105.
  29. Zarrabi M, Dalirfardouei R, Sepehrizade Z, Kermanshahi RK. Comparison of the antimicrobial effects of semi-purified cyclotides from Iranian *Viola odorata* against some of plant and human pathogenic bacteria. Journal of applied microbiology 2013;115(2):367-75.
  30. Gautam SS, Kumar S. The Antibacterial and Phytochemical Aspects of *Viola odorata* Linn. Extracts Against Respiratory Tract Pathogens. Proceedings of the National Academy of Sciences, India Section B: Biological Sciences 2012;82(4):567-72.
  31. Pränzing M, Lööv C, Burman R, Göransson U, Andersson DI. The cyclotide cycloviolacin O<sub>2</sub> from *Viola odorata* has potent bactericidal activity against Gram-negative bacteria. Journal of antimicrobial chemotherapy 2010;65(9):1964-71.
  32. Muhammad N, Saeed M, Qayum M, Khan H. Antimicrobial screening of *Viola betonicifolia*. Middle East J Sci Res 2013;15:55-60.
  33. Hassan FA, Naeem IS. Biological activity of *Viola odorata* Linn against *Mycobacterium tuberculosis*. International Journal of Pharmacy and Biological Sciences 2014;5(3):61-69.
  34. Qadir MI, Ali M, Saleem M, Hanif M. Hepatoprotective activity of aqueous methanolic extract of *Viola odorata* against paracetamol-induced liver injury in mice. Bangladesh Journal of Pharmacology 2014;9(2):198-202.
  35. Elhassaneen Y, Sabry S, Musalum T, El-Eskafy A, El-Fatah AA. Effect of sweet violet (*Viola odorata* L.) blossoms powder on liver and kidney functions as well as serum lipid peroxidation of rats treated with carbon tetrachloride. J Am Sci 2013;9(5):88-95.
  36. Vishal A, Parveen K, Pooja S, Kannappan N, Kumar S. Diuretic, laxative and toxicity Studies of *Viola odorata* aerial parts. Pharmacology online 2009;1:739-748.
  37. Siddiqi HS, Mehmood MH, Rehman NU, Gilani AH. Studies on the antihypertensive and antidyslipidemic activities of *Viola odorata* leaves extract. Lipids in health and disease 2012;11(1):6.
  38. Feyzabadi Z, Jafari F, Kamali SH, Ashayeri H, Aval SB, Esfahani MM, et al. Efficacy of *Viola odorata* in treatment of chronic insomnia. Iranian Red Crescent

- Medical Journal 2014;16(12):e17511.
39. Mittal S. A. Thin layer chromatography and high-pressure liquid chromatography profiling of plant extracts of *Viola odorata* Linn. Int J Pharm Bio Sci 2013;4(1):542-9.
  40. Katoch M, Paul A, Singh G, Sridhar SNC. Fungal endophytes associated with *Viola odorata* Linn. as bioresource for pancreatic lipase inhibitors. BMC Complementary and Alternative Medicine 2017;17(1):385.
  41. Asthana M, Kumar A. Dose Response of *Viola odorata* on Meiotic and Mitotic Chromosomes of *Vicia faba*. Br J Pharm Res 2014;4(4):520-530.
  42. de Melo JG, Santos AG, de Amorim ELC, et al. Phytochemical and Pharmacological Notes of Plants Indicated to Treat Tumors in Brazil. Rev Bras Farmacognosy Braz Journal of Pharmacognosy 2011;21(4):744-753.
  43. Mousavi SH, Naghizade B, Pourgonabadi S, et al. Protective Effect of *Viola Tricolor* and *Viola odorata* Extracts on Serum/Glucose Deprivation-Induced Neurotoxicity: Role of Reactive Oxygen Species. Avicenna J Phytomed 2016;6(4):434-41.
  44. Karimifar K, Alipanah H, Big MR. Effect of *Viola odorata* Extract on Reducing Infarct Volume and Neurological Defects in Focal Cerebral Ischemia Animal Mod. J Mazandaran Univ Med Sci. 2017;27(148):1-11.
  45. Vishal A, Parveen K, Pooja S, et al. Diuretic, Laxative and Toxicity Studies of *Viola odorata* Aerial Parts. Pharmacology online 2009;1:739-748.
  46. Barekat T, Otroshy M, Samsam-Zadeh B, et al. A Novel Approach for Breaking Seed Dormancy and Germination in *Viola odorata* (A Medicinal Plant). Nov Appl Sci 2013;2(10):513-516.
  47. Surati VKV, Singh RP, Srivastava GK, et al. Evaluation of *in vitro* Antimicrobial Activity and Essential Oil Composition of Ethanol Extract of *Viola odorata* L. Leaves. World Journal of Pharmacy and Pharmaceutical Sciences (WJPPS) 2015;4(5):1121-1129.
  48. Salve T, Rathod V, Tike SK, et al. A Review Article on Banafsha (*Viola odorata* LINN.). Punarnav 2014;2(4):1-8.
  49. Gautam SS, Navneet, Kumar S. The Antibacterial and Phytochemical Aspects of *Viola odorata* Linn. Extracts against Respiratory Tract Pathogens. Proc Natl Acad Sci, India, Sect B Biol Sci 2012;82(4):567-572.