

A REVIEW ON JASMINUM GRANDIFLORUM

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ABSTRACT

Jasminum grandiflorum, commonly known as Spanish jasmine, is a highly valued medicinal plant widely used in traditional and modern therapeutic practices. This review comprehensively examines its phytochemical composition and pharmacological activities. Phytochemical analysis has revealed the presence of flavonoids, alkaloids, glycosides, tannins, terpenoids, and essential oils, which contribute to its diverse medicinal applications. Various extracts of *Jasminum grandiflorum* have demonstrated significant pharmacological effects, including antioxidant, anti-inflammatory, antimicrobial, hepato protective, wound-healing, and analgesic activities. Additionally, the plant exhibits spasmolytic, antiulcer, cytoprotective, anticonvulsant, and antifertility effects, indicating its broad therapeutic potential. It has also shown promising activity against breast cancer, viral infections, diabetes, and hypertension. The essential oils derived from its flowers possess antibacterial and anti-acne properties, making them valuable in dermatological treatments. Furthermore, the plant's hepatoprotective and neuroprotective properties suggest its potential for managing liver and neurological disorders. The traditional use of *J. grandiflorum* in Ayurveda and folk medicine aligns with its scientifically validated medicinal properties, highlighting its relevance in integrative healthcare. Given its wide range of pharmacological activities and bioactive compounds, *Jasminum grandiflorum* emerges as a promising candidate for further research in natural drug development and novel therapeutic formulations. Future studies should focus on clinical evaluations, mechanistic insights, and potential applications in pharmaceutical and cosmetic industries.

KEYWORDS: *Jasminum grandiflorum*, Anti-inflammatory activity, Antimicrobial activity.

INTRODUCTION

Jasminum grandiflorum, commonly known as Spanish jasmine or royal jasmine, is a fast-growing, deciduous or semi-evergreen climbing shrub in the Oleaceae family. Native to South Asia, the Middle East, and parts of Africa, it is widely cultivated for its fragrant white flowers, which bloom primarily in summer and early autumn. *Jasminum grandiflorum* Linn. is a highly valuable medicinal plant, native to Asia, Kashmir, Afghanistan, and Persia, cultivated in India, wild in sub-tropical North-West Himalayas, Western Ghats, Nilgiris, France, Italy, China, Japan, India, Morocco and Egypt. It is widely recognized for its fragrant flowers and therapeutic applications in traditional medicine. The phytochemical investigation of *Jasminum grandiflorum* has revealed a variety of bioactive compounds, including flavonoids, alkaloids, tannins, glycosides, terpenoids, and essential oils. The pharmacological studies of the whole plant *Jasminum grandiflorum* have demonstrated its diverse medicinal properties, making it valuable in traditional and modern medicine. Various extracts of the plant have shown antioxidant, anti-inflammatory, antimicrobial, hepatoprotective, wound-healing, and analgesic activities. Traditionally, *Jasminium grandiflorum* has been used in Ayurvedic and folk medicine for treating skin diseases, respiratory disorders, and gastrointestinal issues.^[1]

PLANT PROFILE



Figure 1: *Jasminum grandiflorum*.

TAXONOMY^[2]

FAMILY: Oleaceae-Olive family

BOTANICAL NAME: *Jasminum grandiflorum* Linn

KINGDOM: Plantae-Plants

SUB KINGDOM: Tracheobionts-Vascular plants

CLASS: Magnoliopsida-Dicotyledons

SYNONYM: Spanish jasmine, Common jasmine, Catalian jasmine, Royal jasmine, Sillian jasminum,

ORDER: Scrophulariales

GENUS: *Jasminum*

SPECIES: *Grandiflorum* linn.

DIVISION: Magnoliophyta-Vascular plants

VERNACULAR NAME^[3]

- ✓ **TAMIL:** Jatimalli, Kotimalligai, Pitchi
- ✓ **HINDI:** Jati, Cameli
- ✓ **SANSKRIT:** Jati, Malati
- ✓ **ENGLISH:** Spanish Jasmine, Common Jasmine, Catalonian Jasmine
- ✓ **KANNADA:** Mallige, Jaaji mallige
- ✓ **TELUGU:** Jaaji, Malati

DESCRIPTION^[4]

It is a scrambling deciduous shrub growing to 2–4 m tall. The leaves are opposite, 5–12 cm long, pinnate with 5–11 leaflets. The flowers are produced in open cymes, the individual flowers are white having corolla with a basal tube 13–25 mm long and five lobes 13–22 mm long.

CHEMICAL CONSTITUENTS^[5]

Linalool: A fragrant, cyclic alcohol.

Benzyl acetate: An ester with a floral, sweet aroma.

Benzyl alcohol: A simple alcohol with a floral, sweet aroma.

Indole: A compound that contributes to the floral and sometimes animalic scent of jasmine.

Benzyl benzoate: An ester with a floral, sweet aroma.

Cis-jasmone: A key compound contributing to the characteristic jasmine fragrance.

Geraniol: Another alcohol with a floral, rose-like aroma.

Methyl anthranilate: A compound responsible for the fruity, grape-like aroma.

Phytol: A long-chain alcohol.

Isophytol: A compound related to phytol.

Geranyl linalool: A compound with a floral, sweet aroma.

Methyl linoleate: An ester with a fatty, oily aroma.

Eugenol: A compound with a spicy, clove-like aroma.

Lactones: A group of compounds contributing to the floral fragrance.

Nerolidol: A terpene alcohol with a floral, sweet aroma.

p-cresol: A compound with a pungent, phenolic aroma.

Benzoic acid: A carboxylic acid.

Vanillin: A compound with a vanilla-like aroma.

High paraffins: Long-chain hydrocarbon.

THERAPEUTIC USES^[6]

1. Traditionally used for treating wounds, ulcers, and skin diseases like conjunctivitis and dermatitis.
2. Some studies suggest that extracts from the leaves and flowers can promote wound healing and have antioxidant properties.
3. The leaves can be chewed to aid in toothaches and stomatitis.
4. Traditionally used to treat mental illness and anxiety.
5. In aromatherapy, jasmine is used for its calming and relaxing properties.

6. Used for treating spasms, dysmenorrhea, and infections.
7. The flowers are used as a beverage with heat-clearing and detoxifying effects.
8. Used for treating odontalgia (toothache) and viral infections.

PHARMACOLOGICAL STUDIES

Spasmolytic activity

Jasmine has spasmolytic activity on guinea pig ileum (post synaptic and not atropine-like) and rat uterus in vitro. The spasmolytic effect of Jasmine absolute was most likely to be mediated through cAMP, and not through cGMP. The contradictory effect in vitro and in vivo has been suggested probably due to the solely physiological effects of jasmine absolute in vitro (producing a relaxation) compared with that in vivo, where it has a strong psychological input, producing a stimulant effect in man and enhanced movement in animals.^[7]

Anti-inflammatory activity

Topical anti-inflammatory activity of a polyherbal formulation, Jatyadi ghrita, consists of *Jasminum officinale*, *Azadirachta indica*, *Berberis aristata*, *Curcuma longa*, *Picrorrhiza kurroa*, *Rubia cordifolia*, *Trichosanthes dioica*, *Aristolochia indica*, *Hemidesmus indicus*, *Randia spinosa* and *Glycyrrhiza glabra* has been evaluated. The preparation showed nearly 50 percent inhibition of croton oil induced ear edema when compared to Diclofenac sodium, which showed 33 percent inhibition.^[8]

Antimicrobial activity

The antimicrobial activity of ethanol callus extracts of two species of *Jasminum*, (*J. grandiflorum* and *J. sambac*) were evaluated. Preliminary phytochemical analysis of the callus extracts revealed the presence of alkaloids, glycoside, flavanoid, terpenes, tannin, resin, and salicylic acid. The extracts were subjected for screening of in-vitro antimicrobial activity against selected disease causing pathogens, viz., *Staphylococcus albus*, *Proteus mirabilis* and *Salmonella typhi*, at the concentrations of 500 mg/ml and 250 mg/ml. The results of antimicrobial activity revealed that all the extracts showed significant antibacterial activity.^[9]

Antiulcer and antioxidant activities

The antiulcer and antioxidant activities of 70% ethanolic extract of leaves of *J. grandiflorum* (JGLE) were evaluated. Antiulcerogenic activity of JGLE (100 and 200 mg/kg, b.w. orally) was evaluated employing aspirin + pylorus ligation (APL) and alcohol (AL) induced acute gastric ulcer models and ulcer-healing activity using acetic acid induced (AC) chronic ulcer model in rats. The antioxidant activity of JGLE has been assayed by using in vitro methods like 2,2-diphenyl-1-picrylhydrazylhydrate (DPPH) assay, reductive ability, superoxide anion scavenging activity, nitric oxide scavenging activity and total phenolic content, in order to explain the role of antioxidant principles in the antiulcerogenic activity of the extract. There was a significant dose dependent decrease in the ulcerative lesion index produced by all the three models in rats as compared to the standard drug famotidine (20 mg/kg, b. w. orally). The free radical scavenging activities of JGLE depends on concentration and increased with increasing amount of the extract. These results suggest that leaves of *J. grandiflorum* possess potential antiulcer activity, which may be attributed to its free radical scavenging activity.^[10]

Cytoprotective activity

The cytoprotective effects of *J. grandiflorum* flowers and leaves in 7,12-dimethylbenz (a) anthracene (DMBA) induced chromosomal abnormalities in bone marrow of female wistar rats were evaluated. Oral pre-treatment of *J. grandiflorum* flower and leaf extracts to DMBA treated rats significantly reduced the frequency of micro nucleated polychromatic erythrocytes in the rat bone marrow. Also, the plant extracts significantly decreased the percentage of aberrant cells; the number of chromatic and chromosomal breaks in DMBA treated rats which proves its cytoprotective effect.^[11]

Chemo preventive and Lipid peroxidative activities

The chemo preventive efficacy and anti-lipid peroxidative potential of *J. grandiflorum* Linn. on 7,12-dimethylbenz (a) anthracene (DMBA)-induced rat mammary carcinogenesis were evaluated. Oral administration of ethanol extract of *J. grandiflorum* flowers (JgEt) at a dose of 300 mg/kg body weight for 14 weeks to DMBA-injected animals completely prevented the formation of tumors in the pre-initiation period. JgEt also exerted significant anti-lipid peroxidative effect and improved the antioxidant defense system in DMBA-treated rats suggesting clearly that JgEt has potent chemo preventive efficacy.^[12]

Breast cancer

Flowers of *J. grandiflorum* are useful to women when brewed as a tonic as it aids in preventing breast cancer and stopping uterine bleeding. Extracts from *Jasminum grandiflorum* show cytotoxicity toward breast cancer cell lines. *Jasminum grandiflorum* exhibits promising breast cancer activity by inducing apoptosis, inhibiting proliferation, reducing inflammation, and preventing angiogenesis. While preclinical studies (in vitro and in vivo) suggest potential benefits, more clinical research is needed to confirm its effectiveness in human breast cancer patients.^[13]

Wound healing activity

The effect of flower extract of *J. grandiflorum* was studied for its wound healing activity at a dose of 250 mg/kg body weight orally for 10 days using excision and dead space wound models in rats. Extract treated rats exhibited 65% reduction in the wound area when compared to controls (54%). The wet and dry granulation tissue weight, and hydroxyproline content in a dead space wound model were increased significantly when compared to controls. Histological studies of the tissue obtained on day 10 from the extract-treated group showed increased well organized bands of collagen, more fibroblasts and few inflammatory cells when compared to controls which showed inflammatory cells, scanty collagen fibers and fibroblasts which suggests the use of *J. grandiflorum* flower extract in the management of wound healing.^[14]

Anti-acne activity

The anti-acne activity of ten natural products is used as a traditional medicine in various skin disorders and has been evaluated against *Propionibacterium acnes* by broth dilution method. Minimal inhibition concentrations (MIC) of *J. grandiflorum* extract was found to be below 800 µg/mL.

Anti-acne activity of essential oil of *J. grandiflorum* was evaluated towards *Propionibacterium acnes* and in vitro toxicology against three human cancer cell lines. Results showed that the essential oil was found to be effective against *Propionibacterium acnes* and showed significantly stronger cytotoxicity of essential oil on human prostate carcinoma cell (PC-3) and human lung carcinoma (A549) and human breast cancer (MCF-7) cell lines.^[15]

Angiotensin Converting Enzyme (ACE) Inhibitor Activity

Bioactivity guided fractionation of extract of aerial parts of *J. grandiflorum* led to the isolation of oleacinid. A study focusing on the aerial parts of *J. grandiflorum* led to the isolation of oleacein, a compound demonstrating ACE inhibitory activity with an IC_{50} value ranging from 26 to 36 μ M. This suggests that oleacein may contribute to the plant's antihypertensive properties. *Jasminum grandiflorum* contains bioactive compounds capable of inhibiting ACE activity, supporting its traditional use in treating hypertension.^[16]

Protease Activity

Protease, a potential candidate in wound healing is not so far studied in *J. grandiflorum* flowers. So an attempt was made to determine the protease activity of floral extracts of *J. grandiflorum*. Buffers of different pH range were used for extraction of the flowers to identify the best buffer for extraction of protease. Total protein content and protease activity were determined in the floral extracts as well as in different organs of the flower. Floral extract showed higher protease activity when the extraction was carried out at pH 4.0 and among the floral organs tested; protease activity was maximum in stamens.^[17]

Antibacterial Activity

Antibacterial studies of fruit extracts of *Jasminum grandiflorum* and phytochemical screening have been done using *Xanthomonas campestris* and *Aeromonas hydrophilia* strains, It was assessed that benzene, chloroform and aqueous extract were completely inactive whereas methanolic extract showed significant inhibitory effect against *X. campestris* and *A. hydrophifa*. The phytochemical analysts revealed the presence of steroids, sugars, reducing sugars alkaloids, phenolic compounds and tannins in the methanolic extract of fruits. This study reported that methanolic extracts of the fruit of *Jasminum grandiflorum* can be used for biocontrol purposes against bacterial infection in plants as well as in animals.^[18]

Analgesic Activity

Analgesic activity of extracts of powdered leaves was evaluated using formalin and acetic acid-induced writhing test method at a dose of 100 and 200 mg/kg orally. Extracts showed dose dependent analgesic activity. Aqueous extract of leaves at a dose of 200 mg/kg showed the highest Antibacterial activity in both the models.^[19]

Anthelmintic Activity

Petroleum, ether, chloroform, acetone, methanolic and aqueous extracts of leaves were evaluated for anthelmintic activity against adult earthworms *Pheretima posthuma* at the concentration of 20 and 0 mg/ML. Observation was made for the time taken to paralysis and death of individual worms up to 4 h of the test period. Among all the extracts, methanolic, chloroform and aqueous extract showed better anthelmintic activity when compared with the standard drug albendazole.^[20]

Hepatoprotective Activity

Ethanol extract of *J. grandiflorum* leaves was evaluated for its hepatoprotective effects in isoniazid (INH)-induced hepatotoxicity in Wistar albino rats using a dose of 200 mg/kg, orally for 30 days. Silymarin (50 mg/kg) was used as standard. The elevated levels of aspartate transaminase, alanine transaminase, and lipid profile following INH administration were significantly lowered by *J. grandiflorum* treatment. It revealed the hepatoprotective activity of leaves extract.^[21]

Anticonvulsant Activity

Methanolic extract of *Jasminum grandiflorum* flower was Used to study anticonvulsant activity at a dose of 100 200 and 400 mg/kg orally using maximal electroshock (MES) seizures and pentylenetetrazole (PTZ)- induced seizures in albino mice. The standards used were diphenylhydantoin in MES method and sodium valproate in PTZ-induced seizures method. The result concluded that *J. grandiflorum* had mild to moderate anticonvulsant property and which may be due to involvement of gamma-amino butyric acid (GABA).^[22]

Antifertility Activity

The aqueous extract of fresh floral buds has been studied on female fertility in rats. The effects was observed on oestrus cycle, implantation, fetal loss, abortion, teratogenicity and serum progesterone levels on days 5, 12 and 20 of pregnancy. The extract at oral doses of 250 and 500 mg/kg produced significant antimplantation effect due to decrease in serum progesterone levels on the 5th day of pregnancy.^[23]

Antiviral Activity

Antiviral activity of oleuropein (Olo) derived from the flowers of *J. grandiflorum* was evaluated on hepatitis B virus (HBV) replication in HepG2 2.2.15 cell line in vitro and duck hepatitis B virus (DHBV) replication In ducklings in vivo. There was undoubtedly anti-HBV activity in HepG2 2.2.15 oelle test in vitro and DHBV-Intected ducklings test in vivo.^[24]

Antidiabetic Activity

In the study, single intraperitoneal injection of streptococci (60mg/kg; b. wt) had displayed noxious biochemical changes. Whilst, treatment with EEJG significantly attenuated the toxic manifestation and thus inhibited the state of diabetes. In the present study, STZ intoxicated rats displayed significant ($p \leq 0.001$) elevation of blood glucose level on 1st, 7th, 14th and 21st day as that of the control rats. Meanwhile, EEJG at the doses of 100mg/kg had not display any significant alteration in the blood glucose level as that of the diabetic control.^[25]

CONCLUSION

Jasminum grandiflorum has been extensively studied for its phytochemical and pharmacological properties, demonstrating significant medicinal potential. The presence of bioactive compounds such as flavonoids, alkaloids, glycosides, tannins, and essential oils contributes to its diverse therapeutic applications. The plant has shown promising results in treating various ailments, including inflammation, microbial infections, ulcers, liver disorders, and oxidative stress-related conditions. Additionally, its wound-healing, analgesic, spasmolytic, and cytoprotective properties further establish its pharmacological importance. Moreover, its anticonvulsant, antifertility, and antiviral activities open new avenues for future research and drug development.

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