

Jasmine Unveiled: A Meta-Analytical Journey through Jasminum Officinale's Healing Secrets

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ABSTRACT:

INTRODUCTION: Jasminum officinale is a widely used aromatic and medicinal plant rich in bioactive compounds such as flavonoids, glycosides, terpenoids, phenolics, and essential oils. Traditionally valued for fragrance, it also demonstrates diverse pharmacological activities, including antimicrobial, antioxidant, anti-inflammatory, hepatoprotective, spasmolytic, and wound-healing effects. Owing to growing concerns of antibiotic resistance and increased interest in natural therapeutics, Jasmine has gained significant relevance in modern phytopharmacology.

AIM: To present a meta-analytical review of the phytochemistry and pharmacological properties of Jasminum officinale, highlighting its therapeutic potential in traditional and modern medicine.

METHODS: A comprehensive literature review was conducted using published articles, Ayurvedic texts, pharmacological studies, and scientific databases. Findings from antimicrobial, antioxidant, hepatoprotective, antiulcer, and wound-healing research were compiled to evaluate the medicinal significance of Jasmine.

RESULTS: Phytochemical analysis indicates the presence of essential oils, flavonoids, phenolics, terpenoids, glycosides, and antioxidants, contributing to Jasmine's therapeutic actions. Extracts demonstrate strong antibacterial effects against *E. coli*, *P. aeruginosa*, *S. aureus*, *B. subtilis*, and *E. faecalis*. Antioxidant assays show high free-radical scavenging potential, while antiulcer studies reveal significant reduction in gastric acidity and enhanced mucosal healing. Essential oils exhibit spasmolytic and vasodilatory actions through calcium-channel-blocking mechanisms. Hepatoprotective studies indicate protection against CCl_4 -induced liver damage through antioxidant pathways. Ayurvedic literature describes Jasmine as Tikta-Kashaya, Ushna, Laghu, and Tridosha-shamaka, with uses in Mukharoga, Vrana, and inflammatory conditions.

CONCLUSION: Jasminum officinale is a multifunctional medicinal plant with significant pharmacological potential. Its rich phytochemical profile supports diverse therapeutic applications, warranting further research, standardisation, and clinical validation for integration into natural and modern healthcare systems.

KEYWORDS: Jasmine, Ayurveda, Jasminum officinale, Meta-analysis, Perfumery, Natural Products.

I. INTRODUCTION:

In the verdant realms of botany, few plants evoke as much admiration and wonder as *Jasminum officinale*, commonly known as the poet's jasmine. This enchanting species, revered for its delicate, star-shaped blossoms and intoxicating fragrance, has woven itself into the fabric of human culture, spanning continents and centuries. Originating from the temperate regions of the Himalayas and central Asia, poet's jasmine has journeyed through history, symbolising love, beauty, and purity in countless traditions. Production of dwarfed ornamental plants is still one of the most important choices to transfer them from outdoors to indoors. These downsized distinguished plants can be used well for landscaping the closed and limited-area spaces. Among ornamental plants that may be suitable for achieving such a choice is the common white jasmine (*Jasminum officinale* L.), [syn. *Jasminum grandiflorum* L.] (1)

It is important to acknowledge that many people worldwide, especially in developing countries, rely on natural plant-based remedies as their main source of healthcare. These medicinal plants are essential in providing crucial healthcare services, and they are used to make various products, such as pharmaceuticals, fragrances, and biopesticides. (2) There are a few reports about the chemical constituents and pharmacological properties of Jasmine. In our continued investigation on searching for safe and effective

anti-HBV agents from traditional Chinese medicine, we found that the hydroalcoholic extraction of the flowers of JOG showed preferable antiviral efficacy against hepatitis B virus (HBV) replication in HepG2 2.2.15 cell line in vitro.(3)

Jasmine essential oil is typically extracted from the flowers of the *Jasminum officinale* plant through a process known as solvent extraction or enfleurage. The oil is rich in complex chemical compounds such as benzyl acetate, linalool, indole, and various other alcohols and esters, which contribute to its characteristic fragrance and therapeutic properties. Many essential oils were found to have bioactivities such as antioxidant, antiviral, antibacterial, antifungal, anti-inflammatory, antidiabetic, antimutagenic and anticarcinogenic.(4)

Antibiotic resistance is a pressing global health issue that occurs when bacteria change in ways that render antibiotics ineffective against them. This means that bacterial infections become harder to treat, leading to longer illnesses, more severe illnesses, and an increased risk of death. Due to the increase in resistance to antibiotics, there is a pressing need to develop new and innovative antimicrobial agents. Among the potential sources of new agents, plants have long been investigated. They contain many bioactive compounds that can be of interest in therapeutic applications.(5)

Jasminum officinale (Samanpichcha) is one of the most demanding indigenous flower species in Sri Lanka, which belongs to the family Oleaceae. The genus consists of around 200 species. This plant is used for the perfume industry as a flavouring agent and for various cosmetics and medicinal purposes.(6) The active principles of many drugs are found in plants or are produced as secondary metabolites. The remarkable contribution of plants to the drug industry was possible because of the large number of physicochemical and biological studies all over the world. Herbal remedies used in folk medicine provide an interesting and still largely unexplored source for the creation and development of potentially new drugs for chemotherapy, which might help overcome the growing problem of resistance and also the toxicity of the currently available commercial antibiotics.(7)

The essential oil of the flower of *Jasminum grandiflorum* contains thirty compounds in various concentrations, with the major component being phytol.(8) NC (natural cosmetics) aim at the care and prettiness of the human body with the help of active constituents in nature. This

can only be achieved with raw materials that are harmless to the skin and the environment. Natural cosmetics help our natural skin functions and rejuvenate the skin. It provides soft and natural care, and thus, it can be said that it helps the skin of all ages to stay healthy. It is thought that natural cosmetics make the body-spirit harmony more alive. Nature, the source of life, offers us everything necessary to lead a healthy and long life, and indigenous people are collecting herbaceous and ligneous species from the wild and other commercial and home gardens to treat a wide range of diseases and satisfy other social conditions.(9) Natural products are highly appreciated, but often very expensive raw materials and, therefore, the fragrance industry is constantly looking for markers in addition to odour to determine the authenticity of such products and to detect possible adulterations.(10)

AIM:

To present a meta-analytical review of the phytochemistry and pharmacological properties of *Jasminum officinale*, highlighting its therapeutic potential in traditional and modern medicine.

METHODS:

A comprehensive literature review was conducted using published articles, Ayurvedic texts, pharmacological studies, and scientific databases. Findings from antimicrobial, antioxidant, hepatoprotective, antiulcer, and wound-healing research were compiled to evaluate the medicinal significance of Jasmine.

II. RESULT:

➤ Taxonomical Classification:(11)

Kingdom: Plantae- Plants

Subkingdom: Tracheobionts- Vascular plants

Division: Magnoliophyta- Flowering plants

Class: Magnoliopsida- Dicotyledons

Order: Scrophulariales

Family: Oleaceae- Olive family

Genus: *Jasminum*

Species: *officinale*Linn

Latin name: *Jasminumofficinale*Linn

➤ Vernacular names:

Sanskrit -Juthika, Mugdhee, Suchinallika, Jaati

Hindi - Juhi, Chameli

English - Spanish or common jasmine

Marathi - Jai

Folk - Chameli

Gujarati - Chambeli

Bengali - Umbustha, Gunica, Yothica
Tamil - Manmadabanam
Telugu - Adavimalla, Madhyanamallige
Oriya - Bonomllika, Jui
Unani - Yaasmin

➤ **Habitat and Distribution:**

✚ **Natural Habitat:**

- **Origin:** It is native to the temperate regions of the Himalayas and central Asia.
- **Climate:** Jasmine prefers a warm, temperate climate with plenty of sunlight. It can tolerate mild winters but is not frost-hardy.
- **Soil:** It grows best in well-drained, fertile soil with a neutral to slightly acidic pH. Jasmine appreciates soil that retains moisture without becoming waterlogged.
- **Elevation:** In its native range, it is often found at elevations ranging from 1000 to 4000 meters.

It is native to Asia: Georgia, China, Tajikistan, Afghanistan, Iran, Iraq, Turkey, Bhutan, India, Nepal and Pakistan. It was widely cultivated in the Mediterranean, Caucasus, Northern Persia, Eastern Afghanistan, Hindukush, India, China and Pakistan for its attractive fragrant flower.(12)

➤ **Phytoconstituents:**

✚ **Phytochemical analysis of the ethanolic Jasmine flowers extract:(13)**

Compound	Result
Cardiac Glycosides	+
Essential Oils	+
Flavonoids	+
Coumarins	+
Steroids	+
Phenolics	+
Tannins	-
Alkaloids	-
Antraquinones	-
Saponins	+
Antioxidants	+

✚ **List of compounds isolated from Jasminum:(13)**

Terpenoids: Nerolidol, Farnesol, Phytol, citrinellylacetate, phenylethylalcohol, Nerol, geraniol, (E)- β -ocimene, 2E,6E)-farnesol, 1- α -terpineol, Myrcene, cis-3-hexenyl benzoate, γ -jasmolactone, methyl linoleate, benzyl 6-O- β -Dxylopyranosyl- β -D-glucopyranoside(β primeveroside), linalyl 6-O-malonyl- β -Dglucopyranoside, Citral, Citronellol, methyl palmitate, benzyl benzoate, Jasmone, methyl anthranilate, benzyl acetate, benzyl alcohol, linalyl acetate, Linalool, (Z)-3-hexenyl benzoate, (Z)-methyl epijasmone, (E,E)- α -farnesene, Benzaldehyde, 2-phenyl ethyl acetate, geranyl acetate, benzyl salicylate, β -Pinene, δ -3-Carene, α – Pinene, (E,E)-2,4-Heptadienal, 6-Methyl-5-hepten-2-one, 2-Pentyl furan, 1-Hexanol, (E)-2-Hexen-1-ol, 1-Hexanol, (E)-2-Hexen-1-ol, 1-Hexanol, Octanal, nPentacosane, n-Tetracosane, Abieta-7,13-dien-3-one, n-Tricosane, n-Docosane, Abieta-8(14),13(15)diene, Methyl octadecanoate, n-Heneicosane, Methyl linoleate, Abietadiene, Kaurene, n-Peicosane, nHexadecanoic acid, Methyl hexadecanoate, n-Nonadecane, (E,E)- α -Farnesyl acetate, Hexadecanal, Octadecane, Benzyl benzoate, Pentadecanal, n-Heptadecane, epi- α -Bisabolol, α -Bisabolol, Tetradecanal, Humulene epoxide II, β -Atlantol, n-Hexadecane, (E)-2-Phenyl ethyl tiglate, Caryophyllene oxide, Hexyl benzoate, (Z)-3-Hexenyl benzoate, trans-Nerolidol, Tridecanal, Benzyl tiglate, (Z,E)- α -Farnesene, Phenyl ethyl-3-methyl butanoate, (E)- β -Ionone, (E)- β -Farnesene, α Humulene, (E)-Geranyl acetone, Aromadendrene, (E)- α -Ionone, (E)- β -Damascenone, α -Copaene, Eugenol, (E,E)-2,4-Decadienal, (E,E)-2,4-Decadienal, Undecanal, Isobornyl acetate, (E)-2-Undecenal, Isobornyl acetate, Nonanoic acid, (E)-2-Decenal, Decanal, α -Terpineol, Methyl salicylate, p-Cymen-8ol, 4-Terpineol, Phenyl ethyl formate, p-Mentha-1,5-dien-8-ol, (E)-2-Nonenal, (E,Z)-2,6-Nonadienal, Benzyl nitrile, cis-Verbenol, cis-Limonene oxide, Nonanal, α -Campholenal, 1-Octanol, Phenylacetaldehyde, p-Cymene.

Phenolics: Oleacein, Isoquercitrin, ursolic acid, salicylic acid, 3,4-dihydroxy benzoic acid, Eugenol, p-cresol, Hesperidin, 2-(3,4- dihydroxy phenyl)-ethanol, oleanolic acid, 5-dihydrocaffeoylquinic acid, 5dihydromethoxycaffeoyl quinicacid, 4-p-coumaroylquinic acid, quercetin-3-O-(2,6-dirhamnosyl)glucoside, kaempferol-3-O-(2,6-di-

rhamnosyl)glucoside, Oleuropein, quercetin-3-O-(6-rhamnosyl)glucoside.

Ester: methyl-N-methyl anthranilate, cis-3-hexenyl acetate, methyl benzoate, methyl hydroxyjasmonate.

Fatty Acids: Dotriacontanol, dotriacontanoic acid

Steroids: Daucosterol

Glycosides: Loganin, jasgranoside B, deacetyl asperulosidic acid, Aucubin, 6-O-methyl-catalpol, 8-dehydroxy shanzhiside, oleoside-11-methyl ester, kaempferol-3-O-rutinoside, 7-glucosyl-11-methyl oleoside, kaempferol-3-O-alpha-L-rhamnopyranosyl (1->3)-[alpha-L-rhamnopyranosyl (1->6)]-beta-D-galactopyranoside, Ligstroside, 7-ketologanin, 2''-epifraxamoside, demethyl-2''-epifraxamoside.

• Pharmacological Review:

Antimicrobial Activity:(14)

Antibacterial activity of *J. officinale* leaf extract in water, ethanol, and acetone was analysed against some ulcer-causing organisms such as *E. coli*, *P. aeruginosa*, *S. aureus*, *B. subtilis*, and *E. faecalis* by Muller Hinton agar diffusion test plates with agar medium. Based on the results, the acetone extract shows maximum inhibition against *E. faecalis*, *P. aeruginosa*, and subsequently *B. subtilis*, *S. aureus* and *E. coli*. Ethanol extract shows maximum inhibition against *E. coli*, followed by *B. subtilis*, *P. aeruginosa*, *S. aureus*, and *E. faecalis*. The aqueous extract shows maximum inhibition against *E. coli*, followed by *E. faecalis*, *P. aeruginosa*, *B. subtilis*, and *S. aureus*. From the above results, we can conclude that *J. officinale* has remarkable antibacterial activity.

Antiulcer Activity:(15)

The reduction in gastric fluid volume, total acidity and an increase in the pH of the gastric fluid in APL rats proved the antisecretory activity of Jasmine. Additionally, Jasmine completely healed the ulcer within 20 days of treatment in the AC model as evidenced by histopathological studies. Like antiulcer activity, the free radical scavenging activities of Jasmine depend on concentration and increase with increasing amount of the extract. These results suggest that leaves of *Jasminum grandiflorum* possess potential antiulcer activity, which may be attributed to its antioxidant mechanism of action.

Wound Healing Activity:

Jasminum officinale (jasmine) helps with wound healing due to its anti-inflammatory and

antioxidant properties, promotes collagen production, and has been traditionally used in Ayurvedic medicine for its healing effects. In dermal wounds extract of *Jasminum officinale* shows significant results.(16)

Antioxidant Properties:

Thirteen essential oils were examined for their antioxidant activity using three different assay systems. Jasmine, parsley seed, rose, and ylang-ylang oils inhibited hexanal oxidation by over 95% after 40 days at a level of 500 µg/mL in the aldehyde/carboxylic acid assay. Scavenging abilities of the oils for the 1,1-diphenyl-2-picrylhydrazyl (DPPH) radical ranged from 39% for angelica seed oil to 90% for jasmine oil at a level of 200 µg/mL. The greatest inhibitory activity toward malonaldehyde (MA) formation from squalene upon UV-irradiation was obtained from parsley seed oil (inhibitory effect, 67%), followed by rose oil (46%), and celery seed oil (23%) at the level of 500 µg/mL. The main compounds of oils showing high antioxidant activity were limonene (composition, 74.6%) in celery seed, benzyl acetate (22.9%) in jasmine, α-pinene (33.7%) in juniper berry, myristicin (44%) in parsley seed, patchouli alcohol (28.8%) in patchouli, citronellol (34.2%) in rose, and germacrene (19.1%) in ylang-ylang.(17)

Spasmolytic Activity:(18)

The *J. officinale* essential oil also provides the scientific basis for the remedies of gastrointestinal (gut spasm and diarrhoea) and cardiovascular (hypertension) disorders. So, the *J. officinale* essential oil might be used as a replacement for calcium channel blockers (CCBs) as it showed a CCB-like mechanism. However, more detailed chemical analysis and molecular mechanisms of *J. officinale* essential oil are suggested in future studies.

Hepatoprotective Effect:(19)

Carbon tetrachloride is one of the most commonly used hepatotoxins, which causes liver fibrosis. It is well documented that carbon tetrachloride is bio-transformed under the action of cytochrome P-450 in the microsomal compartment of the liver to trichloromethyl radical, which readily reacts with molecular oxygen to form trichloromethyl peroxy radical. This free radical, in the presence of oxygen, may cause peroxidation of lipid in the target cell, resulting in extensive damage. Hepatotoxic effect of CCl₄ is due to oxidative damage by free radical generation, and

the antioxidant property is claimed to be one of the mechanisms of hepatoprotective drugs. Many phytochemical reports revealed that the ethanolic extract of the plants was found to contain higher concentrations of flavonoids and glycosides. It has been reported that the flavonoid constituents of plants possess antioxidant properties through free radical scavenging. Administration of CC14 (1ml/kg CC14 mixed with an equal quantity of liquid paraffin) to rats produced hepatotoxicity, as shown by a significant increase in the serum levels of AST, ALT, ALP, Glucose, Cholesterol and Bilirubin in comparison to the control group. Also, total protein levels were significantly decreased to 2.65g/dl in the CC14 control groups from the level of 5.46g/dl in the normal control group. Ethanolic and chloroform extract of *Jasminum officinale* Linn. given at a dose of 350mg/kg, reduced the raised serum enzyme levels get back to nearly normal but also improved serum lipid profile. The results are well comparable with Silymarin (standard drug). In conclusion, the results show that *Jasminum officinale* Linn. has potent hepatoprotective activity against carbon tetrachloride-induced liver fibrosis in rats.

Insights of Ayurveda:

References of Jaati (*Jasminum officinale*) in Ayurvedic texts-

Acharya	Gana or Varga
Charak	Kushthaghna
Bhavprakash	Pushpvarga
KaiyadevNighantu	AaushadhiVarga
Shaligramnighantu	Pushpavarga
Raj nighantu	KarviradiVarga
Chakraatta	Nadivaran Chikitsa

Rasapanchaka and Guna-karma:

Rasa-Tikta, Kasaya

Virya- Ushna

Vipaka-Katu

Guna- Laghu, Snigdha, Mrudu

Dosakarma – Tridosahara

Rogagnata- Tridoshajavikara, Dantashoola, Dantadaurbalya, Mukharoga.

Karma- Mukharoganashaka, Saumanasyajanana, Medhya, Vajikarana.

• Utility mentioned in Ayurveda:

1) जातितारमन्दारैर्दुःस्वप्नश्चाविनश्यति।

(यो. र. पू. 56)

2) जातियुगंतिक्तमूष्णंतुवरंलघुदोषजित्।

शिरोऽक्षिमुखदन्तार्तिविषकुष्ठानिलास्त्रजित्।।

(भा.प्र.नि. पुष्पवर्ग)

3) मालतीतुवरतिक्ताकटूष्णादोषनाशिनी।

शिरोऽक्षिमुखदन्तार्तिविषकुष्ठानिलास्त्रजित्।।1974 ॥

(के.नि.)

4) चम्बेलीतुवरतिक्ताव्रणकुष्ठविषस्त्रजित्।

शिरोऽक्षिमुखदन्तार्तिहशत्वन्दोषनाशिनी।।

(ध.नि.)

5) जातिपत्रसैस्तैलंविपक्वंपूतिकर्णजित्।

(चक्रदत्त)

6) जातीव्यंतिक्तमुष्णंतुवरंलघुवातजित्।

शिरोऽक्षिमुखदन्तार्तिविषकुष्ठव्रणस्त्रजित् ॥

III. DISCUSSION:

Jasminum officinale is a plant that has left an indelible mark on history, culture, and modern industry. Its aromatic, medicinal, and ornamental qualities make it a versatile and invaluable resource. From ancient civilisations to the present day, jasmine has been a symbol of beauty, love, and spiritual purity. Its continued use in the perfume, tea, and wellness industries ensures its place as one of the most cherished plants worldwide. As both an aesthetic and functional addition to gardens, homes, and personal care products, *Jasminum officinale* remains a beloved and enduring element in cultures around the globe.

Jasminum officinale is a plant with a long history of medicinal use and continues to be valued for its diverse health benefits. From its calming and sedative effects to its antioxidant, anti-inflammatory, and antibacterial properties, jasmine has a lot to offer as a natural remedy. Whether used in aromatherapy to reduce stress, in skincare products to promote healthy skin, or as a tea to soothe the digestive system, ***Jasminum officinale*** remains an important part of both traditional and modern medicine. As research continues, the full potential of jasmine's medicinal properties will likely become even clearer, further solidifying its place in holistic health practices.

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