Annals of Phytomedicine 14(1): 388-395, 2025

DOI: http://dx.doi.org/10.54085/ap.2025.14.1.37

Annals of Phytomedicine: An International Journal
http://www.ukaazpublications.com/publications/index.php

Print ISSN : 2278-9839 Online ISSN : 2393-9885

Review Article : Open Access

Chemical composition and biological activities of essential oil in *Jasminum grandiflorum* L.: A review

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Article Info

Article history
Received 14 April 2025
Revised 30 May 2025
Accepted 31 May 2025
Published Online 30 June 2025

Keywords
Jasminum grandiflorum L.
Phytochemicals
Anti-inflammatory
Biofilms
Antiulcer activity

Abstract

Essential oils are plant secondary metabolites composed of volatile compounds that play key roles in plant defense mechanisms against herbivores, insects, and microbial threats. *Jasminum grandiflorum* L., commonly known as jasmine, is a plant known for its rich phytochemical profile, including tannins, saponins and essential oils, which are associated with notable antifungal properties. The essential oil of *J. grandiflorum* primarily consists of acetate (37%), benzyl benzoate (34.7%), linalool (9.6%), (Z)-jasmone (5%), isophytol (3.3%) and eugenol (2.1%). The absolute jasmine oil demonstrates moderate to high antimicrobial activity against both Gram-positive and Gram-negative bacteria, as well as yeast. Additionally, it provides various health benefits, including antipyretic effects, support for the nervous system, and antiulcer and antigastric activities. The *J. grandiflorum* essential oil can inhibit the growth of biofilms formed by *Pseudomonas fluorescens*. Since biofilms are typically resistant to antimicrobial agents, this suggests a significant potential for jasmine oil in addressing persistent infections. The anti-inflammatory and antioxidant properties of the plant may be attributed to its phenolic and flavonoid content. One notable compound identified in the active n-butanol fraction of the plant, cumaroylquinic acid, has been found to exert anti-inflammatory effects by downregulating pro-inflammatory cytokines and modulating key transcription factors. Overall, *J. grandiflorum* is highly valued for its biological activities, particularly its antimicrobial and wound-healing potential, making it a promising candidate for therapeutic and medicinal applications.

1. Introduction

Essential oils are classified as secondary metabolites of plants that are made up of volatile molecules that give plants their distinct flavor or scent (Stringaro *et al*., 2018). The most popular methods for extracting essential oils from plant material are steam distillation, hydro distillation, or mechanically cold pressing leaves (Baj *et al*., 2015). Plants produce secondary metabolites that act as defensive mechanisms against predators, including microorganisms, insects and herbivores. These chemicals have been shown to have antibacterial properties. The microorganism's resistance to antibiotics and in this way to use the antimicrobial plant extracts for short the life span of any antibiotic (Marjorie *et al*., 1999). The *J. grandiflorum* was commonly called as Chameli. It is an aromatic flowering shrub that grows in both plains and mountain range as well as it has been cultivated in India, Afghanistan, Persia, Italy, France, China, Japan, Morocco and Egypt (The Wealth of India, 2004; Frank and Amelio, 1999). The Oleaceae plant *J. grandiflorum* tends to be used in the fragrance industry because of its high quantity of aromatic compounds (Joulain, 2021). The *J. grandiflorum* contains phytochemicals such tannins, saponins and essential oils that are thought to have antifungal properties. Through, the disruption of cell membranes and interference with fungal growth, these chemicals demonstrate inhibitory actions against fungal infections (Meena Prabha *et al*., 2025). It has been shown to exhibit odontalgic, thermogenic, antiseptic, emollient, suppurative and tonic properties. It has also been used to treat skin conditions, ulcerative stomatitis, leprosy, loose teeth, otorrhea, otalgia, wounds (Sandeep and Paarakh, 2009). Liquid essential oils have shown great activity against microorganisms in a number of *in vitro* investigations; nevertheless, *in vitro* efficacy requires larger concentrations. It employs essential oils as natural preservatives that affect their sensory attributes (Gutierrez *et al*., 2008).The vapor-phase essential oils could be an option for antimicrobial agents for food storage and preservation (Nadjib *et al*., 2014). This study examined the chemical composition, biological activity and uses of *J. grandiflorum* essential oil.

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2. Chemical composition

The season has an influence on the chemical composition of essential oils. The primary components identified in the essential oil were eugenol (2.1%), benzyl benzoate (34.7%), linalool (9.6%), (Z)-

jasmone (5%), isophytol (3.3%) and acetate (37%). The activity of absolute jasmine against yeast and both Gram-positive and Gram-negative bacteria ranged from moderate to high (Luo *et al*., 2007).The chemical components of various portions of *J. grandiflorum* have been the subject of several published publications and it's are revrealed chemical content of *J. grandiflorum* leaves were found to contain secoiridoid glycosides, demethyl-2"-epifraxamoside, jasminan-hydride (Sadhu *et al*., 2007), isoquercitrin, oleacein, 2-(3, 4-dihydroxy phenyl)-ethanol, ursolic acid (Somanadhan, 1998), resin, 3, 4-dihydroxybenzoic acid, salicylic acid, 2-hydroxy-30, 40-dihydroxyacetophenone and oleanolic acid. Linalool, vanillin, cis-3-hexenol, indole, 2-vinyl pyridine, isophytol, farnesol, myrcene, geraniol, geranyl linalool, phytol, eugenol, cis-3-hexenyl alcohol, methyl anthranilate, methylbenzoate, benzyl cyanide, methyl- N-methyl anthranilate, methyl palmitate, methyl linoleate and p-cresol are among the constituents of flowers (Rastogi and Mehrotra, 1999). Methyl jasmonate, benzyl benzoate, P-cresol, linalyl acetate, benzyl alcohol, indole, jasmone, methyl anthranilate, geraniol, nerol, 1-terpineol, d and dl-linalool and methyl jasmonate are the constituents of jamine oil (Rastogi and Mehrotra, 1999). Racemic (5-pent-2-enyl)-5, 1-pentanolide, jasmolactone, farnesol, nerolidol and eugenol (Sharma *et al*., 2005; Rastogi and Mehrotra, 2001; Sandeep, 2009). Ethanolic extracts of *J. grandiflorum* flowers included methyl anthranilate, benzyl alcohol, indol, benzyl acetate and the terpenes linalool and linalyl acetate (Nayak and Mohan, 2007).The *J. grandiflorum* liquid CO_2 extraction yielded terpenoids and benzenoids. (E, E)-farnesene, benzyl acetate and (Z)-3-hexenyl benzoate are among the main constituents that lend the jasmine fragrance its high diffusivity. Other constituents include (Z)-jasmone, indole, methyl anthranilate, (Z)- (Z)-methyl epijasmonoate and methyl jasmonoate (Prakash *et al*., 2012). The GC and GC/MS were used to assess the chemical composition of *J. grandiflorum*. The main constituents found were benzyl benzoate (20.7%), linalool (8.2%), benzyl acetate (23.7%), isophytol (5.5%), geranyl linalool (3.0%), phytol (10.9%), methyl linoleate (2.8%) and eugenol (2.5%) (Jirovetz, 2007).

Table 1: Chemical composition of essential oil

S.No.	Compound	%	RI (lit.)	RI (calc.)
1.	(Z)-b-ocimene	1.1	801	801
2.	m-methylphenol	0.3	855	855
3.	(E)-hexenyl propionate	0.2	902	900
4.	Linalool	9.6	960	965
5.	Benzyl acetate	37.0	973	976
6.	2-undecanone	0.5	977	978
7.	Eugenol	2.1	979	981
8.	(Z)-jasmone	5.0	985	986
9.	(E,E)-a-farnesene	0.9	988	991
10.	Caryophyllenyl alcohol	1.9	991	997
11.	(Z)-Methyl jasmonate	0.3	998	1004
12.	Benzyl benzoate	34.7	1024	1026
13.	(Z,Z)-farnesyl acetone	0.6	1031	1035
14.	Methyl hexadecanoate	0.8	1035	1037
15.	Isophytol	3.3	1042	1046
16.	(E)-phytol acetate	1.4	1096	1099

Source: Galovicova *et al*., 2022

The stem extract of *J. grandiflorum* exhibits strong antimicrobial activity due to compounds like benzoic acid 4-ethoxy ethyl ester and ethyl paraben. These phytochemicals are known for their ability to inhibit the growth of bacteria and other pathogens. The presence of homovanillyl alcohol also contributes antioxidant properties that enhance microbial resistance. This supports its potential use in natural antimicrobial therapies (Keerthivasan *et al*., 2024).There are several phytochemicals that may be responsible for the antimicrobial action, including flavonoids, alkaloids, tannins, saponins, glycosides, salicylic acid, *etc.* (Ali *et al*., 2017).

3. Health benefits

3.1 Antipyretic properties

The ethanolic extract's potential as an antipyretic drug was demonstrated by the fact that its percentage of inhibition also rose. The *J. grandiflorum* (500 µg/ml) was found to be 63.37% inhibited by the greatest concentration of ethanolic extract stem (Meena Prabha *et al.,* 2025; Evans *et al*., 2009; Kokate, 2007). It demonstrated the antipyretic properties of an ethanolic extract of *J. grandiflorum* stem. Alkaloids, flavonoids, tannins and phenolic chemicals are among the phytoconstituents that have been discovered in *J. grandiflorum* stem extracts. These secondary metabolites are well-known for their important therapeutic qualities, such as their antipyretic and antifungal effects. The broad-spectrum antifungal activity and fever-reducing benefits are confirmed by the pharmacological trials (Ebrahimzadeh *et al*., 2010).

3.2 Nervous system

The phenolic compounds that were found in *J. grandiflorum* flowers, including 5-dihydrocaffeoylquinic acid, dihydromethoxy caffeoylquinic acid, 4-p-coumaroylquinic acid, quercetin-3-O-(2,6-dirhamnosyl) glucoside, kaempferol-3-O-(2,6-di-rhamnosyl) glucoside, quercetin-3-O-(6-rhamnosyl) glucoside, limonene and phytol have the potential to treat disorders of the central nervous system and promote antioxidant protection (Ferreres *et al*., 2014). The essential oil of pepper contains neuroprotective compounds such as piperine, limonene and phytol, identified through GC-MS analysis. These bioactives help protect nerve cells by reducing oxidative stress and inflammation. Piperine, in particular, is known to enhance cognitive function and support brain health. Such properties underline the potential of bush pepper in developing neuroprotective therapeutics (Vasantharaj *et al*., 2024).

Table 2: Antimicrobial activity of essential oil

Extract	Method of *in vitro* study	Result	References
Spanish jasmine absolute	Agar diffusion disc and serial dilution methods	The jasmine absolute demonstrated medium to high activity (as measured by reference compounds such as eugenol and three synthetic antibiotics) against the yeast *Candida albicans*, the Gram-negative bacteria *Escherichia coli, Pseudomonas aeruginosa, Klebsiella pneumonia* and *Salmonella* sp., and the Gram-positive bacterium *Enterococcus faecalis*.	Galovi Cova *et al*., 2021
Methanolic extract	Agar-diffusion method	Significant antibacterial action against every examined bacterium (*Escherichia coli, Proteus vulgaris, Pseudomonas aeruginosa,Staphylococcus aureus, Sarcina lutea, Bacillus subtilis, Mycobacterium phlei, Candida albicans*) was demonstrated by *Jasminum grandiflorum*.	Jirovetza *et al*., 2007
n-hexane, chloroform, acetone, methanol and water extracts leaf of Spanish jasmine	MIC by macro broth dilution method.	Chloroform extract was shown to be active against all seven bacterial strains in *J. grandiflorum* within the range of 1.56-6.25 mg/ml; n-hexane, acetone, ethanol and water extracts, on the other hand, indicate action against one or more strains.	Abdel-Sattar *et al*., 2008
Petroleum ether, chloroform, acetone, methanol and aqueous extract	Disc diffusion method	*J. grandiflorum* aqueous extracts, petroleum ether and methanol demonstrated superior efficacy against all four bacteria compared to the conventional penicillin. Only *Pseudomonas aeruginosa* and *Bacillus subtilis* were susceptible to the effects of chloroform extract. *Pseudomonas aeruginosa* and *Escherichia coli* were the two bacteria that the acetone extract worked best against.	Sandeep padma *et al*., 2009
Methanolic extract	Agar well diffusion method.	*J. grandiflorum* had the strongest antifungal activity of any plant extract examined in this investigation. *J. grandiflorum* exhibited antimycotic properties and markedly slowed *Alternaria sp*. fungal development.	Mishra Alka *et al*., 2010
Ethanolic extract	Disc diffusion method.	The extract exhibited an acceptable range of inhibition against the majority of the bacteria that were tested. When it encountered *Proteus vulgaris, J. grandiflorum* had the greatest zone of inhibition. *J. grandiflorum* had no activity against. The measured MICs ranged from 250 to 500 µg/ml.	Mahmudur Rahman *et al*., 2014
Ethanolic extract	Disc diffusion method	Compared to the Soxhlet extraction method, the ultrasonic extraction method was able to extract more active compounds from the jasmine flower that inhibited *S. aureus*. However, neither extraction method was able to yield active compounds that inhibited *E. coli*.	Rasha Saad *et al*., 2014
Ethanol, Methanol, Propanol, Chloroform, Diethyl ether, Hexane and aqueous extracts	Agar well diffusion method	The antibacterial activity of all *J. grandiflorum* extracts was significant. The extract of chloroform had the highest zone of inhibition against *Bacillus subtilis*, whereas the extract of ethanol demonstrated the second most effective zone of inhibition against *E. coli.* Ethanol extract (*Pseudomonas aeruginosa* and *Klebsiella pneumonia*) and diethyl ether extract (*Streptococcus* sp.)Revealed low activity.	Sushant Shekhar and Prasad, 2015
Methanolic extract	Disc diffusion method	The extract from *J. grandiflorum* shown strong action against one Gram-negative and six Gram-positive bacteria.	Ali *et al*., 2017

3.3 Antiulcer activity

APL (Aspirin + Pylorus ligation) has induced acute gastric ulcer models in albino rats were used to test the antiulcer potential of hydroalcoholic extract of *J. grandiflorum* leaves at oral doses of 100 and 200 mg/kg. The findings demonstrated a substantial decrease in gastric fluid volume, free acid and total acid as well as an elevation in the pH of the stomach fluid, indicating the antisecretory and perhaps antiulcer action of *J. grandiflorum* leaves (Arun *et al*., 2016; Nilesh *et al*., 2009). The plant extract's concentration determines the free radical scavenging activity, which rises with increasing extract concentration (Umamaheswari *et al*., 2007).

3.4 Antibiofilm activity

An MALDI-TOF MS Biotyper mass spectrometer was used to assess the antibiofilm activity of *J. grandiflorum* essential oil against the biofilm-forming bacteria *Pseudomonas fluorescens.* Biofilms have a high level of resistance to inhibitory substances, including antibiotics (Ka Caniova *et al*., 2020; El-Tarabily *et al*., 2021; El-Baz *et al*., 2021). Essential oil has possible capacity to prevent the formation of biofilms. The oils that exhibited the strongest antibiofilm efficacy were jasmine, cinnamon, clove and rosemary (De Oliveria Carvalho *et al*., 2020; Galovi Cova *et al*., 2021; Valkova *et al*., 2022). In the presence of essential oils, analysis revealed decreased adhesion and roughness (Hirapara *et al*., 2017).

3.5 Wound healing activity

The numerous inflammatory and reactive oxygen species-mediated disorders have been suggested to benefit from the antioxidant, anti-inflammatory and immunomodulatory properties of secoiridoids, which are abundant metabolites in the Oleaceae family (Castej *et al*., 2020; Meiss *et al*., 2020; Cicerale *et al*., 2012). The result on the anti-inflammatory properties of secoiridoids, specifically ligstroside and oleuropein was demonstrated strong action in the past and are the metabolites that give *J. grandiflorum* its anti-inflammatory properties (Lucas *et al*., 2011; Cheng *et al*., 2018; Chaturvedi *et al*., 2011). Even with other significant advancements in polyphenol biology, polyphenols are important for reducing oxidative/ inflammatory stress and enhancing protective responses (Matias *et al*., 2014). Jasminum exhibits strong antioxidant properties due to the presence of compounds like flavonoids and tannins. These antioxidants help neutralize harmful free radicals, reducing oxidative stress in the body. This action supports cellular health and may prevent chronic diseases. Thus, jasmine serves both aesthetic and therapeutic purposes in health care. (Krishnaveni *et al*., 2024). In a dead space wound model, the hydroxyproline concentration and the weight of the wet and dry granulation tissue were considerably higher than handling. The analyses of the tissue taken from the extracted group revealed fewer inflammatory cells, more fibroblasts, and well-organized collagen bands than regulates, which displayed fibroblasts, collagen fibers, and inflammatory cells. These findings point to the potential role of *J. grandiflorum* flower extract in wound healing. The methanolic extract of *J. grandiflorum* leaves was shown an increase in the rate of collagen production and an increase in the antioxidant rate in the newly formed healed tissue, indicating the potential for wound healing (Chaturvedi *et al*., 2013).The ethanolic extract of *J. grandiflorum* flowers increased tissue granulation and wound contraction, which helped diabetic wounds heal in Wistar albino mice (Hirapara *et al*., 2017). In a similar vein, the hydroalcoholic extract of *J. grandiflorum* leaves was investigated for its ability to cure wounds at a dosage of 250 mg/kg body weight in rats with dead space and excision wound models, where sulfathiazole ointment was the conventional treatment (Mishra *et al*., 2010). An assessment of the mucosdhesive's healing impact on oral biopsy ulcers showed that it was helpful in decreasing wound width and accelerating the healing process (Mortazavi *et al*., 2020). Jasmine contain compounds are pyran-4-one, oxirane and 7-hexadecatrienoic acid with proven anti-inflammatory effects. These metabolites help inhibit inflammatory mediators and reduce oxidative stress. Enhanced levels in mutant lines suggest improved therapeutic potential for inflammation-related conditions. This validates its traditional use for wound healing and skin care (Mirunalini *et al*., 2024; Sabarivasan *et al*., 2024).

The animals were deprived of food for 12 h prior to the procedure. A circular wound, approximately 2 cm in diameter was made on the depilated dorsal thoracic region of anima (Swati *et al*., 2013; Johnson *et al*., 2010). The animals were split into 4 groups: the standard group received the same dose of betadine ointment (Hunasagi*et al*., 2018), the test groups received 250 mg leaf and root extracts once daily to the entire area of the wound, and the control group received normal saline (Nayak and Krishna Mohan, 2007). The parameters that were revealed were scar area size and shape, wound closure and epithelization.

Table 3: Wound healing activity for essential oil of *J. grandiflorum*

Wound area (%)	Control	Leaf extract	Root extract	Standard
Day 4	10.50 ± 0.63	16.75 ± 1.33	14.58 ± 1.70	21.84 ± 1.75
Day 8	23.06 ± 1.02	28.83 ± 1.27	26.25 ± 1.27	41.84 ± 2.22
Day 1	264.50 ± 0.69	72.66 ± 2.3	67.91 ± 1.42	75.66 ± 2.45
Day 1	679.68 ± 0.18	89.58 ± 1.33	86.66 ± 3.30	94.91 ± 1.78
Day 1	891.43 ± 0.70	100	93.58 ± 0.76	100
Epithelization in days	21 ± 0.365	15.66 ± 0.21	17.83 ± 0.30	15.16 ± 0.47

Source: Hunasagi *et al*., 2018

Wounds treated with leaf extract were seen to epithelialize more quickly than those in the control group. Rats given leaf extract showed a 61.346% decrease in wound area compared to 55.72% for the control group. The use of *J. grandiflorum* leaf extract in the treatment of wound healing is suggested by the evidence of an elevated rate of wound contraction (Mishra *et al*., 2010).

Table 4: Wound healing activity of *J. grandiflorum*

Extract used	Animal model and wound model	Activity	References
Ethanolic extract	Dead space wound models and male Wistar strain albino rats	In contrast to controls, the ethanol extract of *J. grandiflorum* flowers has the ability to promote wound healing activity. Increased hydroxyprolinec content and wound contraction enhance *J. grandiflorum* in the topical management and treatment of wounds.	Mehatre Dhulappa and Ashok, 2013
Aqueous alcoholic extract	Models of excision and dead space wounds in male Dr. strain albino rats	Rats treated with extract showed a 65% decrease in wound area compared to 54% for controls. In a dead space wound model, the hydroxyproline concentration and wet and dry granulation tissue weight both dramatically increased in comparison to controls. Therefore, our study concludes that the leaf extract of *J. grandiflorum* has the ability to cure wounds in a repeatable manner.	Ravishankar *et al.*, 2014
J. grandiflorum leaf extract and crude paste	Model of excision wounds in albino rats	Wound contraction and epithelization are encouraged by jati extract and leaf crude medicine paste. When compared to the control group (*Betadine ointment*), the extract of Jati Patra and Kalka treatment demonstrated an integrated effect. When used to treat excision wounds, jati patra extract and paste are safe, effective and well-tolerated.	Almeida *et al*., 2017
J. grandiflorum leaf paste	Models of excision and incision wounds in albino rats	In comparison to control, *J. grandiflorum* leaves improved the early inflammatory phase, increased wound contraction and encouraged an early epithelization, all of which aided in wound healing. In comparison to the normal group, the drug-treated group had a higher wound-breaking strength.	El-Shiekh *et al*., 2020
Oil extracted from fresh leaves of *J. grandiflorum*	Models of excision and burn wounds in albino rats	Compared to control and vehicle control groups, test groups demonstrated a substantial increase in the pace of wound contraction and a significant decrease in times of epithelialization in excision wound and burn wound models. In burn and excision wounds, the oil extract of *J. grandiflorum* leaves has demonstrated wound-healing properties.	Matias *et al*., 2014

3.6 Evaluation of colon histopathology and histochemistry

Glass slides were used to hold a 5 µm paraffin-embedded slice of the colon. Using decreasing alcohol grades, tissue slides were deparaffinized and rehydrated. Sections were then stained using Alcian blue and hematoxylin and eosin (H and E) (Guardia *et al*., 2001). An Olympus BX43 light microscope was used to analyze the dyed colon sections, and an Olympus DP27 camera coupled with Cellsens dimension software was used to take pictures. According to the modified Macpherson and Pfeiffer histological grading method, the colitis score was assessed (Jun-Wei *et al.,* 2018). Grade 0 denotes normal histological structure, whereas grade 1 denotes edema and moderate inflammatory cell infiltration in the mucosal and/or submucosal layers. Capillary proliferation with few erosions linked to intact muscularis mucosae, grade 2 = 50% of the part under examination exhibiting the previous grade, grade 3 is characterized by significant inflammatory cell infiltrations, primarily neutrophils and edema, frequently with a severe ulcerative zone that extends into the submucosa through the muscularis mucosae. Grade 4 refers to infrequent inflammatory cells that infiltrate the muscularis propriae while maintaining intact muscle; grade 5 refers to widespread ulcerative areas associated with coagulative necrosis that are encircled by a large number of neutrophils and fewer mononuclear cells. Necrosis of grade 6 was seen in 50% of the portions under examination in the muscularis propria. In colon samples stained with Alcian blue dye, the number of positive goblet cells was measured per Lieberkuhn crypt (Liang and Kitts, 2015).Thus, the phenolic and flavonoid content of *J. grandiflorum* may One of the main compounds in the active n-butanol fraction, cumaroylquinic acid was discovered to exhibit anti-inflammatory qualities by downregulating pro-inflammatory cytokines and altering crucial transcription factors to be responsible for its anti-inflammatory and antioxidant properties (Abdel Motaal *et al.,* 2016). It was also found to have antioxidant properties, which may help reduce oxidative stress in a number of disease models (Fuccelli *et al.,* 2018). Additionally, caffeoylquinic acid, hydroxytyrosol, syringin, rutin, quercetin, isorhamnetin-O-rutinoside and kaempferol-o-rhamnoside glucoside (Song and Zhang, 2010; Marilena *et al*., 2015; Beckett and Stenlake, 2001; Radha *et al*., 2016).

3.7 The antihistamine effects

Anthelmintics have been referred to as antihelminthics and class of antiparasitic medications that eliminate internal parasites and parasitic worms (helminths) from the body by either killing or stunning them without seriously harming the host (Edwin and Edwin, 2006). Alternatively, it was referred to as vermicides (that kill) or vermifuges (that stun). They are employed to treat helminthiasis, a disorder in which helminths infect plant, humans or animals (Kulkarni and Ansari, 2004).The impact of ethanolic extracts, hexane, chloroform and ethyl acetate on earthworms was investigated. Below 50 mg, the ethanolic extract exhibited strong anthelmintic properties (Radha *et al.,* 2016). The ethanolic extact significant a value has been provided compared to other, because it will act as a solvent to keep active ingredients in solution and also functions as a preservative.

Table 5: The antihistamine effects

S.No.	Extracts	Daylight	UV Light
1.	Hexane	Pale yellow	Yellow
2.	Chloroform	Dark brown	Yellowish green
3.	Ethyl acetate	Brownish yellow	Yellow
4.	Ethanol	Brown	Pale brown

4. Future research prospects

The Oleaceae group of *J. grandiflorum* contains lot of biological chemical properties and it used for different medicinal, aromatic and different biological activity. It contains many core project are characterize the individual phytochemicals, specific bioactivities, anti-resistant bacteria, biofilm-forming pathogens,the molecular pathways for anti-inflammatory and antioxidant effects of phenolics and flavonoids, to developed the stable pharmaceutical properties and useage analysis were central nervous system, focusing on its sedative, anxiolytic, antidepressant activities, antiulcer, antigastric and fever-reducing effects of the plant through traditional and modern biomedical models.

5. Conclusion

The *J. grandiflorum* has been provided significant pharmacological importance due to its rich composition of essential oils and secondary metabolites. These secondary metabolites, including tannins, saponins, flavonoids and phenolic compounds, serve as a natural defense mechanism for the plant against herbivores, insects, and pathogenic microbes. The essential oil extracted from *J. grandiflorum* is particularly notable for its diverse chemical profile and these components are act as a antimicrobial, antifungal and anti-inflammatory properties. Scientific findings support the effectiveness of jasmine essential oil in inhibiting the growth of both Gram-positive and Gram-negative bacteria, as well as yeast. It has also demonstrated the ability to resistance of many conventional antimicrobial groups. This suggests its potential as a natural alternative for combating biofilm-associated infections. Moreover, the presence of phenolic and flavonoid compounds in *J. grandiflorum* contributes to its antioxidant and anti-inflammatory effects. In addition to its antimicrobial and anti-inflammatory benefits, *J. grandiflorum* has shown promising therapeutic properties such as antipyretic, antiulcer, antigastric, and neurological effects. Taken together, these findings underscore the plant's significant potential in natural medicine, especially in antimicrobial, antifungal, anti-bacterium and wound healing applications.

Acknowledgements

The authors express their gratitude and credit the researchers behind the original studies whose works are referenced in this review.

Conflict of interest

The authors declare no conflicts of interest relevant to this article.

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Citation **S. Jaganathan, K. R. Rajadurai, A. Beaulah, M. Madhan Mohan, K. Kalpana, S. Rajesh and M. Kabilan (2025). Chemical composition and biological activities of essential oil in *Jasminum grandiflorum* L.: A review . Ann. Phytomed., 14(1):388-395. http://dx.doi.org/10.54085/ap.2025.14.1.37.**