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Pharmacological and Therapeutic Properties of *Jasminum officinale* L.: A Review

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***Abstract*:** Nowadays, plant-derived products play an important role to deal with various health problems. The medicinal importance of plants is due to the phytochemicals present in them. Phytochemicals are biologically active secondary metabolites derived from plants that naturally exist. There are several major phytochemicals present in *Jasminum officinale* are in alkaloids, coumarin, emodin, flavonoids, phenol, saponins, sesquiterpenoids, secoiridoids, and tannins and they are known to possess definite pharmacological activities which are responsible for their medicinal properties. Therefore, an acquaintance of phytochemical is essential, to associate their existence along with their synergistic impact on the therapeutic value of a definite medicinal plant related to a specific pharmacological profile. The present review focused on the therapeutic properties of constituents of *J. officinale* along with the proven pharmacological and aromatherapy profile. This study revealed that plants possess several medicinal properties such as gastrointestinal disorders and hypertension which are not explored yet with proven pharmacology and could be further investigated as a potential therapeutic agent by modern biotechnology and clinical studies.

***Keywords*:** *J. officinale*, Phytoconstituents, Pharmacological actions, Therapeutic applications, Aroma therapy

The plants are leading candidates in the development of novel medications because of their extensive range of biological activities, which are influenced by the presence of several phytocompounds (Kumari et al 2018, Balkrishna et al 2021, Dhatwalia et al 2021, Sharma et al 2021, Sonam et al 2021). The genus *Jasminum* comprises over 200 species belonging to the family Oleaceae, which are distributed in Asia, Australia, Africa, and the Southern Pacific Islands area (Lu et al 2019). *Jasminum* officinale is an important herbal plant of this genus and is mainly found in China and widely cultivated in Caucasus, China, Eastern Afghanistan, India, Hindukush, Mediterranean, Northern Persia, and Pakistan. *J. officinale* grows up to 9 m is characterized by twining shrubs, bright, vigorous, deciduous climber and leaves are 6-10 cm long, sharply pointed pinnate, opposite and produces the large flush of clusters of starry, flowers are pure white and responsible for heady scent. Fruits are berry, black, and full of crimson juice (Musaddique et al 2013, Shubhangi et al 2019, Elhawary et al 2020). *J. officinale* showed several pharmacological activities as anti-microbial, anti-viral, and anti-spasmodic, cytotoxic, in addition to wound promoter (Elhawary et al 2020). Leaves are responsible for their therapeutic properties like anti-diabetic, anti-oxidant, antiseptic, anti-spasmodic, and wound healing (Prachee et al 2019). Flowers of *J. officinale* are traditionally used as CNS depressant, a mild anesthetic, astringent, and sedative (Musaddique et al 2013). Prior found chemicals are flavonoid, iridoid, saponins, sesquiterpene, with some biological activities (Zhao et al 2008, Ning et al 2013, Zhao et al, 2013, Guo et al 2014). Whole plants and flowers have several phytoconstituents such as alkaloids, saponins, tannins, resin, flavonoids, and terpenoids. Moreover, the leaves contain ascorbic acid alkaloids, resin, carbohydrates, coumarins, flavonoids salicylic acid, saponins, tannins, and terpenoids (Musaddique et al 2013, Prachee et al 2019). In some places of China, several plants of this genus have been used as therapeutic remedies. Whole parts of the plant such as stem, barks, leaf, root and flowers are being most widely used traditionally. The whole plant is traditionally used for chronic ulcer healing, tumor and skin disease. In the traditional system, leaves are chewed and used in the treatment of ulceration of the mouth (Musaddique et al 2013). In folk medicine, stems have been used to treat many disorders such as chronic inflammatory like angiitis, ulceration, colitis, and enteritis (Lu et al 2019). *J. officinale* contains essential oil which is widely used in aromatherapy. Jasmine oil is very expensive due to the presence of highly active compounds. Most people like it due to its sweet scent fragrance (Shubhangi et al 2019). These oils are very effective in cardiovascular and gastrointestinal diseases (Hafiz Mazid et al 2020). Flowers contain various volatile compounds, including farnesene, linalool, nerolidol, indole, benzyl alcohol, benzyl acetate, benzyl benzoate, hexenyl benzoate, jasmine lactone, and jasmone. Those have

medicinal benefits and important ingredients in perfumes, cosmetics, flavorings, and food (Cristian Eugen et al 2018) as well as in cosmetics for hair and skin pomades, lip balms, lipsticks, pastes, powders, soaps, hair perfumes and hair dyes (Jacek et al 2017). Leaves can be used as therapeutic agents to generate clean, inexpensive, eco-friendly silver nanoparticles which have been safely used with no side effects. Nanotechnology used in medicine mainly depends on the natural measure of biological methods to yield accurate ways for management and prevention of disease diagnosis and treatment (Elhawary et al 2020). Jasmine is widely used in aromatherapy for a calming and soothing effect, suppression of stress, pulmonary depression, aphrodisiac and has been prescribed for sexual problems (Shahbaa 2018). Extract of jasmine taken as massage helps to decrease pain severity in the first stage of labor and is more effective in aromatherapy (Mahbubeh 2020).

Medicinal significance: The whole plant is mostly used in traditional medicine (Duke et al 2002, Khare 2007). Jasmine is an ornamental plant that is found throughout Asia and is generally used in aromatherapy. Leaves show pharmacological activities such *as* antiseptic, anti-spasdomic, and wound healing which is reported from ancient Indian literature (Wealth of India, 2003) Whole plant is traditionally used for chronic ulcer healing, tumor and skin disease. *J. officinale* is a remedy for hepatitis and duodenitis. It is also used to treat fever, diabetes, diarrhea, ringworm, ulcers and eruptions in the mouth (Zhao et al 2009). Flowers of *Jasminum officinale* are traditionally used as a CNS depressant, sedative, a mild anesthetic, and astringent (Duke et al 2002, Khare 2007). Syrup formed by the flowers is used for the disorders of the chest, i.e., coughs and hoarseness (Khare 2007). Flowering buds of jasmine are used for the treatment of abscess, dermatological ulcers and ophthalmic disorders (Zhao et al 2009). Leaf juices and flowers have anthelmintic, diuretic and emmenagogue activity.

In the traditional system, leaves are chewed and useful for the treatment of ulceration of the mouth, skin diseases and fever (Barnes 2007, Khare 2007). Jasmine oil is effective in reducing labor pain that helps to enhance the release of endorphins that alleviate pain by applying in the coccyx area (Mukhlis et al 2018). It contains sweet-smelling flowers that contain fragrant oil (Bhattacharya 2010). Jasmine oil has a wide range of applications in traditional medicine including gastric spasms (Arun et al 2016) and cardiovascular diseases (Sandeep 2009). Leaves are also chewed to alleviate several types of pain such as aphthous, stomatitis and toothache. Leaf juice or oil are used as ear drop to alleviate ear pain and help in the treatment of soft corns between the toes, throat, and gums problems. In addition, it is also used in neurological disorders such as depression, nervous exhaustion, and stress-related conditions, skin problems, uterine, musculoskeletal disorders cough as well as help to relax the feeling of optimism, euphoria, confidence (Shukla 2013, Al-Khazraji 2015, Al-Snafi 2018).

Phytoconstituents: *J. officinale* is aneminentindustrial and medicinal plant that contains coumarins, alkaloids, emodin, flavonoids, leucoanthocyanin, phlobatannins, sesquiterpenes, secoiridoids, steroids, tannins and terpenoids (Nikita et al 2019, Elhawary et al 2020). The whole plants and flowers revealed the presence of alkaloids,

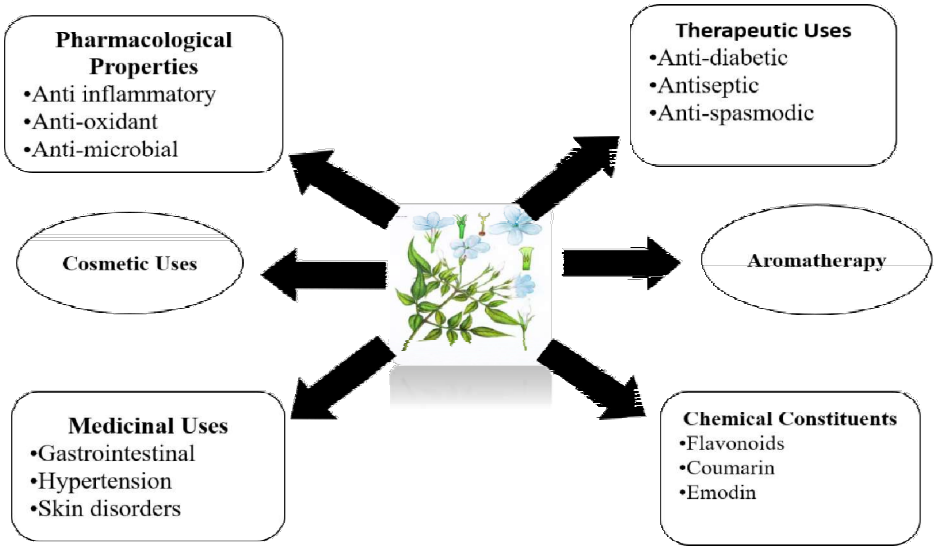


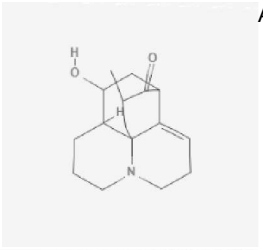
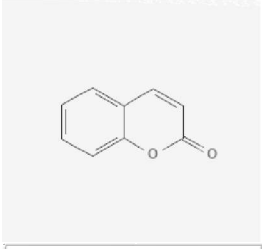
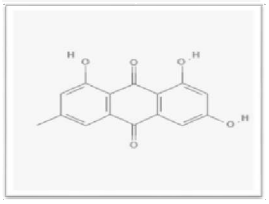
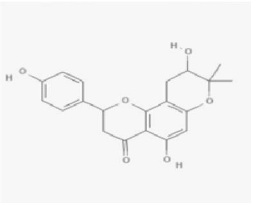
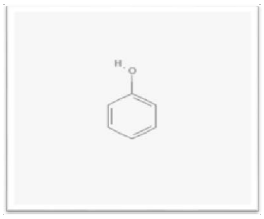
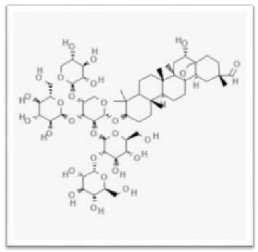
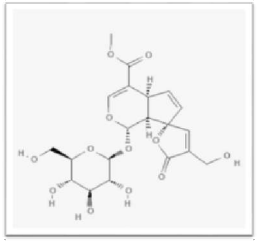
Fig. 1. Properties of *J. officinale* L.

Table 1. Medicinal uses of *Jasminum officinale* L.

Diseases	Part uses	Preparation	References
Amenorrhoea	R; F	ND	Sharma 2001
Bilious	F	ND	Shiddamallayya et al 2010
Blood disease	F; R	Tea	David 2013
Burning sensation	F	ND	Shiddamallayya et al 2010
Cancer	AP; L; F	Extract	Sood 2005
Catarrh	P	ND	Ali Esmail 2018
Chronic inflammatory	S	ND	Ye Lu et al 2019
Cough and hoarseness	F	Syrup	Musaddique et al 2013
Coughs	F	Syrup	David 2013
Dental ailments	L; F	chewed	Ali Esmail 2018
Depression	P	ND	Ali Esmail 2018
Diabetes	F	ND	Shiddamallayya et al 2010
Eye diseases	F; L	Tea	David W2013
Gastrointestinal diseases	R; F	ND	Fleming 2000
Headaches	R	Tea	David 2013
Heart disease	F	ND	Shiddamallayya et al 2010
Hepatic disorders	F	ND	Panda 2013
Insomnia	R	Tea	David 2013
Intestinal worms	F	ND	Panda 2013
Labor pain	P	Massage	Hamid et al 2018
Leprosy	F	ND	Sharma 2001
Mental debility	R	ND	Sharma PC 2001
Musculoskeletal disorders	R	Tea	Ali Esmail 2018
Nerves diseases	F	Tea	David 2013
Nervous exhaustion	P	ND	Ali Esmail 2018
Oral diseases	L; F	Chewed	Ali Esmail 2018
Otorrhoea	L	Juice	Ajay et al 2009
Paralysis	R	ND	Sharma 2001
Respiratory system	P	oil	Panda 2013
Rheumatism	R	Tea	David 2013
Ringworm	L	Chewed	Ajay et al 2009
Sexual problems	P	Oil	Panda H 2013
Skin diseases	WP; L; F	Juice	Ali Esmail A2018
Snakebite	L	Tea	David 2013
Stress	P	ND	Ali Esmail 2018
Thirst	F	ND	Shiddamallayya et al 2010
Tumors	AP; L; F	Extract	Panda H 2013
Ulcer	WP	ND	Musaddique et al 2013
Urinary tract infections	P	ND	Ali Esmail 2018
Uterine disorders	P	ND	Ali Esmail 2018
Wounds	L	Tea	David 2013

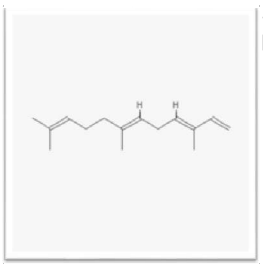
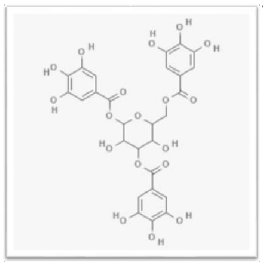
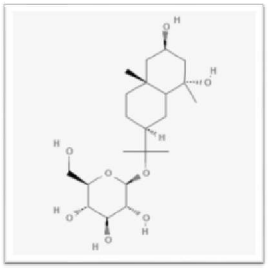
Aerial Parts: AP; Flower: F; Flowers: F; Leaf: L; Not defined: ND; Plant: P; Stem: S; Whole plant: WP

Table 2. Active compound present in *Jasminum officinale* L.

Active compound		Part used	References
	Alkaloids	L; F	Dubey et al 2019
	Coumarin	L	Dubey et al, Nikita et al 2019
	Emodin	P	Nikita et al 2019
	Flavonoids	L; F	Dubey et al 2019
	Phenol	L	Dubey et al 2019
	Saponins	L; F	Dubey et al 2019
	Secoiridoids	P; L	Elhawary et al 2020

Cont...

Table 2. Active compound present in *Jasminum officinale* L.

Active compound		Part used	References
	Sesquiter-penoids	S	Ye Lu et al 2019
	Tannins	L; F	Dubey et al 2019
	Terpenoids	L; F	Dubey et al 2019

Flower: F; Leave: L; Plant: P, Stem: S [Source: https://pubchem.ncbi.nlm.nih.gov/]

saponins, tannins, resin, flavonoids and terpenoids (Table 2). Moreover, the leaves contain ascorbic acid alkaloids, resin, carbohydrates, coumarins, flavonoids salicylic acid, saponins, tannins and terpenoids (Musaddique et al 2013, Prachee et al 2019). This plant is also showing the presence of nor-cinalbicane type sesquiterpenoids and one eremophilene-type sesquiterpenoid (Ye Lu et al2019). Flowers contain many volatile compounds, including farnesene, linalool, nerolidol, indole, benzyl alcohol, benzyl acetate, benzyl benzoate, hexenyl benzoate, jasmine lactone and jasmone (Jacek et al 2017).

Pharmacological activities: The biological studies of *Jasminum officinale* are summarized in Table 3. Through quantitative analysis, the anti-inflammatory, anti-microbial and anti-oxidant activity are s the dominant activity of this plant, followed by the anti-cancer activity, anti-nociceptive activity, anti-ulcer activity, effect on the Central Nervous System (CNS) were also examined and reviewed thoroughly.

Clinical trial based evidence: A clinical trial was conducted to assess the effects of aromatherapy with *J. officinale* in 155 physically healthy nulliparous women aged between 18 and 30 years for 6 months on pain severity and labor outcome

Table 3. Pharmacological profile of *Jasminum officinale* L.

Activity	Extract	Part used	Assays	Outcomes	References
Anti-cancer activity	Aqueous extract of nanoparticles (AgNPs)	L	Bladder (5637) and breast cancer (MCF-7) cell lines	IC_{50} range 9.3 to 40 µg/ml.	Elhawary et al 2020
Anti-inflammatory activity	Jasminol A, B, G and H; Ethanol extract; Essential oil	S; F; WP	Lipopolysaccharide (LPS)-induced NO production	IC_{50} 20.56 to 31.60 µM	Lu et al 2019
			Xylene-induced ear edema	Inhibition 53%	Atta et al 1998
			Cotton pellet granuloma test	Weight reduction in cotton granuloma	Lu et al 2019
			5-lipoxygenase inhibitory activity	47% inhibition of 15-lipoxygenase	WEI et al 2010
Anti-microbial activity	Methanolic extract; Ethanolic extract; Essential oil	L	Disc diffusion method	Maximum inhibition against *K. pneumonia* with inhibition zone (18 mm)	Shekhar et al 2015
			Well diffusion or pour plate methods	Methicillin-resistant *S. aureus* (MRSA) with inhibition zone (4.6 mm)	Gunasekara et al 2017
			Tube dilution assay	Inhibition against *Trichosporon ovoides* with MIC3.1 µl/ml	Saxena et al 2012
Anti-nociceptive activity	Ethanol extract	L	Acetic acid-induced withing	48 and 49% inhibition at 200 and 400 mg/kg.	Atta et al 1998
Anti-oxidant activity	Methanolic extract; Aqueous extract	L	DPPH and free radical scavenging assay	50% scavenging ability at 700 µl.	Shiddamallayya et al 2010
			DPPH and scavenging assay	IC50 value is 76.6 µg/ml.	Seham et al 2019
			DPPH, NO, superoxide, ABTS radical scavenging and reducing power assay	IC_{50} values 41.16, 30.29, 20.19 and 29.48 µg/ml, respectively for DPPH, NO, superoxide and ABTS radical scavenging assays	Dubey et al 2016
Anti-ulcer activity	Petroleum ether; Chloroform extracts	L	Aspirin-induced ulcer	64.03 and 57.47% inhibition of gastric ulcer at 200 mg/kg	Khandal et al 2018
Central Nervous System (CNS)	Alcoholic extract	AP	Pentobarbital induced	Alteration of sleeping and latency time	Elisha et al 1998

Aerial parts: AP; Flowers: F; Leaves: L; Stem: S; Whole Plant: WP; IC_{50}: 50% inhibitory concentration

finding that aromatherapy and control groups displayed a significant difference in labor pain 30 min after the intermediation (Maasumeh et al 2014). In another study, the effect of jasmine oil is applied to reduce labor pain among pregnant ladies for the month, while jasmine oil massage on sacrum for 10 minutes, the average pain score was 4.26 while least at 4 and extreme score at 7 that the average pain notch has lain between 3.75 to 4.57 whereas the average pain score was of 6.64 before test where the lowest score was 6 and the maximum score was 9 that the average pain score was between 6.25 to 6.8 (Mukhlis et al 2018).

CONCLUSION

J. officinale has several medicinal uses and could be explored in advance for the development of novel therapeutic drugs not only for treating diseases such as gastrointestinal and cardiovascular (hypertension) disorders but also in the field of modern biotechnology where its leaves can be used as bioreduction agents to produce inexpensive, eco-friendly and clear silver nanoparticles. The future investigation could be applied to the nanoparticle and therapeutic property of *J. officinale* with the help of modern biotechnology and clinical studies.

REFERENCES

Al-Khazraji SM 2015. Evaluation of antibacterial activity of *Jasminum officinale*. *Journal of Pharmacy and Biological Sciences* **10**(1): 121-124.

Al-Khazraji SM 2018. Potentiating effects of alcoholic extract of the aerial parts of *Jasminum officinale* on pentobarbital-induced sleep. *Plant Archives* **18**(1): 697-702.

Al-Snafi AE 2018. Pharmacology and medicinal properties of *Jasminum officinale*: A review. *Indo American Journal of Pharmaceutical Sciences* **5**(4): 2191-2197.

Al-Snafi AE 2018. Traditional uses of Iraqi medicinal plants. *IOSR Journal of Pharmacy* **8**(8): 32-96.

Arun M, Satish S and Anima P 2016. Phytopharmacological profile of *Jasminum grandiflorum* Linn. (Oleaceae). *China Journal Integrate Medicine* **22**: 311-320

Atta AH and Alkofahi A 1998. Anti-nociceptive and anti-inflammatory effects of some Jordanian medicinal plant extracts. *Journal of Ethnopharmacology* **60**(2): 117-124.

Balkrishna A, Rohela A, Kumar A, Kumar A, Arya V, Thakur P, Oleksak P, Krejcar O, Verma R, Kumar D and Kuca K 2021. Mechanistic insight into antimicrobial and antioxidant potential of *Jasminum* species: A herbal approach for disease management. *Plants* **10**(6): 1-25.

Barnes J, Anderson LA and Phillipson JD 2007. *Herbal Medicines*. 3rd ed. United Kingdom, p. 710.

Bhattacharya S and Bhattacharya S 2010. In vitro propagation of *Jasminum officinale* L.: A woody ornamental vine yielding aromatic oil from flowers. *Methods Molecular Biology* **589**: 117-126.

David W 2013. *Herbalpedia: The ultimate herbal encyclopedia*. Pennsylvania, USA: Silver Springer.

Dhatwalia J, Kumari A, Verma R, Upadhyay N, Guleria I, Lal S, Thakur S, Gudeta K, Kumar V, Chao CJ, Sharma S, Kumar A, Manicum AE, Lorenzo JM and Amarowicz R 2021. Phytochemistry, pharmacology, and nutraceutical profile of *Carissa* species: An updated review. *Molecules* **26**(22): 1-34.

Drobnik J and Wełna K 2017. Cosmetic plants of the early 19th century. *Polish Journal of Cosmetology* **20**(4): 349-358.

Dubey P, Tiwari A, Gupta SK and Watal G 2016. Phytochemical and biochemical studies of *Jasminum officinale* leaves. *International Journal of Pharmaceutical Sciences and Research* **7**(6): 2632-2640.

Duke JA, Godwin MJ and du Celleir J 2002. *Handbook of Medicinal Herbs*. 2nd ed. CRC Press.

Elhawary S, EL-Hefnawy H and Mokhtar FA 2020. Green synthesis of silver nanoparticles using extract of *Jasminum officinal* L. leaves and evaluation of cytotoxic activity towards bladder (5637) and breast cancer (MCF-7) cell lines. *International Journal of Nanomedicine* **15**: 9771-9781.

El-Hawary, SS, El-Hefnawy HM, Osman SM, El-Raey MA and Mokhtar FA 2019. Phenolic profiling of different Jasminum species cultivated in Egypt and their antioxidant activity. *Natural Product Research* **35**(22): 4663-4668.

Elisha EE, Al-Maliki SJ and Ibrahem DK 1988. Effects of *Jasminum officinale* Flowers on the Central Nervous System of the Mouse. *International Journal of Crude Drug Research* **26**(4): 221-227.

Fleming T 2000. *PDR for herbal medicines*. Montvale, NJ: Medical Economics Company.

Gunasekara TDCP, Radhika NDM, Ragunathan KK, Gunathilaka DPP, Weerasekera MM, Hewageegana HGS and Fernando SSN 2017. Determination of antimicrobial potential of five herbs used in ayurveda practices against *Candida albicans*, *Candida parapsilosis* and methicillin resistant *Staphylococcus aureus*. *Ancient Science of Life* **36**(4): 187-190.

Hussain M, Bakhsh H, Aziz A, Majeed A, Khan IA, Mujeeb A and Farooq U 2013. Comparative in vitro study of antimicrobial activities of flower and whole plant of *Jasminum officinale* against some human pathogenic microbes. *Journal of Pharmacy and Alternative Medicine* **2**: 33-43.

Kaviani M, Maghbool S, Azima S and Tabaei MH 2014. Comparison of the effect of aromatherapy with *Jasminum officinale* and *Salvia officinale* on pain severity and labor outcome in nulliparous women. *Iranian Journal of Nursing and Midwifery Research* **19**(6): 666-672.

Khandal S, Singh C and Godara A 2018. Evaluation of anti-ulcer activity of chloroform and ether extract *of Jasminum officinale* L. leaf. *Journal of Biomedical and Pharmaceutical Research* **7**(1): 47-54.

Khare CP 2008. *Indian medicinal plants: An illustrated dictionary*. Springer Science & Business Media 900.

Kiritikar KR and Basu BD 1935. *In, Indian Medicinal plants*. India.

Kshirsagar S, Takarkhede S, Khan NA, Varma GG and Sonawane P 2019. A study on acid-base indicator characteristics of hydro-alcoholic extract of *Jasminum officinale* and *Ixora coccinea* flowers. *Journal of Pharmaceutics and Drug Research* **2**(6): 203-206.

Kumari A, Verma R, Sharma M, Chauhan P and Kumar A 2018. Evaluation of phytochemical, antioxidant, antibacterial and anti-cancerous activity of *Ficus auriculata* Lour. and *Osyris wightiana* Wall. ex Wight. *Bulletin of Environment, Pharmacology and Life Sciences* **7**(8): 64-70.

Lu Y, Han ZZ, Zhang CG, Ye Z, Wu L and Xu H 2019. Four new sesquiterpenoids with anti-inflammatory activity from the stems of *Jasminum officinale*. *Fitoterapia* **135**: 22-26.

Meena AK, Bansal P and Kumar S 2009. Plants-herbal wealth as a potential source of ayurvedic drugs. *Asian Journal of Traditional Medicines* **4**(4): 152-170.

Mukhlis H, Nurhayati N and Wandini R 2018. Effectiveness of jasmine oil (*Jasminum officinale*) massage on reduction of labor pain among primigravida mothers. *Malahayati International Journal of Nursing and Health Science* **1**(2): 47-52.

Panda H and Hota D 2013. *Handbook of aromatic and essential oil plants*. New Delhi, India: Bio Green Books.

Pubchem 2021. *Jasminum officinale*. Available online: https://pubchem.ncbi.nlm.nih.gov/ (accessed on August 20 November 2021).

Răducanu CE, Pârvulescu OC, Dobre T, Dumitru I and Drăgu F 2018. Air drying of aromatic plants coupled with recovery of volatile compounds. *Bulletin of Romanian Chemical Engineering Society* **5**(1): 1-106.

Rasheed HM, Wahid F, Qayyum R, Shah AJ and Khan T 2020. Chemical composition and pharmacological evaluation of essential oil from *Jasminum officinale* flowers for spasmolytic and vasodilator activities. *Farmacia* **68**(4): 722-727.

Sandeep PM 2009. *Jasminum grandiflorum* Linn (Chameli): ethnobotany, phytochemistry and pharmacology: A review. *Pharmacology Online* **2**: 586-595.

Sapra NP and Pandya HA 2019. Analysis of Alkaloids fromin Vitro andin Vivo (Natural Conditions) Samples of *Jasminum Sambac* L. *International Journal of Research in Advent Technology* **7**(3): 1392-1401.

Saxena S, Uniyal V and Bhatt RP 2012. Inhibitory effect of essential oils against *Trichosporon ovoides* causing Piedra Hair Infection. *Brazilian Journal of Microbiology* **43**: 1347-1354.

Sharma PC, Yelne MB and Dennis TJ 2001. *Database on medicinal plants used in Ayurveda* New Delhi, India: Central Council for Research in Ayurveda & Siddha 3.

Sharma S, Kumari A, Dhatwalia J, Guleria I, Lal S, Upadhyay N, Kumar V and Kumar A 2021. Effect of solvents extraction on phytochemical profile and biological activities of two *Ocimum* species: A comparative study. *Journal of Applied Research on Medicinal and Aromatic Plants* **25**: 100348.

Shekhar S and Prasad MP 2015. Evaluation of antimicrobial activity of Jasminum species using solvent extracts against clinical pathogens. *World Journal of Pharmaceutical Sciences* **4**: 1247-56.

Shiddamallayya N, Yasmeen A and Gopakumar K 2010. Hundred common forest medicinal plants of Karnataka in primary healthcare. *Indian Journal of Traditional Knowledge* **9**(1): 90-95.

Shukla RR 2013. *Jasminum officinale* Linn- Ayurvedic approach. *International Journal of Ayurvedic and Herbal Medicine* **3**(1): 1114-1119.

Sonam, Kumari A, Kumar V, Guleria S, Sharma M, Kumar A, Alruways MW, Khan N and Raina R 2021. Antimicrobial potential and chemical profiling of leaves essential oil of *Mentha* species growing under North-West Himalaya conditions. *Journal of Pure*

and Applied Microbiology **15**(4): 2229-2243.

Sood SK, Parmar S and Lakhanpal TN 2005. *Ethnic plants of India used in cancer cure: A compendium*. Dehradun, India: Bishen Singh Mahendra Pal Singh.

Tabatabaeichehr M and Mortazavi H 2020. The effectiveness of aromatherapy in the management of labor pain and anxiety: A systematic review. *Ethiopian Journal of Health Sciences* **30**(3): 449-458.

Watal G, Dubey P, Tiwari A, Tiwari P, Awasthi S and Rai AK 2019. Phytochemical and phytoelemental profile of *J. officinale*. *International Journal of Pharmacognosy and Phytochemical Research* **11**(1): 5-9.

Wei A and Shibamoto T 2010. Antioxidant/lipoxygenase inhibitory activities and chemical compositions of selected essential oils. *Journal of Agricultural and Food Chemistry* **58**(12): 7218-7225.

Zhao G, Yin Z and Dong J 2009 Antiviral efficacy against hepatitis b virus replication of oleuropein isolated from *Jasminum officinale* L. var. *grandiflorum*. *Journal Ethnopharmacology* **125**: 265-268.

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