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JASMINUM SPECIES: AN OVERVIEW

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ABSTRACT

Keywords:

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The use of herbal drugs for prevention and treatment of various health ailments has been in practice since time immemorial. Literature revealed that about 25% of drugs prescribed worldwide are of plants origin. Traditionally *Jasminum* species has been used to treat dysmenorrhoea, amenorrhoea, ringworm, leprosy, skin diseases and also as an analgesic, antidepressant, anti-inflammatory, antiseptic, aphrodisiac, sedative, expectorant therefore an attempt has been made to enumerate some of *jasminum* species used for the alleviation of ailments. In the present article an endeavour has been made to present a potential of *Jasminum* species used for general healthcare.

INTRODUCTION:

Herbal plants are pioneer for new drug discovery and development, not only for plant constituents used directly as therapeutic agents, but also as starting materials for synthesis of pharmacologically active compounds ^[1]. The use of plants for prevention and treatment of various health ailments has been in practice from time immemorial and it is estimated that about 25% of drugs prescribed are derived from plants, moreover, WHO's essential medicine list contains 252 drugs out of which 11% is exclusively of plant origin ^[2]. In the present scenario, pharmaceutical companies are involved in research on plant materials for their potential medicinal value as the demand for herbal products is growing exponentially due to its fewer side effects as compare to other system of medicines ^[3]. *Jasminum* genus with about 200 species belonging to family Oleaceae are of three types: shrub or bush form, vines and trees, native to tropical and warm temperate regions. Many *Jasminum* plants prominently feature white, yellow or pink flowers with sweet fragrance and others are unscented ^[4]. *Jasminum* species is used to treat many conditions such as amenorrhoea, ringworm, leprosy, skin diseases and also as an analgesic, antidepressant, anti-inflammatory, antiseptic, aphrodisiac, sedative, expectorants, diuretics and among others.

***Jasminum grandiflorum* Linn** (Spanish jasmine, Common jasmine, Chameli, Jati)

Jasminum grandiflorum is a scrambling sub erect twining evergreen shrub ^[5,6], native to India, France, Italy, China, Japan, Morocco and Egypt^[7-10]. The leaves are opposite, entire ovate to somewhat elliptic in shape with acuminate mucronate apex, whereas flowers are terminal and axillary cymes, calyx lobes are long, linear ^[11,12]. Roots are useful in cephalalgia, mental debility, chronic constipation, flatulence, strangury, sterility, dysmenorrhoea, amenorrhoea, ringworm, leprosy, skin diseases and giddiness. Leaves are useful in odontalgia, fixing loose teeth, ulcerative stomatitis, leprosy, skin diseases, otorrhoea, otalgia, strangury, dysmenorrhoea, ulcers, wound, corns and flowers are useful in

stomatopathy, cephalopathy, odontopathy, ophthalmopathy, leprosy, skin diseases, pruritis, strangury, dysmenorrhoea, ulcers, as refrigerant, ophthalmic and vitiated conditions of pitta^[13]. Phytochemical studies revealed that leaves contains 2''-epifraxamoside, demethyl-2''-epifraxamoside, jasminanhydride^[14], oleacein, 2-(3, 4- dihydroxy phenyl)-ethanol, isoquercitrin, ursolic acid^[15], resin, salicylic acid, jasminine, indole oxygenase^[16], 3, 4-dihydroxy benzoic acid, 2-hydroxy-30, 40-dihydroxyacetophenone and oleanolic acid^[14], flower contains Cis-3-hexenol, 2-vinyl pyridine, indole, myrcene, linalool, geranyl linalool, α -terpineol, geraniol, linalyl acetate, nerolidol, phytol, isophytol, farnesol, eugenol, benzyl alcohol, p-cresol, methyl benzoate, benzyl cyanide, benzyl acetate, methyl dihydrojasmonate, methyl anthranilate, jasmone, methyl- N-methyl anthranilate, vanillin, cis-3-hexenyl benzoate, benzyl benzoate, methyl palmitate, methyl linoleate^[17], jasgranoside, jaspolyoside, 8-epi-kingside, 10-hydroxy-oleuropein, 10-hydroxyligstroside, oleoside-7,11-dimethylester^[18], 3-O- α -L-rhamnopyranosyl(1 \rightarrow 2)- β -D-xylopyranosyl-hederagenin-28-O- β -D-galactopyranosyl(1 \rightarrow 6)- β -D-galactopyranosylester, hederahederagenin-3-O- β -D-glucopyranosyl(1 \rightarrow 3)- α -L-arabinopyranoside, 2- α ,3 β ,23-trihydroxyolean-12-en-28-oic-O- β -D-glucopyranosyl ester, hederagenin-3-O- β -Dxylopyranosyl(1 \rightarrow 3)- α -L-rhamnopyranosyl (1 \rightarrow 2)- α -L-arabinopyranoside, 2 α ,3 β ,23-trihydroxyolean-12-en-28-oic-O- α -L-rhamnopyranosyl(1 \rightarrow 4)- β -D-glucopyranosyl(1 \rightarrow 6)- β -D-glucopyranosyl ester, hederagenin-3-O- α -L-rhamnopyranosyl(1 \rightarrow 2)- α -L-arabinopyranoside^[19], kaempferol-3-O- α -L-rhamnopyranosyl(1 \rightarrow 3)-[α -L-rhamnopyranosyl(1 \rightarrow 6)- β -D-galactopyranoside, kaempferol-3-O-rutinoside, 7-ketologanin, oleoside-11-methyl ester, 7-glucosyl-11-methyloleoside, ligstroside and oleuropein^[20]. Moreover, jasmine oli consist of methyl jasmonate^[21], benzyl benzoate, linalool, linalyl acetate, benzyl alcohol, indole, jasmone, methyl anthranilate, P-cresol, geraniol, racemic (5-pent-2-enyl)-5, 1-pentanolide, benzyl benzoate, nerol, 1- α -terpineol, d and dl-linalool, γ -jasmolactone, farnesol, nerolidol and eugenol^[10,22]. Hydro

alcoholic extract of leaves of *Jasminum grandiflorum* L. showed anti ulcer activity in aspirin and pylorus ligation (APL) induced acute gastric ulcer models with reduction in gastric fluid volume, free acid, total acid and an increase in the pH of gastric fluid [23]. Petroleum ether, chloroform, acetone, methanol and aqueous extracts of leaves of *Jasminum grandiflorum* Linn were screened for their *in vitro* antibacterial activity against *Staphylococcus aureus*, *Bacillus subtilis*, *Escherichia coli* and *Pseudomonas aeruginosa* by using agar diffusion method. Out of all extracts tested, petroleum ether, methanol and aqueous extracts were effective against all four microorganisms. Chloroform extract was only effective against *Bacillus subtilis* and *Pseudomonas aeruginosa*. Acetone extract was effective against *Pseudomonas aeruginosa* and *Escherichia coli* [24]. Ethanolic flower extract of *Jasminum grandiflorum* have been shown wound healing activity by reduction in wound area, increased wet and dry granulation tissue weight and hydroxyproline content in excision and dead space wound models [25]. Oleacein extracted from aerial parts of *J. grandiflorum* exhibited ACE inhibitor activity with IC₅₀ values 26-66 mM [15]. Oleuropein extracted from the flowers of *J. grandiflorum* demonstrated indubitable anti-HBV (hepatitis B virus) activity in HepG2 2.2.15 cells test in vitro and duck hepatitis B virus (DHBV) infected ducklings test in vivo [26]. Oral administration of ethanol extract of *J. grandiflorum* flowers to 7,12-dimethylbenz(a)anthracene (DMBA) injected animals prevented the formation of tumors in the pre-initiation period and exerted significant anti-lipid peroxidative effect and improved the antioxidant defense system in DMBA-treated rats [27]. The antioxidant activity of ethanolic extract of leaves of *Jasminum grandiflorum* L. (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 it showed antioxidant activity in a dose dependent manner [28]. Flowers of *J. grandiflorum* are useful to women when brewed as a tonic as it aids in preventing breast cancer and stopping uterine

bleeding^[29]. Ethanolic and aqueous extract of *J. grandiflorum* flowers and leaves in DMBA treated rats showed reduction of micronucleated polychromatic erythrocytes in bone marrow^[30].

Jasminum sambac (Arabian jasmine, Indian jasmine, Sampaguita, Mogra) *Jasminum sambac* is a member of Oleaceae family, known as sampaguita in the Philippines, where it is national flower, gunda mallige in India, mo li in China, pikake in Hawaii and Arabian jasmine in the mainland USA. It is commercially grown in India, Thailand, China and Philippines^[31]. It is an evergreen vine or shrub reaching up to 1-3 m. The leaves are ovate; phyllotaxy is opposite or in whorls of three. The flowers blooms throughout the year and are produced in clusters of 3-12 together. They are strongly scented and open at night, close in morning^[31]. The plant traditionally used as an analgesic, antidepressant, anti-inflammatory, antiseptic, aphrodisiac, sedative, expectorant and tonic (uterine) effects^[31]. Roots are used to treat wounds and snake bites. The leaves and flowers have antipyretic and decongestant properties^[31]. The flowers are used for treatment of diarrhoea, abdominal pain, conjunctivitis and dermatitis. The leaves and roots are used for treating diarrhoea, fever, pain and as an anaesthetic^[33, 34]. Phytochemical studies shown that the roots contains dotriacontanoic acid, dotriacontanol, oleanolic acid, daucosterol and hesperidin^[35] and leaves contain sambacosides A, E and F^[36], flower contains molihuaside A-E, sambaeoside A^[37]. The essential oil and methanol extract of flowers of *J. sambac* were evaluated for its antimicrobial activity against *E. faecalis* CIP103907, *E. coli* CIP 105182, *S. enterica* CIP105150 and *S. pyogenes.*, *B. Cereus* LMG 13569 by using disc diffusion and micro dilution methods^[32] and also subjected for their antioxidant activity by DPPH free radical scavenging and β -carotene-linoleic acid assays. In the DPPH test system, the IC₅₀ value of essential oil and methanol extract were respectively 7.43 and 2.30 μ g/ml. In the β -carotene-linoleic acid system, oxidation was effectively inhibited by *J. Sambac* and the RAA (Relative

antioxidant activity) value of essential oil and methanol extract were respectively 96.6% and 93.9% [32]. Ethyl acetate (EAE) and water extract (WTE) of leaves of *Jasminum sambac* showed reduction in plasma glucose level, lipid profile and serum urea in diabetic rats [38]. The efficacy of jasmine flowers applied to the breasts to suppress puerperal lactation was compared that of Bromocriptine by reduction in serum prolactin level [39].

***Jasminum mesnyi* Hance** (Primrose jasmine, Japanese jasmine, Japani chameli)

Jasminum mesnyi Hance (*Jasminum primulinum* Hemsley) also known as “Primrose Jasmine” or “Japanese Jasmine” found in tropical, sub-tropical and warm temperate regions of Asia. It is an open evergreen, rambling shrub, leaves are opposite, trifoliolate and attached to base of branchlets. Flowers are usually solitary, axillary or rarely terminal, yellow coloured, having 6-10 petals [40-42]. The glossy dark green leaves are opposite and divided into three leaflets. The trumpet shaped flowers are borne in early spring and sporadically into summer [43]. *Jasminum mesnyi* leaves contains secoiridoids glucosides such as jasmoside and jasmesoside, 9"-hydroxyjasmesoside, 9"-hydroxyjasmesosidic acid, jasminin 10"-O-β-d-glucoside, 2"-hydroxyjasminin, isojasminin, jasminin, 4"-hydroxyisojasminin, jasmosidic acid and phenolic glucoside like syringin or rutin [44-47]. Methanolic leaf extract and its n-butanol, ethyl acetate fractions of *Jasminum mesnyi* have been shown to reduce fasting serum glucose level [48] and also showed in-vitro antioxidant activity in a dose dependent manner by DPPH radical scavenging and nitric oxide radical scavenging assays [48].

***Jasminum angustifolium* Linn.** (Wild Jasmine, Banmallika)

Jasminum angustifolium Linn. belonging to the family Oleaceae, distributed in south India (kerala, Karnataka) on the hills of lower elevation [49]. Leaves are simple ovate-lanceolate, acute, glabrous [50] and flowers are either solitary or more usually in three. Petals are linear, obtuse and acute [51]. Ethanolic and aqueous extracts of whole plant of *Jasminum angustifolium* Linn. have been shown antitumor activity by increasing the survival time (life

span) and decrease in peritoneal cancer cell count and body weight against Dalton's ascitic lymphoma (DAL) model [52]. Hepatoprotective effect of ethanolic and chloroform extract of *Jasminum angustifolium* Linn were evaluated against carbon tetrachloride (CCl₄) (1ml/kg) induced hepatic damage and was evidenced by reduction in level of alkaline phosphatase (ALP), alanine amino transferase (ALT), aspartate amino transferase (AST), cholesterol, glucose, total protein and bilirubin concentration in blood [53].

Jasminum auriculatum (Needle flower jasmine, Juhi, Juyi)

Jasminum auriculatum Vahl (Oleaceae) commonly known as Juhi, Needle flower jasmine, Yutika, grows almost throughout South India, on dry slopes of the Western Ghats [54]. Flowers are white, sweet scented and trifoliate with two lower leaflets broadly ovate, acuminate or rounded [55]. The roots are useful in skin diseases especially for ringworm and flowers are fragrant, bitter, acrid, sweet, refrigerant, astringent, cardiotoxic, diuretic and depurative in nature. They are useful in burning sensation, hyperdesia, ulcers, odontalgia, stomatopathy, ophthalmopathy, cardiopathy, urolithiasis, nephrolithiasis, strangury and dermatopathy [55]. *Jasminum auriculatum* leaves has been reported to contain lupeol and jasminal [56]. Alcoholic and aqueous extracts of flowers of *Jasminum auriculatum* showed diuretic activity by increasing the total volume of urine and concentrations of potassium and sodium salts in urine [57] and antiurolithiatic activity by reducing the elevated urinary oxalate synthesis [58].

***Jasminum arborescens* Roxb.** (Tree Jasmine)

Jasminum arborescens Roxb. belonging to family Oleaceae and distributed in Sub-Himalayan tract, Bengal, Central and South India. It is known as Nava-mallikaa in Ayurveda and Nagamalli in Siddha [59]. Leaves are opposite, simple, ovate, acute or acuminate [60] and are astringent, stomachic. Juice of leaves, with pepper, garlic and other stimulants, is used as an emetic in obstruction of bronchial tubes due to viscid phlegm [59]. Ethanol, chloroform and

petroleum ether extracts of leaves of *Jasminum arborescens* Roxb has been shown in-vitro antioxidant activity in a dose dependent manner by DPPH free radical scavenging and Fe⁺³ reducing power assays [59] and also anthelmintic activity of these extracts was performed on adult Indian earthworm *Pheretima pashuma* in which time taken for paralysis and death of worms was found lesser in case of ethanol extract followed by chloroform and petroleum ether extract [59].

***Jasminum amplexicaule* Buch.-Ham.**

Jasminum amplexicaule Buch.-Ham. belonging to the family Oleaceae, distributed in Sikkim, Bhutan, Khasia, South India to Hongkon. Leaves are opposite, simple, ovate-lanceolate, acuminate and flowers are scentless, calyx is pubescent, corolla is white, tinged with red outside [60]. This plant used as a traditional medicine in dysentery, diarrhoea and bellyache in China [61]. It contained some di and trimeric iridoids like jasamplexoside A, B and verbascoside [62] and leaves contained jaslanceosides B, E., jasminoside, isojasminoside [63]. Methanol extract of twigs and leaves of *Jasminum amplexicaule* and different fractions of this extract showed anti-diarrhoea, analgesic activity in castor oil-induced and magnesium sulphate-induced diarrhoea models, antienterpooling assay, gastrointestinal motility models and analgesic activities were investigated using hot-plate, writhing and formalin models [61].

***Jasminum lanceolarium* (Jasminum lanceolaria, Jasminum lanceolarium Roxb.)**

Jasminum lanceolarium is a climbing shrub belongs to family Oleaceae, distributed in China, India, Myanmar, Taiwan [64]. Leaves are opposite, alternate, simple or trifoliate [65]. Leaves and stems revealed the presence of 5, 7, 3', 5'-tetrahydroxyflavanone, (2S)-5, 7, 3', 4'-tetrahydroxyflavan-5-O-beta-D-glucopyranoside, mannitol, nonacosane, trans-p-coumaric acid, cis-p-coumaric acid, ferulic acid and, trans-cinnamic acid [66], trans-P-coumaroyl and trans-feruloyl esters of 10-hydroxyoleoside, jaslanceosides A-E [67,68] and (2S)-5,7,3',5'-tetrahydroxy-flavanone 7-O-beta-D-allopyranoside, Betulinaldehyde, betulinic acid, betulin,

syringing, liriiodendrin and compound (2S)-5,7,3',5'-tetrahydroxy-flavanone 7-O-beta-D-glucopyranoside exhibited significant radical scavenging activity through DPPH (1,1-diphenyl-2-picrylhydrazyl) radical scavenging assay^[69].

Jasminum nudiflorum (winter jasmine, hardy jasmine)

Jasminum nudiflorum Lindl. belonging to family Oleaceae, is an rambling, diffuse shrub with slender, arching stems and four-angled green branchlets that bear opposite compound leaves with three leaflets and distributed in South England, China^[70,71]. Leaflets are dark green, oblong and flowers are bright yellow, unscented, funnel shaped^[70]. In China, flowers and leaves are used in treatment of inflammatory swelling, purulent eruptions, bruises or traumatic bleeding^[72]. Phytochemical studies revealed that leaves and stems contained jasnudiflosides A-C^[73], also leaves contained jasnudiflosides F-L, nudifloside D, isooleoacteoside^[74] and stems contained jasnudiflosides D- E, nudiflosides A-C^[75]. Leave extract of *Jasminum nudiflorum* Lindl. has been shown inhibitory effect on the corrosion of cold rolled steel in 1.0 M hydrochloric acid by weight loss, potentiodynamic polarization and electrochemical impedance spectroscopy (EIS) methods in a dose dependent manner^[76].

CONCLUSION:

Medicinal plants play a significant role as therapeutics aids in health system all over the world. A major factor impeding the development of the medicinal plant is lack of information about utilization of medicinal plants. Here we summarised the some activities of *Jasminum* species which may be open a new era for development of new drug for various ailments.

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