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JASMINUM SAMBAC (BELA): A TRADITIONAL FRAGRANT FLOWER WITH MODERN MEDICINAL VALUE: A REVIEW

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ABSTRACT

Jasminum sambac, commonly known as Bela, is a widely recognized ornamental and medicinal plant valued for its distinct fragrance and traditional uses across various cultures. Traditionally revered in Ayurveda, Unani, and folk medicine, Bela has been used for treating ailments such as headaches, fever, anxiety, wounds, and skin disorders. Recent phytochemical investigations have revealed that the plant contains a variety of bioactive compounds, including flavonoids, alkaloids, terpenoids, and essential oils like linalool and benzyl acetate, which contribute to its therapeutic potential. Scientific studies have demonstrated its pharmacological activities, including antimicrobial, antioxidant, anti-inflammatory, antidepressant, and wound-healing effects. Additionally, its soothing aroma finds extensive use in aromatherapy and cosmetic formulations. This review aims to provide a comprehensive overview of the traditional uses, phytochemistry, pharmacological properties, and current and potential applications of *Jasminum sambac*, highlighting its significance as a natural source for developing novel herbal therapies and wellness products.

KEYWORD: *Jasminum sambac*, Bela, Arabian jasmine, phytochemistry, traditional medicine, pharmacological activities, essential oils.

1. INTRODUCTION

Jasminum sambac, commonly known as Bela, Arabian jasmine, or Mogra, is a highly fragrant flowering plant belonging to the Oleaceae family. Native to South and Southeast Asia, it is widely cultivated in tropical and subtropical regions for its aromatic flowers, which are valued for ornamental, religious, cosmetic, and medicinal purposes. In India, Bela holds deep cultural significance and is commonly used in garlands, offerings, and traditional celebrations.[1]

Beyond its ornamental value, *Jasminum sambac* has a rich history in traditional medicine systems such as Ayurveda, Unani, and Siddha. Various parts of the plant including its flowers, leaves, and roots have been used to treat a wide range of ailments including fever, cough, skin infections, wounds, diarrhea, and anxiety. The plant is also known for its calming and sedative properties, making it popular in aromatherapy and traditional wellness practices.[2]

Phytochemical analyses have revealed the presence of numerous bioactive compounds in *Jasminum sambac*, including flavonoids, alkaloids, iridoids, phenols, tannins, and essential oils. These compounds contribute to the plant's wide spectrum of pharmacological activities, such as antioxidant, antimicrobial, anti-inflammatory, analgesic, and antidepressant effects. Furthermore, the essential oils derived from its flowers are extensively used in perfumery, cosmetics, and personal care products.[3]

Fig 1.1 *Jasminum Sambac* Plant.

In recent years, increasing interest in natural remedies and plant-based therapeutics has sparked renewed scientific attention toward *Jasminum sambac*. Despite its widespread traditional use and promising pharmacological profile, comprehensive reviews consolidating the current knowledge on its medicinal potential remain limited. This paper aims to provide an in-depth overview of the ethnomedicinal uses, phytochemistry, pharmacological properties, and potential therapeutic applications of *Jasminum sambac*, thereby highlighting its value as a multifaceted medicinal plant.[4]

Fig 1.2 *Jasminum sambac Flower.*

1.1 Botanical Description

Jasminum sambac, commonly known as Arabian jasmine, is a cherished ornamental and aromatic plant recognized by various names across different cultures. It holds the esteemed title of national flower in the Philippines, where it is called *Sampaguita*. In India, it is known as *Gunda Mallige*; in China, as *Moli*; in Hawaii, as *Pikake*; and in the mainland United States, it retains the name *Arabian jasmine*.[5]

This plant is widely cultivated on a commercial scale in Thailand, the Philippines, and India. Thought to be native to Southeast Asia or India, Jasminum sambac is an evergreen, broadleaf shrub or vine. When provided with structural support, it grows as a twining shrubby vine; without support, it adopts a spreading shrub-like form. It typically reaches a height of 1 to 3 meters.[6]

The plant's foliage consists of dark green, ovate leaves arranged either oppositely or in whorls of three. Under controlled greenhouse conditions, it is capable of blooming year-round. The flowers, highly fragrant and borne in clusters of 3 to 12, open at night and emit a rich, pleasing aroma.[7]

Arabian jasmine thrives in warm, humid conditions during the day but prefers cooler temperatures at night, making it well-suited for indoor cultivation where it is safe from frost damage. In full sunlight, it tends to form dense, bushy shrubs, while in shaded environments, it grows as a vine with larger and darker foliage. It also performs well as a container plant, making it a popular choice for decorative indoor and patio gardening.

For optimal growth, Jasminum sambac requires well-drained soil that maintains consistent moisture and is rich in organic content such as compost, peat moss, humus, or leaf mold. However, overly wet or waterlogged conditions can hinder its growth and should be carefully avoided.[8]

Table 1.1: Botanical Description.

Feature	Description
Scientific Name	*Jasminum sambac* (L.) Aiton
Common Names	Bela, Arabian Jasmine, Mogra
Family	Oleaceae
Habitat	Tropical and subtropical regions
Parts Used	Flowers, leaves, roots, and oil
Morphology	Shrub with white fragrant flowers, ovate leaves

1.2 Traditional and Ethnomedicinal Uses

Because of its many therapeutic uses, jasmineum sambac has long been prized. Antidepressant, analgesic, sedative, anti-inflammatory, antibacterial, expectorant, and aphrodisiac are some of its uses. Traditionally, the roots have been used to heal snake bites and wounds. The leaves and flowers both have antipyretic and decongestant properties.[9]

Different components of the plant are often used to treat a variety of conditions, including dermatitis, diarrhoea, conjunctivitis, and stomach discomfort. Throughout Asia, traditional medicine has utilised the flowers specifically to treat ailments like toothaches, breast cancer, abscesses, asthma, and uterine bleeding. Additionally, the roots and leaves are used to cure fever, diarrhoea, and other digestive issues.[10]

The leaves are used in traditional Chinese medicine to treat stomach discomfort, gallstones, diarrhoea, and quadriplegia. In several Asian nations, including Thailand, Jasminum sambac is one of the most extensively grown jasmine species because of its many therapeutic uses and great medicinal value.[11]

- Ayurveda: Used as a cooling agent, aphrodisiac, and blood purifier.
- Unani medicine: Flower extracts used in liver complaints and skin infections.
- Chinese medicine: Tea made from flowers used for stress relief, digestive aid, and detoxification.
- Folk medicine: Used topically for wounds, burns, and skin eruptions.

1.3 Phytochemistry of *Jasminum sambac*

Jasminum sambac is a rich source of bioactive compounds that contribute to its wide-ranging medicinal properties. Phytochemical analyses of various parts of the plant particularly the flowers, leaves, and roots have revealed the presence of multiple classes of secondary metabolites. These include:[12]

- **Flavonoids** (e.g., quercetin, kaempferol): known for their antioxidant and anti-inflammatory activities.
- **Alkaloids**: contribute to antimicrobial and analgesic effects.
- **Tannins and Phenolic Compounds**: provide antioxidant, astringent, and wound-healing properties.
- **Terpenoids** (e.g., linalool, α-terpineol, nerol): major components of essential oils with strong antimicrobial and aromatic properties.
- **Saponins**: possess anti-inflammatory, antimicrobial, and immunomodulatory actions.
- **Essential Oils**: extracted primarily from the flowers, containing linalool, benzyl acetate, indole, methyl anthranilate, and cis-jasmone.

These phytochemicals act synergistically to produce a broad range of biological effects, making *Jasminum sambac* a promising candidate for herbal formulations and pharmaceutical applications.

1.4 Pharmacological Activities of *Jasminum sambac*

Scientific studies have validated several pharmacological actions of *Jasminum sambac*, supporting its traditional medicinal use:[13]

I. Antioxidant Activity

Extracts from the flowers and leaves show significant free radical scavenging properties due to their high phenolic and flavonoid content, helping reduce oxidative stress.

II. Antimicrobial Activity

Essential oils and extracts exhibit strong antibacterial and antifungal effects against pathogens like *Staphylococcus aureus*, *Escherichia coli*, and *Candida albicans*.

III. Anti-inflammatory and Analgesic Effects

Both in vivo and in vitro studies have demonstrated the plant's ability to reduce inflammation and pain, attributed to flavonoids and terpenoids.

IV. Antidepressant and Anxiolytic Effects

Inhalation of *Jasminum sambac* essential oil has been shown to reduce stress and anxiety levels, acting through olfactory pathways and neurotransmitter modulation.

V. Wound Healing

Extracts accelerate tissue regeneration and collagen synthesis, making it useful for treating cuts, ulcers, and skin infections.

VI. Antidiabetic and Hypolipidemic Effects

Preliminary studies indicate potential in regulating blood glucose and lipid levels, possibly through improved insulin sensitivity and antioxidant mechanisms.

Table 1.2: Phytochemicals and Pharmacological Activities.

Plant Part	Major Phytochemicals	Pharmacological Activities
Flowers	Linalool, Benzyl acetate, Methyl anthranilate, Flavonoids	Antioxidant, Antidepressant, Antimicrobial, Aromatherapeutic
Leaves	Tannins, Saponins, Alkaloids, Phenolic compounds	Anti-inflammatory, Analgesic, Antibacterial, Wound healing
Roots	Iridoid glycosides, Alkaloids	Antipyretic, Anti-inflammatory, Traditional fever remedy
Essential Oil	Linalool, Nerol, Indole, Cis-jasmone	Sedative, Antimicrobial, Anxiolytic, Skin-soothing
Whole plant	Flavonoids, Terpenoids, Alkaloids, Saponins	Antidiabetic, Antioxidant, Immunomodulatory

1.5 Therapeutic Applications of *Jasminum sambac*

Based on traditional knowledge and modern pharmacological evidence, *Jasminum sambac* is used in the treatment and management of various health conditions:[14]

- **Respiratory Disorders**: Used to relieve cough, bronchitis, and asthma symptoms due to its soothing and anti-inflammatory effects.
- **Skin Ailments**: Applied topically for treating acne, wounds, eczema, and fungal infections.
- **Mental Health**: Used in aromatherapy for reducing anxiety, stress, and depression, thanks to the relaxing aroma of its essential oil.[15]
- **Fever and Infections**: Traditionally used to reduce fever and treat infections due to its antimicrobial and antipyretic effects.
- **Oral Health**: Leaves are chewed or used in decoctions for mouth ulcers and sore throats.

Additionally, *Jasminum sambac* is widely used in cosmetic and personal care products due to its fragrance and skin-enhancing properties. Its essential oil is a valued ingredient in perfumes, lotions, hair oils, and soaps.[16]

2. Method

2.1 Literature Search Strategy

The data for this review were gathered from multiple reputable scientific databases and sources. The comprehensive literature search included:

- **Databases**: PubMed, ScienceDirect, Scopus, Web of Science, Google Scholar, and AYUSH Research Portal.
- **Search period**: 2000–2025.
- **Languages**: Only articles published in English were considered.
- **Selection criteria**: Only original research articles, reviews, and ethnobotanical records discussing the biological and therapeutic properties of *Jasminum sambac* were included.[17]

2.2 Inclusion and Exclusion Criteria

Table 1.2 Inclusion and Exclusion Criteria.

Criteria	Description
Inclusion	Peer-reviewed journals, books, and theses with data on *Jasminum sambac*; experimental studies (in vitro, in vivo); ethnopharmacological reports
Exclusion	Articles lacking scientific validation, publications in non-English languages, unrelated species of *Jasminum*

2.3 Data Extraction and Organization

Information was extracted manually from selected studies, and organized under the following categories:[18]

- Botanical identification and morphology.
- Traditional and folk medicine uses.
- Phytochemical composition.
- Biological and pharmacological activities.
- Therapeutic and commercial applications.

A spreadsheet was maintained to collate

- Plant parts used.
- Solvents/extraction techniques.
- Biological models used (in vitro/in vivo).
- Doses/concentrations tested.
- Pharmacological outcomes.[19]

2.4 Phytochemical Analysis

Although this review does not include experimental lab work, methods reported in the included studies for phytochemical screening were noted:[20]

- **Qualitative screening**: Standard tests for alkaloids, flavonoids, saponins, tannins, and terpenoids.
- **Quantitative analysis**: Total phenolic content (Folin-Ciocalteu method), total flavonoid content (Aluminum chloride colorimetric assay).
- **Chromatography techniques**: Thin Layer Chromatography (TLC), High Performance Liquid Chromatography (HPLC), and Gas Chromatography-Mass Spectrometry (GC-MS) for essential oil profiling.[21]

2.5 Pharmacological Activity Assessment (as per included articles)

- Antioxidant activity: DPPH, ABTS, FRAP assays.
- Antimicrobial: Disc diffusion, MIC determination.
- Anti-inflammatory: Carrageenan-induced paw edema model in rodents.
- Anticancer: MTT assay on MCF-7, HepG2, and other cell lines.
- Wound healing: Excision and incision wound models in rats or mice.
- Anti-diabetic: Inhibition of α-amylase and α-glucosidase enzymes in vitro.[22]

2.6 Data Presentation

The data was synthesized and presented in:

- Comparative tables for pharmacological activities
- Summary tables for bioactive compounds
- Flowcharts and diagrams (where necessary)
- A comprehensive narrative synthesis describing trends and correlations.[23]

2.7 Quality Assessment

Each study included was assessed for scientific rigor based on:

- Study design
- Sample size
- Statistical significance
- Relevance to the topic.[24]

3. CONCLUSION

Jasminum sambac (Bela) is a multifaceted plant that holds considerable potential in both traditional and modern medicine. Its rich phytochemical composition including essential oils, flavonoids, and alkaloids underpins a wide range of pharmacological activities such as antioxidant, anti-inflammatory, antimicrobial, wound-healing, and mood-enhancing effects. While the plant has long been used in traditional systems of medicine, emerging scientific studies have begun to validate many of these therapeutic claims. However, further clinical research and standardization of extracts are needed to fully establish its efficacy and safety for broader pharmaceutical use. Given its therapeutic diversity and cultural relevance, *Jasminum sambac* stands as a promising candidate for the development of plant-based formulations in complementary and integrative health care.

4. DISCUSSION

The comprehensive evaluation of *Jasminum sambac* reveals its immense therapeutic value, rooted in both traditional applications and modern scientific validation. Historically used in Ayurveda and folk medicine, this plant has played a prominent role in the treatment of various ailments such as respiratory disorders, skin diseases, anxiety, and infections. The consistency between ethnobotanical uses and emerging pharmacological evidence underscores its potential as a multipurpose medicinal plant.

Phytochemically, *Jasminum sambac* is endowed with a rich variety of bioactive compounds, particularly flavonoids, terpenoids, alkaloids, phenolics, and essential oils. These constituents are largely responsible for the plant's strong antioxidant, antimicrobial, and anti-inflammatory effects. Essential oil components like linalool and benzyl acetate not only offer therapeutic effects but also serve as valuable ingredients in the cosmetic and fragrance industries.

Pharmacological studies support its efficacy in managing oxidative stress, microbial infections, inflammatory conditions, and psychological stressors. For instance, the antioxidant capacity of flower extracts supports their potential use in aging-related diseases, while antimicrobial properties validate traditional use in treating wounds and infections. Similarly, the anxiolytic and antidepressant actions linked with the essential oil are consistent with its popular use in aromatherapy.

Despite these promising findings, some limitations remain. Most studies have been conducted in vitro or in animal models; human clinical trials are relatively scarce. Additionally, the lack of standardized extract formulations and dosing parameters poses challenges in translating laboratory findings into clinical applications. Issues such as compound stability, bioavailability, and potential interactions with conventional drugs also warrant further exploration.

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