INTERNATIONAL JOURNAL OF PHARMACEUTICAL SCIENCES
[ISSN: 0975-4725; CODEN(USA): IJPS00]
Journal Homepage: https://www.ijpsjournal.com

Review Paper

Eucalyptus globulus in Modern Therapy: A Comprehensive Review

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ARTICLE INFO

Published: 16 Feb. 2025
Keywords:
Eucalyptus globulus, 1,8-cineole, α-pinene, p-cymene, cryptone, spathulenol, anti-microbial, anti-fungal, anti-viral, anti-inflammatory, anti-nociceptive, anti-oxidant
DOI:
10.5281/zenodo.14879159

ABSTRACT

The shrubby plant or flowering tree Eucalyptus globulus is a member of the Myrtaceae family. Over 700 species are known to exist in the genus Eucalyptus, which has been utilised extensively for a variety of uses throughout human history for thousands of years. Eucalyptus is basically native to Tunisia and Australia but has also been evident to be found in Africa and from tropical to southern temperate regions of America. Genus eucalyptus further consists of four subspecies which are Eucalyptus bicostata, Eucalyptus pseudoglobulus, Eucalyptus globulus and Eucalyptus maidenii among which Eucalyptus globulus is a medium to large sized evergreen and broad leaf tree that can grow upto the height of 70 m and its diameter can be about 4 to 7 feet. Because of their unique chemical makeup, several portions of this plant are both highly helpful medicinally and nutritionally. Its essential oil contains monoterpenes, sesquiterpenes, ethers, carboxylic acids, ketones, aldehydes, alcohols, and hydrocarbons in addition to esters and ethers. The plant's leaf oil contains 1,8-cineole, α-pinene, p-cymene, cryptone, and spathulenol, according to phytochemical analysis. On the other hand, α-thujene, 1,8-cineole, and aromadendrene are the main constituents of essential oil that is derived from buds, branches, and fruits. Due to these chemical compounds, Eucalyptus globulus is found to be a potential antimicrobial, anti-fungal, anti-viral, anti-inflammatory, analgesic, anti-nociceptive and anti-oxidant agent of nature. Some recent scientific investigations have also revealed that essential oil of Eucalyptus globulus also have anti-diabatic potentials that enhances its market value due to excessive usage in number of pharmaceutical products of traditional and advanced system of medicines.

INTRODUCTION

The enormous and unbreakable *Eucalyptus globulus* tree, also referred to as southern blue gum, was discovered for the first time on the island of Tasmania in 1792. It is one of the Myrtaceae family's big genera. There are over 900 different species of eucalyptus, and practically all of them may be found in Australia. Since its introduction

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Relevant conflicts of interest/financial disclosures: The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

as a fuel tree in 1843, eucalyptus has become a very prominent tree in India. *Eucalyptus globulus* is one of the more complicated species according to numerous searches, because it has four odd subspecies: *Eucalyptus bicostata*, *Eucalyptus pseudoglobulus, Eucalyptus globulus, and Eucalyptus maideni*i [1]. It is widely grown throughout India, including the Nilgiris, Annamalai, Palani, and Shimla hills. There are many different species of eucalyptus that are grown in a range of climates [2], but the most suitable one is found in warm, subtropical regions due to their high economic value. There are more than hundred species which have been seek in India at contrasting period of time and some species are below planting [1]. In recent years, there has been an increase in demand for products made from plants and their therapeutic applications. While this tree is used as a traditional asset by 80% of the population in poor countries, it is also a popular fitness care aromatic herb in many other countries, particularly in rural areas. According to Indian tradition, every plant has certain medicinal qualities, and since ancient times, the medicine has been used as a crucial source of antidote. Originally utilised for a variety of purposes including food and medicine.

2. Vernacular Names

Due to variations in geographical location or language that may differ from one region to another it is known by a number of Indian names, including: In Latin, *Eucalyptus globulus* is called Tail Parn; in Sanskrit it is commonly called Sugandh; in English we typically refer to it as Gum Tree or Gum Eucalypt; in Hindi it is most commonly known as Nilgir, Kannad as Nilgiri; and in Gujarat it is known as Harit Parn [1].

Scientific classification of Eucalyptus

Kingdom	**Plantae**
Divison	Magnoliophyta
Class	Magnolipside
Order	Myrtales
Family	Myrtaceae
Genus	Eucalyptus
Species	*Eucalyptus globules*

3.Botanical description

Leaves

Although the majority of eucalyptus species are evergreen, certain species shed their leaves at the end of the dry season. As a result, mature plants are typically very tall and fully leafed, with their leaves hanging towards the ground and providing patchy shade. The leaves of a mature eucalyptus tree are frequently lanceolate, petiolate, waxy, or glossy green, and they appear to alternate. The leaves are typically glaucous and oppositely sessile to the seedling, however there are numerous inconsistencies.

Bark

The eucalyptus bark may vary depending on the tree's age. As a result, even though eucalyptus bark is smooth, there are no particularly distinctive characteristics because the old bark dries up and sheds each year. there are also some species of eucalyptus which have fascinating multicolored bark such species are rainbow eucalyptus (Eucalyptus deglupta) native to the south East Asia.there are some more verities of eucalyptus tree which have stringy bark. In many species of eucalyptus dead bark is retained [3].

Flower

The most distinctive features of Eucalyptus species are their capsule-shaped or gum nut-shaped blooms and fruit.Fluffy stamens are found in large quantities on flowers. They can be pink, red, cream, pink, or yellow, among other colours. Stamens which are often confined within a cap

which is called as an operculum and this situation remain present in bud. Operculum is composed of both petals or fused sepals. Eucalyptus flower doesn't have petals to decorate themselves they have numerous stamens their most prominent feature which unite.

4. Chemical Composition

The essential oils obtained from the leaves, bare branches, flower buds and mature fruits of *Eucalyptus globulus* contain large number of highly valuable chemical compounds. The leaf oils were found to contain 1,8-cineole (4.10–50.30%) depending upon maturity and origin of their collection site. Other major components of the leaf oils were α-pinene (0.05–17.85%), p-cymene (trace-27.22%), cryptone (0.00–17.80%) and spathulenol (0.12–17.00%). In contrast, the essential oil of fruit, bud and branch oils is known to contain α-thujene (0.00%, 11.95% and trace respectively), 1,8-cineole (15.31%, 36.95% and 56.96% respectively) and aromadendrene (23.33%, 16.57% and 8.24% respectively). eucalyptus plants are now widely used in forest management for fuel, paper pulp and lumber.

5. Pharmacological Uses

Eucalyptus globulus oil is used as an anti-septic and anti-spasmodic stimulant agent in bronchitis, asthma and minor respiratory complaints [4]. By using externally, it has increasing effects on blood flow and skin temperature. Therefore, it has been used in semi-solid dosage forms for the treatment of cough, to promote scar formation in burns and injuries and as an anti-rheumatic agent. It is used as aninhalant because 1,8-cineole is a well-known medicinal component that causes a sensation of cold and this is accompanied with a facilitated respiration [5]. Thus, it is often inhaled in asthma, pharyngitis and related conditions.

5.1 Antimicrobial properties

Compared to pure 1,8-cineole, crude *Eucalyptus globulus* oil appears to be more effective against microorganisms cultivated in suspensions and biofilms [6]. While 1,8-cineole was inert against *Pseudomonas aeruginosa* and *Escherichia coli*, it was active against two gram-positive bacteria and had a beneficial effect on *Escherichia coli*.

5.2 Antifungal properties

It was discovered that *Eucalyptus globulus* oil worked well against filamentous and yeast-like fungi. MICs values between 0.025 and 1% (V/V) were found [7]. Two distinct strains of *Candida albicans* were used to investigate the anti-candida properties of the 30 plant oils. A concentration of 0.05% (V/V) was enough to inhibit their growth completely, MIC values of 2-8 mg/ml. Anti-fungal effects of *Eucalyptus globulus* oil were also observed against five Fusarium species.

5.3 Anti-Oxidative properties

Free radical which are release from the phagocytes through the process of infection which frequently induces inflammation [8]. The essential oil which is extracted are well known in order to prove the various component preserve cells from the destruction and dying such as free radicle or Reactive oxyden species [9]. These free radicle plays one of the important roles in the production of the energy as of the physiological point of view, in the living cell there are some biomolecule synthesize, phagocytosis as well as cell growth [10]. The extract mechanism that how the essential oil extracts his function on inflammatory cells are still not known [5].

5.4 Antihistaminic properties

From the leaves of the plant hexane gas is extracted, meanwhile ethanol is extracted from the fruit and leaves of the plant diffident Immunoglobulin E which depending upon the histamine and freeing from Rat Basophilic Leukemia-2H3[11].

5.5 Anti-Diabetic and Repellent properties

Eucalyptus globulus oil has been shown to have both repellant and anti-diabetic properties.

5.6 Antiplaque properties

Eucalyptus globulus which is very useful in inhibiting dental plaque formation [12].

5.7 Stimulant properties

Eucalyptus oil which is extracted from its various parts is used as a stimulant and antiseptic gargle. In terms of locally applied, it diminishes ssensibility. It also expands the cardic action [1].

5.8 Respiratory Disease

Since Ancient times eucalyptus *globulus* is used as a medicine and treats many diseases it is used in the treatement of bronchitis, asthma and many more [13].

5.9 Larvicidal properties

The leaves of *Euclyptus golobulus* has influential activity against *Culex quinquefasciatus* and *Culex tritaeniorhynchus* [14].

5.10 Analgesic/Anti-Nociceptive properties

Eucalyptus globulus oil induced analgesic effects. Analgesic effect was demonstrated by i.p. injection at doses of 10 or 100 mg/kg (rats, positive control: morphine; HED=1.6 and 16 mg/kg) and by subcutaneous injection at doses of 0.1, 10 and 100 mg/kg (acetic acid induced writhing mice; HED=0.16, 1.6 and 16 mg/kg). The effect of 1,8-cineole (oral administration) in mice on chemical (acetic acid and formalin) nociception. In the formalin test, a dosage of 400 mg/kg (HED=32.5 mg/kg) inhibited significantly the paw licking response while a dosage of 200 mg/kg (HED=16.2 mg/kg) inhibited only the second phase. The incidence of abdominal constriction response was found to be significantly less even in the lowest dose of 100 mg/kg (HED=8.1 mg/kg).

5.11 Anti-malarial properties

It cannot take place of cinchona because it confers some of the antimalaril action [1].

Conventional Uses and Medicinal Applications

The uses of eucalyptus oils are very vast and wide ranging because there are so many species. Traditionally, eucalyptus species have been used for supporting a healthy respiratory system and to soothe the muscles after exercise. The Australian Aborigines used the leaves for soothing physical and emotional discomfort. Unfortunately, with the broad uses and abundance of species some confusions, are faced and even exploitation of the consumer takes place. This is similar to the problems often encountered with other popular essential oils such as cinnamon essential oil and the Melaleuca species. Therefore, it is upto us as consumers and oil users to understand the plant and the oil so we can use the oils safely and correctly.

SUMMARY AND CONCLUSION

Eucalyptus is large genus of mostly very large trees of the myrtle family (Myrtaceae), native to Australia, Tasmania and nearby islands. More than 500 species have been described. In Australia, the eucalypts are commonly known as "gum trees" or "stringy bark trees". Many species are cultivated widely throughout the temperate regions of the world as shade trees or in forestry plantations. Economically, eucalyptus trees constitute the most valuable group within the order Myrtales. The leaves are leathery and hang obliquely or vertically. The flower petals cohere to form a cap when the flower expands. The fruit is surrounded by a woody, cup-shaped receptacle and contains numerous minute seeds. Possibly, largest fruits ranges from 5 to 6 centimeters (2 to 2.5 inches) in diameter are borne by *Eucalyptus globulus*, also known as the mottlecah or silver leaf, eucalyptus. The eucalypts grow rapidly and many species attain great height. *Eucalyptus globulus* the giant gum tree or mountain ash of Victoria and Tasmania, attains a height of about 90 meters (300 feet) and a circumference of 7.5 m. Eucalyptus wood is extensively used in Australia as fuel and the timber is commonly used in buildings and fencing.

ACKNOWLEDGEMENT

I am grateful to God for continuous support.

DISCLAIMER

All the information of research data and results are the original work of the co responding author.

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HOW TO CITE: Dr. Grace Cornelius*, Eucalyptus globulus in Modern Therapy: A Comprehensive Review, Int. J. of Pharm. Sci., 2025, Vol 3, Issue 2, 1326-1330. https://doi.org/10.5281/zenodo.14879159