



Review Article

## A review on phytochemistry and pharmacological activity of *Eucalyptus globulus*

Rahul Kumar<sup>1\*</sup>, Shilpa Rana<sup>2</sup>, Amandeep Singh<sup>3</sup>

<sup>1\*,2,3-</sup> Dev Bhoomi Institute Of Pharmacy And Research, Dehradun, Uttarakhand, 248007.

### ABSTRACT

The therapeutic value of *Eucalyptus globulus* plant, confirms the phytochemistry and pharmacological activity of *Eucalyptus globulus*, in this review article. It is widely observed plant having a tremendous latent in terms of medicinal uses. *Eucalyptus globulosa* plant from family Myrtaceae, commonly known as blue gum grow well in Nilgiris, and Shimla hills. It is rich source of phytochemical constituents which contain flavonoids, alkaloids, tannin and propanoids, which are present in leaves, stem, and root of the plant. They have various properties like anti-inflammatory, antibacterial, antiseptic, astringent, anti-diabetic, anti-oxidative, antiviral, antitumor, antihistaminic, anticancer cytochrome p450 inhibitor and hepatoprotective effect.

**Key words:** *Eucalyptus globulus*, phytochemistry, pharmacological activity.

**Corresponding Author:** Shilpa Rana, Dev Bhoomi Institute Of Pharmacy And Research, Dehradun, Uttarakhand, 248007

**E.mail:** shilparana9994@gmail.com

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### INTRODUCTION

*Eucalyptus Globules* is an evergreen, evergreen tree, one of the most widely grown indigenous trees in Australia. They usually grow from 30 to 55 m tall. The tallest tree known to date in Tasmania is 90.7 meters. *Eucalyptus globules*, discovered on the island of Tasmania in 1792 by French explorers, is one of the first eucalypt species described earlier[1]. The largest eucalypt forests in Tasmania were among the longest forests in the world and 110 *Eucalyptus globulus* trees were recorded. By the end of the 1800s at an altitude of 60-90 m, it was regularly harvested from southeastern Tasmania and exported worldwide by farmers [2]. *Eucalyptus globulus* is a member of the Myrtaceae. The perennial tree is also called gum blue and is called the cold tree. The leaves are brown, mixed directly or indirectly. Removal of eucalyptus leaf for the treatment of osteoporosis, asthma, skin rash and nose breathing in the swollen state of the respiratory tract [3].

### Biological Descriptions

#### Leaves

*Eucalyptus* leaves remain rare but some tropical plants lose their leaves when the season ends. Although mature *Eucalyptus* trees are usually tall and completely leafy [4].

### BOTANY OF PLANT

#### Origin and Distribution

*Eucalyptus globulus* is naturally distributed in Tasmania and southeastern Australia, but is now being developed and developed in parts of the world. The slopes in Africa are found in high places, especially in Ethiopia, where it was introduced in 1890. The introduction of the *Eucalyptus globulus* in Ethiopia is said to have played a major role in the country's development, and today the tree is an important Addis

Ababa and surrounding areas that can be used as firewood, charcoal, and building materials. It grows in South Africa, Lesotho and Swaziland [5].

#### Taxonomic status

<b>Kingdom</b>	Plantae
<b>Class</b>	Magnoliapsida
<b>Order</b>	Myrtales
<b>Family</b>	Myrtaceae
<b>Genus</b>	Eucalyptus
<b>Species</b>	Globulus
<b>Kingdom</b>	Plantae
<b>Class</b>	Magnoliapsida
<b>Order</b>	Myrtales

#### Vernacular names in Indian languages

English [3]	blue gum, eucalyptus, fever tree
Hindi [2]	safeda, yukeliptas
Kannada [6]	karpoora thaila vriksha, neelagiri thailada mara, neelgiri mara, nilagiri mara, taila, teilada
Malayalam [1]	Yukkalimaram
Sanskrit [5]	haritaparna, nilaniryasa, sugandhapatra, tailaparnah, tailaparni
Tamil [5]	kapura maram, karpuramaram, karupuramaram, nilappicin, yukkalimaram

#### Plant Description

##### Tree:

**Eucalyptus Globules** is semi deciduous aromatic small shrub or tree. Its stem is dark green to brownish in colour. It is 4-8.7m or 13-31 feet tall. The diameter of main stem is about 16cm [6].

##### Habitat:

*Eucalyptus globulus* will grow on a wide range of substrates, but it is especially common and widespread on soils derived from granite and grano-diorite rocks. It is best developed on moderately fertile loams or heavy, well-drained soil. Blue gum does not occur naturally on poorly- drained soils or on strongly-calcareous or alkaline soils[7].

##### Fruit:

The fruit is a woody conical or hemispherical capsule with the valves close to rim level. The leaves fruits and branches all have a strong 'eucalypt' fragrance and can be used as a 'pot pourri' in cupboards and drawers[8].

##### Leaf:

Dark green & dull green

Size of leaf- 12.5 cm in length & 3.5 cm in breadth

Shape of leaf- Lanceolate & oblong [9].

##### Venation names and leaf

Blue gum, Tasmanian blue gum, southern blue gum, fever tree (En).

Gommier bleu, arbre à fièvre (Fr).

Gomeiro azul, eucalipto comum (Po).

Mkaratusi (Sw) [9].

##### Stem and bark:-

Trees with **stem bark** lesions are frequently observed in *Eucalyptus globulus* Labill. plantations, particularly in the central west region of Uruguay. These lesions constitute a problem for trunk decortications at harvest and they also facilitate the access of fungi that could cause wood decay[10].

##### Flower:

The flowers, which are larger than those of other Tasmanian eucalypts, usually occur singly in the axils of the leaves. The flower-buds maybe up to three-quarters of an inch in diameter, they are coarsely ribbed, warty and are, as in all eucalypts, closed by an operculum or cap representing the sepals and petals[11].

##### Phytoconstituents

The essential oil of eucalyptus used in medicine is commonly found in fresh leaf water. It is waterproof or colored when properly prepared, with its aroma and character and its flavor, melting with the weight of alcohol. The most important properties are Eucalyptol, which is present in it. The globulus reaches 70% of its volume [12,13].

#### CHEMICAL COMPOSITION

### Chemical Constituents of the Leaves of *Eucalyptus Globulus*

The essential oils contain oxygenated monoterpenes, monoterpenes and oxygenated sesquiterpenes. Of these, 1, 8-eucalyptus (72.71%)  $\alpha$ -terpinene (2.54%), terpinene-4-ol (0.34%), and - linalool (0.24%) were the major oxygenated monoterpenes, while  $\alpha$ -eucalyptol (0.39%), (-) - globulol (2.77%), and eucalyptol (0.44%) were the major sesquiterpene. A few important nutrients were  $\gamma$ -terpinene acetate (3.1%), geranyl acetate (0.71%), L- pinocarveol (0.36%),  $\beta$ -sabinene (0.25%), and terpinolene (0.19%). Half (0.26%) of the total sites remain unknown [14].

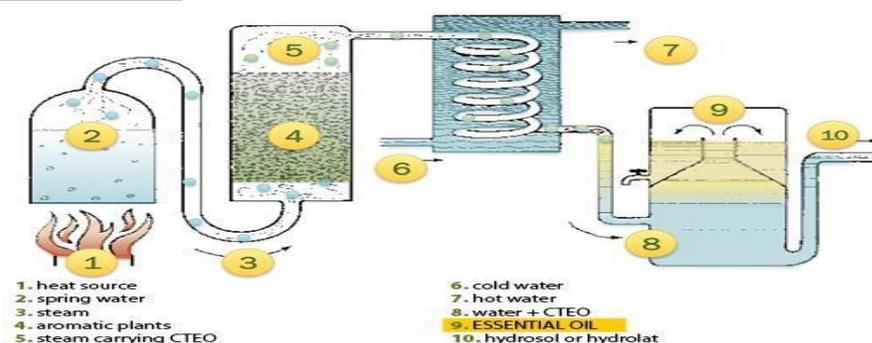
### Chemical Constituents in the Fruit of *Eucalyptus Globulus*

Fifteen compounds were identified and identified as beta-sitosterol, betulonic acid, stigmasterol, euscaphic acid, 2 $\alpha$ -hydroxybetulinic acid, macrocarpol B, macrocarpal A, oleanolic acid 3,4, 3-O-trimethylsuccinic acid, 3-O-methylsuccinic acid - 10- (2''-O-acetyl) -  $\alpha$ -L-rhamnopyranoside, 3-O-methylsuccinic acid, succinic acid and gallic acid [15].

### Constituents of the Wood of *Eucalyptus Globulus*

The major structure identified includes sterols, sterol esters, fatty acids, sodium ketones, hydrocarbon and triglycerides. Small chemicals such as fatty alcohol, mono- and diglycerides, wax and tocopherols are also identified among the lipids from the *Eucalyptus* wood. Sterols, sterol esters, fatty acids, steroid ketones, hydrocarbon and triglycerides were the major identified areas [16].

## THERAPEUTIC APPLICATIONS



*Eucalyptus* (Myrtaceae) is one of the most important and cultivated species in the world. In Australia, this species is the second largest, after *Acacia*, and contains about 750 species. *EA* expects effective treatment for mild inflammation of the respiratory tract and bronchitis. And in the apparent treatment of asthma, fever and throat are described by traditional medicine programs. Treatment of cystitis, diabetes, gastritis, kidney, kidney (not specified), laryngitis, leucorrhoea, malaria, dunes, ring, wounds, skin lesions, urethritis and vaginitis described in human medicine [18].

### Air Freshners

Most of *eucalyptus* oils are in aroma lamps, electric room diffusers, and spray mists. To make a simple mist spray, Dilute 50 to 100 drops or so of essential oils in 4 fluid ounce (120ml) of pure water. Spray to refresh and cleanse the air [19].

### Allergy

*Eucalyptus* is used in many of allergies [19].

- **Bronchitis:** A nagging cough that lingers and causes difficulty in breathing is often symptomatic of bronchitis.
- **Congestion:** Congestion in the airways, lungs, sinus and chest makes breathing difficult and being sick even more miserable.
- **Sinus:** The cold that linger may not be just a cold. The congestion and headache may be signs of a sinus infection.
- **Asthma:** *Eucalyptus* has been shown to help ease breathing in asthma [19]

### **Antiseptic**

The medicinal Eucalyptus oil is probably the most powerful antiseptic of its class, especially when it is old, as ozone is formed in its exposure to the air. It has decided disinfectant action, destroying the lower form of life [20].

### **Stimulant**

Eucalyptus oil is used as a stimulant and antiseptic gargle. Locally applied, it impairs sensibility. It increases cardiac action [20].

### **Antimalarial**

Its antiseptic confers some antimalarial action, though it cannot take place of Cinchona. Malarial infected mice treated with a standard antimalarial drug (0.68/8.4 mg/kg of Artemether/Lumefantrine) [21].

### **Anthelmintic action**

For some years Eucalyptus-chloroform was employed as one of the remedies in the tropics for hookworm. Due to the presence of phytochemical constituents such as borneol, cineol, linalool, geranyl acetate, saffrol, anethol due to which it exhibits anthelmintic action of different intestinal worms [21].

### **UTI and RTI Infection**

An emulsion made by stimulating equal parts of fat with gum-arabic fluid has been used as a urethral injection, and has also been given to lung cancer and other lung cancers and bronchitis [22].

### **Spasmodic action**

In cases of spasmodic croup throat, oil can be used externally [22].

### **Irritant action and parasitic Infection**

In large vessels, it acts as an irritant to the kidneys, in which large quantities are produced, and as a sign of depression which eventually terminates its action in the medullary center. In animal work. Eucalyptus oil is transmitted by cold tea, distemper dogs, to all animals with septicemia. It is also used for skin-related skin reactions [22].

### **Anti-inflammatory**

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### **Antihistaminic**

Hexane extraction of leaves, ethanol extract of fruits and leaves of Eucalyptus globulus prevented IgB-2H3-dependent IgE-IgE-cell production [24].

### **Antiviral**

Twelve bodies of Eucalyptus globules were tested and twenty-six herbs were tested for their inhibitory effects on the Epstein-Barr virus in a short in vitro assay. The results indicate that most of the euglobals had monoterpene properties, and euglobal-III had strong inhibitory activity. Grandinol, homograndinols have shown side effects [25].

### **Antitumor**

Antitumor activity of Euglobals Ia1, Ia2, Ib, Ic, IIa, IIb, IIc, III, IVa, IVb, and V and VII were evaluated in vitro by 12-O-tetradecanoylphorbol-13-acetate (TPA) - Updated Epstein - The Barr virus antigen (EBV-EA) program is a rapid screening program. Euglobal-III showed strong inhibitory activity, followed by euglobals Ib, IIa, Ic, Ia1, Ia2. Eucalyptus globulus oil inhibits the delivery of NPS-induced NF-kappa B to other THP-1 cells [26].

### **Antifungal**

Treatment of demodicidosis of the human face with freshly prepared camphor oil (Eucalyptus globulus) with or without glycerol dilutions was given full treatment with concentrations of 100%, 75%, and 50%. Extraction of Eucalyptus globulus leaves and oil showed antifungal properties as they slowly blocked the growth of Malassezia furfur in Sabouraud's extrose agar medium [27].

### Antiplateque

*Eucalyptus globulus* may be useful in inhibiting dental plaque [28].

### Cytochrome p450 enzymes inhibitor

*Eucalyptus* oil (*Eucalyptus globulus*), is identified as inhibitor of six major cytochrome P450 enzyme with IC (50) values between 20 and 1000µg/MI [29].

### Larvicidal

*Eucalyptus globulus* leaves were found to be potent against *Culex quinquefasciatus* and *Culex tritaeniorhynchus* (larvicidal activity) [30].

### Nerve Blocker

Terpineol, a low-toxic alcohol modifier, is widely used in the perfume industry. An important part of essential oils for many medicinal plants and aromatherapy. Terpineol, a powerful non-toxic chemical, is part of the *Eucalyptus globulus* (*Eucalyptus*) essential oil, widely used in human medicine and aromatherapy. Effects of terpineol on potential energy (CAP) for ratpineol-based rat neurological studies including cell-based blockade [31].

### Antibacterial effect

These results suggest further studies to elucidate the role of E-cell therapy. International guidelines for the treatment of respiratory diseases are being approved [32].

### Neurophysiologic effect

The effects of eucalyptus oil preparation on parameteriologic, psychosocial and psychology in algesimetric research have been a Study in 32 32 in blind, -placebo-control, and randomized research. Four different arrangements were made for the forehead and the use of the temple [33].

### Antidiabetic effect

The leaves of eucalyptus globulus are used in the treatment of sugar in traditional medicine. The purpose of this study was to evaluate the effects of eucalyptus on damage caused by pancreatic trees by synthetic methods.

The result revealed that *Eucalyptus globules* in the form of tin allowed diabetics to save part of pancreatic beta cells and repair the damage itcaused by STZ in mice. Studies show a beneficial effect of eucalyptus in the treatment of diabetes [34].

### Antioxidant effect

Unripe extracts from fruits of *Eucalyptus globules* were analyzed for their in vitro antioxidant characteristics. These results suggest that *E.globulus* fruits have interesting antioxidant activities [34].

### Anticancer effect

Methanolic extract of *Eucalyptus globulus* and *Tinosopra Cordifolia* was grown in a toxic environment and the industry investigated their anticancer activity against MCF-7 breast cancer cell lines to study the effect of cytotoxicity [35].

### CONCLUSION

Literature studies show that *Eucalyptus globulus* is very useful in medical treatment. The chemicals in the plant such as aromatic oils are used in medical treatment. Other types of eucalyptus have been widely used in their therapeutic applications such as analgesic, antifungal, antifungal, anti-inflammatory, antibacterial, antidiabetes, antioxidative, antiviral, antitumor, anticancer, hepatoprotective. The main chemical structure (1-8 cineole) is responsible for various functions. This structure is present in its leafy oil, also known as eucalyptol. Essential oils are a common group of natural products present in aromatic plants. Crude oil and other plant extracts are of interest as a natural product source.

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