A REVIEW ON EUCALYPTUS GLOBULUS: A DIVINE MEDICINAL HERB

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ABSTRACT
Eucalyptus globulus a widely observed plant has a tremendous latent in terms of medicinal uses. Continentally it contains different chemical constituents. This review comprise pharmacological aspects of Eucalyptus globulus ensure its diversified strengths in various human & animal therapies. Eucalyptus globulus is a rich source of phytochemical constituents which contain flavonoids, alkaloids, tannins and propanoids, which are present in the leaf, stem and root of the plant. Numerous studies have shown that Eucalyptus globulus exhibit various properties like anti-inflammatory, anticancer, antibacterial, antiseptic and astringent. The present review articles critically discusses about various phytochemicals associated with the plant. As it has a reputable octane rating, it can be used as a fuel in its own right but production costs are currently too high for the oil to be economically viable as a fuel. Though eucalyptus has some of the arguments against it like restricting germination of other species, detrimental to soil micro and macro fauna, new studies on water consumption of Eucalyptus contradict this myth.

Key words: Eucalyptus globulus, antiseptic, microbic, Urinary Tract Infection (UTI), Respiratory tract infection (RTI).

INTRODUCTION
Eucalyptus globulus was discovered in islands of Tasmania in 1792 by French Explorers. Eucalyptus trees are quick growers and many species reach a great height. Eucalyptus trees are quick growers and many species reach a great height. Eucalyptus amygdalin (Labille) is the tallest known tree, specimens attaining as much as 480 feet, beyond in height even the
Californian Big Tree (*Sequoia gigantea*). Many species yield valuable timber, others oils, kino, etc. Genus Eucalyptus contains about 600 species of all the species, *Eucalyptus globulus* is the most widely cultivated in subtropical and Mediterranean regions. It necessarily follows that the term Eucalyptus oil is meaningless from a scientific point of view unless the species from which it is derived is stated. There are a great number of species of Eucalyptus trees yielding essential oils, the foliage of some being more odorous than that of others, and the oils from the various species differing widely in nature. The Aborigines (native Australians) have traditionally used eucalyptus leaves to heal wounds and fungal infections. Leaf extracts of eucalyptus have been approved as food additives, and the extracts are also currently used in cosmetic formulations.

**Description**

The leaves are leathery in texture, hang diagonally or vertically, and are studded with glands contain a fragrant volatile oil. The flowers in bud are enclosed with a cup-like covering (hence the name of the genus, derived from the Greek *eucalyptos* well-covered), which is unnerved off as a lid while the flower expand. The fruit is bounded by a woody, cup shaped container and contains abundant minute seeds.

The Eucalyptus industry is becoming of financial importance to Australia, especially in New South Wales and Victoria. Many of the aged species which give the oil of buying have given way to other species which have been found to have better yield or improved oils. About twenty-five species are at the present time being utilize for their oil.

The oils may be roughly divided into three classes of commercial importance:

1. The Medicinal Oils, which contain substantial amounts of eucalyptol (cineol). The Industrial Oils, containing terpenes, which are used for flotation purposes in mining operations.
2. The Aromatic Oils, such as *E. citriodora*, which are characterize by their aroma. The different groups of barks are:
   - **Stringybark** - consists of strands which can be pulled off in long pieces. It is usually thick with a spongy texture.
   - **Ironbark** - is hard, rough and deeply furrowed. It is soaked with dried sap exuded by the tree which gives it a dark red or even black colour.
   - **Tessellated** - bark is broken up into many distinct flakes. These flakes are like cork and can flake off.
• **Box** - has short fibres.
• **Ribbon** - this has the bark coming off in long thin pieces but still loosely attached in some places. The pieces can be long ribbons, firmer strips or twisted curls.

**Synonyms** - Blue Gum Tree, Stringy Bark Tree, Blue Mallee, Blue Mallee Oil, Eucalipto, Eucalypti Folium, Eucalyptol, Eucalypt Oil, *Eucalyptus blatter*, *Eucalyptus bicostata*, Eucalyptus Essential Oil, Eucalyptus Oil, *Eucalyptus fructicetorum*, *Eucalyptus globulus*, Eucalyptus Leaf.

**Part used widely** - The oil of the leaves.

**Habitat** - Australia, North and South Africa, India and Southern Europe.

**Morphological Characters**
The flowers in bud are covered with a cup-like membrane (hence the name of the genus, derived from the Greek *eucalyptos* well-covered), which is thrown off as a lid when the flower expands. The fruit is surrounded by a woody, cup shaped receptacle and contains numerous minute seeds. The first leaves are broad, without stalks, of a shining whitish-green and are opposite and horizontal, but after four or five years these are succeeded by others of a more sword-shaped form, 6 to 12 inches long, bluish-green in hue, which are alternate and vertical, i.e. with the edges turned towards the sky and earth, an arrangement more suited to the climate and productive of peculiar effects of light and shade. The flowers are single or in clusters, almost stalkless.

An adult eucalyptus may take the form of a low shrub or a very large tree. There are three main behaviors that species can be divided into.

1. Forest trees are single-stemmed and have a crown form a minor amount of the whole tree height.
2. Woodland trees are single-stemmed even though they may branch at a small space above ground level.
3. Mallees are multi-stemmed from position level, usually less than 10 m (33 ft) in height.

Tree sizes follow the convention of:
• **Small** — to 10 m (33 ft) in height
• **Medium-sized** — 10–30 m (33–98 ft)
• **Tall** — 30–60 m (98–197 ft)
• **Very tall** — over 60 m (200 ft)
Classification\textsuperscript{[4]}

Kingdom- \textit{Plantae} – Plants  
Subkingdom -\textit{Tracheobionta} – Vascular plants  
Superdivision- \textit{Spermatophyta} – Seed plants  
Division- \textit{Magnoliophyta} – Flowering plants  
Class- \textit{Magnoliopsida} – Dicotyledons  
Subclass-\textit{Rosidae}  
Order- \textit{Myrtales}  
Family-\textit{Myrtaceae} – Myrtle family  
Genus -\textit{Eucalyptus L'Hér.} – gum  

\textbf{Chemical constituents}
The essential Oil of Eucalyptus used in medicine is obtained by aqueous distillation of the fresh leaves. It is a colorless or straw-colored fluid when properly prepared, with a
characteristic odour and taste, soluble in its own weight of alcohol. The most important constituent is Eucalyptol, present in \textit{E. globulus} up to 70 per cent of its volume.

Various other ingredients with different proportions are observed in various regions across the continents. These can be illustrated as,

- \textbf{China}\textsuperscript{[5]}: 1, 8-eucalyptol, \(\alpha\)-pinene, \(\alpha\)-terpineol, globulol, \(\alpha\)-terpineol acetate and alloaromadendrene
- \textbf{Spain}\textsuperscript{[6]}: 1,8-cineole depending upon maturity and origin of their collection site. Other major components of the leaf oils were \(\alpha\)-pinene, \(\rho\)-cymene, cryptone and spathulenol. In contrast, the fruit, bud and branch oils contained \(\alpha\)-thujene and trace,1,8-cineole and aromadendrene.
- \textbf{Nigeria}\textsuperscript{[7]}: oxygenated monoterpenes with terpinen-4-ol as the most abundant constituent. Other notable compounds include \(\gamma\)-terpinene, spathulenol, \(\rho\)-cymene and \(\rho\)-cymen-7-ol. Globulol and \(\alpha\)-phellandrene.
- \textbf{Ethiopia}\textsuperscript{[8]}: 1, 8-cineole, cis-ocimen, \(\alpha\)-terpineolacetate, \(\alpha\)-terpineol, aromadendrene, globulol, \(\beta\)-pinen, \(\beta\)-myrcene, 4-terpineol and camphene.

\textbf{Steam Distillation Process Of Eucalyptus Oil}\textsuperscript{[9]}

\textbf{Medicinal Action}

Stimulant, antiseptic, aromatic
Medicinal Uses

Air Fresheners \[10\]
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 ounces (120ml) of pure water. Spray to refresh and cleanse the air.

Allergy \[10\]
Eucalyptus is used in many of allergies
- 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 just be a cold. The congestion and headache may be signs of a sinus infection.
- Asthma: Eucalyptus has been shown to help ease breathing in asthma.

Antiseptic \[11\]
The medicinal Eucalyptus Oil is probably the most powerful antiseptic of its class, especially when it is old, as ozone is formed in it on exposure to the air. It has decided disinfectant action, destroying the lower forms of life. Internally, it has the typical actions of a volatile oil in a marked degree.

Stimulant \[11\]
Eucalyptus Oil is used as a stimulant and antiseptic gargle. Locally applied, it impairs sensibility. It increases cardiac action.

Antimalarial \[12\]
Its antiseptic properties confer some antimalarial action, though it cannot take the place of Cinchona.

Anthelmintic action \[12\]
For some years Eucalyptus-chloroform was employed as one of the remedies in the tropics for hookworm, Due the presence of Phyto chemical constituents such as borneol, cineol, linalool, gernayl acetate, saffrol, antheol due to which it exhibit anthelmintic action of different intestinal worms.
UTI AND RTI Infection \cite{13}
An emulsion made by shaking up equal parts of the oil and powdered gum-arabic with water has been used as a urethral injection, and has also been given internally in drachm doses in pulmonary tuberculosis and other microbic diseases of the lungs and bronchitis.

Spasmodic action \cite{13}
In croup and spasmodic throat troubles, the oil may be freely applied externally.

Irritant action and Parasitic Infection \cite{13}
In large doses, it acts as an irritant to the kidneys, by which it is largely excreted, and as a marked nervous depressant ultimately arresting respiration by its action on the medullary centre. In veterinary practice, Eucalyptus Oil is administered to horses in influenza, to dogs in distemper, to all animals in septicemia. It is also used for parasitic skin affections.

Antihistaminic \cite{14}
Hexane extract of leaves, ethanol extract of fruits and leaves of Eucalyptus globulus inhibited IgE dependent histamine release from RBL-2H3 cells 42.

Anti-inflammatory \cite{14}
1,8-cineole, major constituent present in volatile oil of Eucalyptus globulus is a strong inhibitor of cytokines, that might be suitable for long term treatment of airway inflammation in bronchial asthma and other steroid-sensitive disorders.

Arguments Against Eucalyptus And Contradiction To Some Myths \cite{15}
1. Eucalyptus is water exhaustive, and reduces water available for other species, successfully out-competing them. In arid areas, the consequent control of other plant life, coupled with a high water demand, reduces soil moisture, prevent the recharge of groundwater, and can reduce local water tables. This is exacerbate by a high transpiration rate analytical of the inefficient use of water.

2. Eucalyptus is nutrient exhaustive, which creates deficit for other plant life, a process that is exacerbating by its low returns in leaf waste to the soil. Thus it does not hold the building of humus, and by implication, does not contribute to the long-standing fertility of the soil, as other species might resulting in an overall nutrient insolvency of the soil.
3. Eucalyptus is poisonous, due to allopathic properties, which serve to reduce not only other plant life, including crops, by restricting germination of other species, but is also detrimental to soil micro and macro fauna.

However, recent studies on water consumption of Eucalyptus contradict this myth. A forestry savings body in Minas Gerais, a region of Brazil, has recently conducted a series of studies into the consumption of water in eucalyptus plantation. The data showed that, from an annual rain rate of 1299.0 mm, 57.1% (741.0 mm) was taken up by eucalyptus trees in the process of transpiration, 9.8% of the total rainfall (128, 0 mm) was evaporated (evaporation is the direct transfer of water from the surface of plants and soil to the atmosphere). Between 0.5 to 1.3% (16.9 mm) were in use directly from the soil surface and 31.8% (414.0 mm) infiltrate the soil and refill the water course.

The conclusions drawn were that transpiration of 741.0 mm per year or 2.3 mm per day is similar to other forest species and persistent crop species and therefore, the information generated suggests that groves of eucalyptus trees do not consume excessive quantity of water. The nutrients in soil around Eucalyptus were also quantified, and it was observed that the effect of this plant is almost same as any other normal tree. Considering the benefits we get from Eucalyptus, we should promote growth of this plant without any bias.

CONCLUSION
The wide survey of literature revealed that Eucalyptus species is an important Source of many pharmacologically and medicinally important chemicals, such as Essential oils, terpenoids which have been use in aromatherapy. A variety of Eucalyptus Species have also been widely studied for their various pharmacological activities like analgesic, antifungal, anti-inflammatory, antibacterial, antidiabetic, antioxidative, Antiviral, Antitumor, antihistaminic, anticancer cytochrome p450 inhibitor and hepatoprotective properties. Although aromatherapy is pleasant, inexpensive, and has little side effects (except for rare allergies), there is little evidence that it is effective in patients undergoing medical interventions.

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