wjpmr, 2023,9(6), 88-94

SJIF Impact Factor: 5.922

WORLD JOURNAL OF PHARMACEUTICAL AND MEDICAL RESEARCH

www.wjpmr.com

Review Article

ISSN 2455-3301

WJPMR

A REVIEW ON MEDICINAL PROPERTY OF EUCLAPYTUS PLANT

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Article Received on 11/04/2023 **Article Revised on 01/05/2023** **Article Accepted on 21/05/2023**

ABSTRACT

Eucalyptus is the most generally established hardwood crop in the tropical and subtropical world on account of its prevalent development, wide versatility and multipurpose wood properties Eucalyptus globulus is a shrubby plant or a blossoming tree having a place with the family Myrtaceae. The current review article critically examines a variety of plant-related phytochemicals as well as the plant's diverse therapeutic uses major objectives of this study were to assess the herbicidal potential of E. globulus leave the primary component that was isolated from eucalyptus leaves showed antibacterial and anti-inflammatory properties. One of the most extensively planted genera in the world today is the eucalyptus. The frequently observed Eucalyptus globulus plant has a wide range of potential medical applications. It contains considerable amounts of flavonoids, alkaloids, tannins, and propanoids, among other phytochemical components. Which are available in leaves, steam, and foundation of the plant there are numerous medicinal properties of eucalyptus, some of which have been supported by pharmacological and clinical research. It is advised that more clinical research be done to confirm the beneficial pharmacological activity of E. globulus. Currently used medications include antibiotics and other pharmaceuticals, however, they have certain negative effects. Antioxidant essential oils have been utilized for a variety of ailments from the beginning of time and have become more and more popular. The phytochemical and pharmacological investigations discussed in this review attest to Eucalyptus globulus' medicinal benefits. Phytochemicals derived from plants have been promoted as effective replacements for several ailments. Numerous research has demonstrated the wide range of qualities exhibited by Eucalyptus globulus, including anti-inflammatory, anticancer, antibacterial, antiseptic, and astringent effects.

INTRODUCTION

French explorers found eucalyptus globulus in Tasmanian islands in 1792.[1] The most common kind of eucalyptus grown in subtropical and Mediterranean areas is the eucalyptus globulus.[1] The Myrtaceae family includes the evergreen, tall tree or shrub known as eucalyptus. Despite being native to Australia and Tasmania, it has spread widely to other nations. There are roughly 700 species of eucalyptus, and more than 300 of them have leaves that yield volatile oil. Pharmaceutical, toiletry, cosmetic, and food industries all employ the essential oils of different eucalyptus species.[2] Pharmaceutical, toiletry, cosmetic, and food industries all employ the essential oils of different eucalyptus species.[2] Eucalyptus trees are one of the most significant hard wood forestry crops in the world and are a significant supply of pulp wood for the manufacture of fine paper. Eucalyptus gum is used for diarrhoea and as an astringent in dentistry, while eucalyptus wood is utilised for building and fuel.[2] Eucalyptus leaf extracts have been authorized for use as food additives, and they are also currently incorporated into cosmetic products.[3] Gargling with eucalyptus oil acts as an antibacterial and stimulant. It accelerates the heartbeat. Therefore, unless the species from which it is obtained is specified, the term "Eucalyptus oil" is scientifically useless. Several different kinds of Eucalyptus trees produce essential oils, with some having more pungent foliage than others and the oils from the various species having quite different properties. Eucalyptus leaves have long been utilized by the Aborigines (original Australians) to treat wounds and fungus diseases.[3] The plant thrives in Shilong, Himachal Pradesh's Annamalai, and Palni hills, as well as the Nilgiris (5,000–8,300 feet) in India.[4] One of the largest and fastest-growing genera in the world is Eucalyptus L'He'ritier (Myrtaceae). With roughly 750 species, this genus is the second biggest in Australia, behind Acacia.[5] Flavonoids, phloroglucinol derivatives, and tannins are among the biologically active terpenoids and polyphenols that are abundant in myrtaceous plants.[6]

Due to their economic worth, various eucalyptus species are grown, especially in subtropical and warm climate zones. In India, some 100 species have been tried at various times; some of them are now being cultivated.[7] The oil can be administered externally without restriction

for croup and spasmodic throat issues. The oil is a component of "Catheter oil," a lubricant and sterilizer for urethral catheters. Also given to horses, dogs, and animals with septicemia is eucalyptus oil. Its extract is frequently used to cure pyorrhea (gum disease), treat parasitic skin infections, and prevent infections after burns[8] The essential oils of Eucalyptus species also have significant biological effects, such as expectorant, diaphoretic, antimalarial, antiseptic, analgesic, anti inflammatory, and bactericidal characteristics.[10] In many cultures around the world, Eucalyptus globulus Labill. (Myrtaceae) is utilised as a home cure for a number of ailments, including microbiological infections.[12] The volatile components of essential oils from various eucalyptus species have been the subject of numerous studies. Additionally, numerous publications have identified the chemical composition of essential oils extracted from leaves immature blooms, and most recently fruits.[13,14] The majority of Eucalyptus research has mostly focused on the composition and biological activities of the essential oil derived from the leaves, finding significant antibacterial effects. Scientists and environmentalists all around the world are fascinated by E. globulus [14]. Essential oils have primarily been used in perfumes and cosmetics, despite their extensive chemical compositionSeveral pharmacological effects of E. globulus leaf extracts have been demonstrated in vivo and/or in vitro research E. globulus leaf extracts have also been employed as food additives due to their antioxidant potential. Eucalyptus leaf extracts have been permitted as food additives, and the extracts are also utilized in cosmetic compositions. Due to their potent aroma, essential oils have mostly been used in food flavouring, cosmetics, and perfumes. The bark is one of the primary by products in the eucalyptus industry.[15]

Classification of Plantae[11]

KINGDOM	PLANTAE
Sub-kingdom	tracheobionta
Super-divison	spermatophyte
Division	magnoliophyta
Class	dicotyledons
Sub-class	rosidae
Order	myrtale
Family	myrtaceae
Genus	eucalyptus
Species	eucalyptus globulus labill

Major Species[15]

There are about 700 species of eucalyptus. Some of them are given below

- Eucalyptus amygdalina
- Eucalyptus microtheca
- Eucalyptus australiana
- Eucalyptus nitens
- Eucalyptus botryoides
- Eucalyptus ovate
- Eucalyptus calophylla
- Eucalyptus pauciflora
- Eucalyptus camaldulensis
- Eucalyptus perriniana
- Eucalyptus citriodora.
- Eucalyptus pilularis
- Eucalyptus cladocalyx
- Eucalyptus polyanthemos
- Eucalyptus consideniana
- Eucalyptus polybractea
- Eucalyptus cypellocarpa.
- Eucalyptus populnea
- Eucalyptus dives
- Eucalyptus radiate
- Eucalyptus gigantean
- Eucalyptus regnans
- Eucalyptus globulus
- Eucalyptus risdonni
- Eucalyptus gomphocephala
- Eucalyptus robusta
- Eucalyptus grandis
- Eucalyptus rossi
- Eucalyptus gunnii
- Eucalyptus rostrata
- Eucalyptus incrassate
- Eucalyptus saligna
- Eucalyptus kino
- Eucalyptus sideroxylon
- Eucalyptus largeflorens
- Eucalyptus sieberiana
- Eucalyptus lesouefii
- Eucalyptus smithii
- Eucalyptus macrocarpa
- Eucalyptus tereticornis
- Eucalyptus macrorhyncha
- Eucalyptus tetrodonta
- Eucalyptus maculate
- Eucalyptus umbra
- Eucalyptus marginata
- Eucalyptus urophylla
- Eucalyptus melanophloia
- Eucalyptus viminalis
- Eucalyptus melliodora
- Eucalyptus wandoo

Some Basic Fact About Eucalyptus

Botanical name- *Eucalyptus Globulas Labill*
Family- Myrtle
Sanskrit/Indian name- Tailapatra, sugandhapatra
Plant parts used- Mainly oil of leaves is used.

Geographical Distribution

E.'s typical geographic distribution Between latitudes 31 and 43 degrees S, only Tasmania, Victoria, and New South Wales are home to globulus. The Otway Ranges, islands in the Bass Straits, south eastern Tasmania, and Wilson's Promontory in Victoria are the places where this species is most prevalent.16 The majority of India's eucalyptus is produced in a select few states, including Andhra Pradesh, Telangana, Tamil Nadu, Punjab, Haryana, and Karnataka, meeting the needs of the paper, pulp, and lumber sectors.[17]

Description[18]

The leaves have a leathery texture, hang vertically or diagonally, and are covered in glands that secrete an aromatic volatile oil. The genus name, which comes from the Greek for "well-covered," "eucalyptus," refers to the cup-shaped covering that keeps the flower in its bud closed while it expands. The fruit is surrounded by a woody cup-shaped structure and is filled with numerous tiny seeds.

Vernacular Name:[18]

There are numerous Indian names for it, depending on the locale or language, such as Harit Parn,

- Tail Parn,
- Sugandh Patra (Sanskrit)
- Gum Tree, Gum Eucalypt (English),
- Neelgir (Hindi),
- Nilgiri (Kannad),
- Eucalyptus globulus (Latin name) (Gujrati).

Morphological Characterstics

The name of the genus, which is derived from the Greek eucalyptus well-covered, comes from the cup-like membrane that covers the flowers as they are in the bud and is thrown off as a lid as the flower opens up. A woody, cup-shaped receptacle surrounds the fruit and is filled with countless tiny seeds. The first leaves are broad, without stalks, whitish-green, opposite, and horizontal. After four or five years, however, these are replaced by others that are more sword-shaped, 6 to 12 inches long, bluish-green in color, alternate, and vertical, that is, with the edges turned towards the sky and earth, an arrangement that is more conducive to the climate and produces unusual effects of light and shade [19].The standard for tree diameters is:

- Small, up to 10 metres (33 feet) tall
- Medium-sized, 10 to 30 metres (33-98ft)
- Tall - 30-60m (98-197 ft.)
- Very tall, over 60 metres (200ft)[20]

Fig. 1: Flower of E.G [21]

Fig. 2: Fruit of E.G.[22]

Fig. 3: Leaves of E.G.[23]

Fig. 4: Whole tree of E.G.

Appearance: The eucalyptus globulus tree has a strong scent. typically reaches heights of 150-180 feet (45.7-54.9 metres) and diameters of 4 to 7 feet (1.2-2.1 m). a well-developed crown, a straight stem that extends to nearly two-thirds of its height.

Leaves: While almost all eucalyptus species retain their leaves throughout the year, certain tropical varieties do not. The leaves of the eucalyptus have oil glands just like those of other myrtle species. The abundance of oils generated is a key characteristic of the genus. Despite being high and fully leafed, mature Eucalyptus trees' shadow is typically spotty because the leaves typically droop downwards.[20]

The leaves are big, leathery, glossy, and dark green. There are between 5.9 and 7.9 inches of average length (15-20 cm). Round, opposing, and horizontal leaves are present on the juvenile branches. On the underside of the leaf, a thicker, grey, waxy bloom is present.

Fruit and flower

The unique blooms and fruit of Eucalyptus species are their most easily recognizable features (capsules or "gumnuts"). Flowers have several fluffy stamens that can be white, cream, yellow, pink, or red. When a flower is in bloom, the operculum, which is made of fused sepals, petals, or both, covers the stamens. As a result, flowers lack petals and instead adorn themselves with numerous, showy stamens. One of the characteristics that connect the genus is the operculum's being driven off and separating away from the cup-like base of the flower as the stamens expand.[20]

The axils give way to flat stalks with solitary, white blooms that contain plenty of stamens. They are about 1.6 and 2.2 inches (or 4 and 5.5 cm) wide. a warty lid made of sepals and petals that forms a bud and separates during flowering. blossoms between December and May.[18]

A woody, globular capsule serves as the fruit. Fruit diameter ranges from 0.8 to 1 inches (2–2.5 cm). The many seeds measure roughly 0.08 by 0.04 inches (2 x 1 mm). Dark brown seeds are surrounded by reddish red chaff.

Parts widley used- oil of leaves

Bark

Fig. 5: Bark of E.G.[22]

Bark[20]: Every year, all eucalypts add a layer of bark, and the top layer degrades and dies. About half of the species lose their dead bark, revealing a brand-new covering of living, fresh bark. Large slabs, ribbons, or tiny flakes of dead bark can all be shed.[20]

Various varieties of bark that are frequently recognised include[20]

- Long fibres make up stringybark, which can be removed in bulky sections. It typically has a spongy texture and is thick.
- Ironbark is tough, coarse, and thoroughly raked. It is dyed a dark red or even black colour because to dried kino, a sap secreted by the tree.
- Tessellated: The bark has been divided into numerous separate flakes. They can flake off and are corky.
- Box possesses short fibres. Some exhibit tessellation as well.
- Ribbon—has long, thin bits of bark peeling off, but in some places is still weakly attached. They could be thicker stripes, lengthy ribbons, or twisted curls.

Adult eucalyptus trees can develop into very large trees or low bushes. Depending on their habits, species can be divided into three categories.

1.Forest trees are single-stemmed, and the height of their crowns is only a small part of their total height.
2. Despite the fact that certain woodland trees may branch temporarily above ground, they all have a single stem.
3. Mallees are multi-stemmed trees with a normal height of less than 10 m (33 ft), growing from the ground up. The accepted range for tree diameters is as follows: *Small: 33 feet (10 metres) *Medium: 33 to 98 feet (10 to 30 metres) *Tall: 98 to 197 feet (30 to 60 metres) *Very tall: 200 feet (60 metres)

Phytoconstituent

Aqueous distillation of the fresh leaves yields the eucalyptus essential oil that is used in medicine. When properly manufactured, it is a colourless or straw-coloured fluid with a distinctive flavour and odour that dissolves in its weight of alcohol. Eucalyptol, a crucial component, is found in E. 70% of the total volume of the globulus.[11]

In many parts of the world, additional substances in varied ratios are used. world's continents. These examples include,

- Chinese compounds include 1, 8-eucalyptol, -pinene, -terpineol, globulol, and -terpineol acetate. alloaromadendrene Depending on the maturity and origin of the collection location.[24]
- Spain: 1,8-cineole. Other The leaf oils' main ingredients were p-cymene, cryptone, cryptone, and spathulenol. In The fruit, blossom, and branch oils, in contrast, included traces of 1,8-cineole, -thujene, and aromadendrene.[25]
- Nigeria:oxygenated monoterpenes, the most prevalent of which is terpinen-4-ol constituent. Other noteworthy substances include -terpinene, -cymene, -cymen-7-ol, -globulol, and -phellandrene. 1, 8-cineole, cis-ocimen, -terpineolacetate, -terpineol, aromadendrene.[26]
- Ethiopia:camphene, 4-terpineol, 4-pinene, and globulol.[27]

Chemical Constituent of Leaves[18]: The oxygenated monoterpenes, monoterpenes, and oxygenated sesquiterpenes made up the majority of the essential oil.

Oxygenated monoterpens	Sesquiterpene	Other significant compound
1,8-eucalyptus (72.71%)	a-eudesmol (0.39%)	Terpineol acetate (3.1%)
Terpined (2.54%)	Globulol (2.77%)	Geranyl acetate (0.71%)
Terpined-4-ol (0.34%)	Epilobulol(0.44%)	L pinocarveol (0.36%)
Linalool (0.24%)		B-sabinene (0.19%)
		Terpinolene (0.19%)

The majority of the essential oil was composed of oxygenated monoterpenes, sesquiterpenes, and monoterpenes. While the primary sesquiterpenes were -eudesmol (0.39%), (-)- globulol (2.77%), and epilobulol (0.44%), the most oxygenated monoterpenes of these were 1, 8-eucalyptus (72.71%), followed by -terpined (2.54%), terpiene-4-ol (0.34%), and linalool (0.24%). Among the notable compounds were terpineol acetate (3.1%), geranyl acetate (0.71%), Lpinocarveol (0.36%), -sabinene (0.25%), and terpinolene (0.19%). There are still 0.26 percent of the total constituents that are unknown.

Chemical Constitute Of Fruits[28]

1.Betasitosterol
2.Betulinic acid
3.Stigmasterol
4.Euscaphic acid
5.2ahydroy betulinic acid
6.Macrocarpol A
7.Macrocarpol B
8.Ellagic acid
9.Gallic acid
10.3-o-methylellafic acid
11.Oleanolic acid 3,4,3-o-trimethylelladic acid

Betasitosterol, betulinic acid, stigmasterol, euscaphic acid, 2ahydroybetulinic acid, macrocarpol B, macrocarpal A, and oleanolic acid were among the fifteen chemicals discovered. 3-Omethylellagic acid and 3,4,3-trimethylelladic acid Gallic acid, 3-O-methylellafic acid, ellagic acid, and 4-O-(2"-O-acetyl)-alpha-Lrhamnopyranoside.

Chemical Constitute of Bark And Wood[29]

Major compound	Minor compound
Sterols	Fatty alcohol
Sterol esters	Waxes
Fatty acid	Mono-giycerides
Steroid ketones	Di-giycerides
Hydrocarbon	Tocopherols
Triglycerides	

Sterols, sterol esters, fatty acids, steroid ketones, hydrocarbons, and triglycerides were among the primary substances found.Among the lipids from E. globulus wood, minor compounds such fatty alcohol, mono- and digiycerides, waxes, and tocopherols were also found. The main compounds found were sterols, sterol esters, fatty acids, steroid ketones, hydrocarbons, and triglycerides.

Extraction of Eucalyptus oil[30]

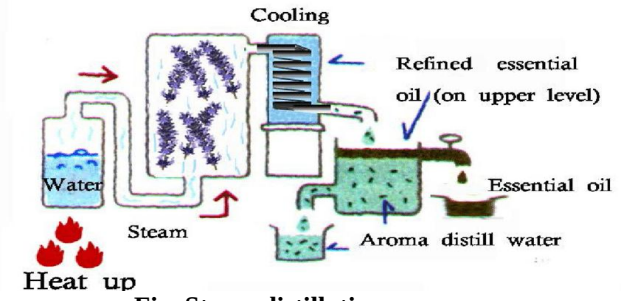

Fig. Steam distillation process.

- In above figure we can see that in the apparatus there are leaves of eucalyptus
- By the process of reflux [heating+colling] we obtained the eucalyptus oil.
- By the process of steam distillation essential oil is obtained.

Vernacular Name[18]

Latin name	E.globulus
Sanskrit name	Sugandha patra
English name	Gum eucalypt
Hindi name	Neelgiri
Gujrati name	Harit parn
Nepali name	Masla ko rukh
Chinese name	Anshu
Japnese name	Hibakujumoku

Pharmacological Use

The genus Eucalyptus (Myrtaceae) is one of the most significant and widely planted in the world. This genus, which has over 750 species, is the second biggest in Australia after Acacia. UA as an expectorant for the symptomatic management of bronchitis and mild respiratory tract irritation. In pharmacopoeias and in conventional medical systems, fever and throat inflammation are also described for the symptomatic treatment of asthma. treatment for laryngitis, renal illness, diabetes, gastritis, and cystitis Folk medicine claims for leucorrhoea, malaria, ringworm, acne, skin ulcers, urethritis, and vaginitis are unsupported by experimental or clinical data.

1. Antiseptic

The most potent is undoubtedly the medicinal Eucalyptus oil. Especially when it is outdated like ozone is, it is the best class antiseptic. exposed to the air, formed in it. It has chosen to use disinfection destroying the lower form of life through action.[32]

2. Anti-material
Although it cannot replace cinchona, its antibacterial action does have some antimalarial effects.[33]

3. Anti-helmentic
For a while, eucalyptus-chloroform was used asamong the tropical cures for hookworm, Due the phytochemical components like borneol are present. Because of cineol, linalool, gernayl acetate, saffrol, and antheol. it displays the antihelmintic effects of various intestinal worms.[33]

4. UTI and RTI infection
In addition to being administered internally in draxhum dosages for the treatment of pulmonary tuberculosis and other microbic diseases of the lungs and bronchitis, an emulsion prepared by combining equal amounts of oil and powdered gum-arabic with water has also been utilized as a urethral injection.[34]

5. Irritant action and parasitic Infection
When taken in large dosages, it irritates the kidneys, where it is primarily eliminated, and it has a noticeable nerve depressive effect that ultimately affects breathing by acting on the medullary center. veterinary medicine.[34]

6. Spasmodic action
The oil may be freely used to treat spasmodic throat problems in croup applied outside.[34]

7. Antihistaminic
Eucalyptus globulus leaves, fruits, and leaf extracts in hexane and ethanol reduced IgE-dependent histamine production from RBL-2H3 cells.[35]

8. Antiplaque
Eucalyptus globulus may help prevent the growth of dental plaque [36]

9. Cytochrome p450 enzymes inhibitor
It has been determined that eucalyptus oil (Eucalyptus globulus) inhibits six of the most important cytochrome P450 enzymes.[37]

10. Larvicidal
It was discovered that the leaves of the eucalyptus globulus were effective against Culex quinquefasciatus and Culex tritaeniorhynchus (larvicidal activity).[18]

11. Nerve Blocker
In the perfumery industry, terpineol, a volatile terpenoid alcohol with minimal toxicity, is frequently utilized. It is a crucial chemical component of the essential oils of numerous plants and has numerous uses in aromatherapy and traditional medicine. A significant portion of the essential oil of Eucalyptus globulus (Eucalyptus), which is widely used in aromatherapy and traditional medicine, is terpineol, a relatively non-toxic, volatile monoterpenoid alcohol. Terpineol caused a dose-dependent blockage of the compound action potential (CAP) of the rat sciatic nerve during research on the substance's effects.[38]

12. Anti-hyperglycemic
When eaten alongside glucose, eucalyptus tereticornis displayed anti-hyperglycemic properties.[39]

13. Myorelaxant
The myorelaxant actions of Eucalyptus tereticornis essential oil in guinea pig isolated trachea appear to be the result of a complicated interaction between its monoterpenoid components.[18]

14. Anti-inflammatory
1, 8-cineole, one of the main components in Eucalyptus violate oil, is known to reduce airway inflammation in cases of bronchial asthma and other steroid-sensitive conditions.[18]

CONCLUSION

According to a thorough review of the literature, the eucalyptus species is a significant source of numerous medicinally and pharmacologically significant compounds, including essential oils and terpenoids that have been used in aromatherapy. According to a thorough review of the literature, the eucalyptus species is a significant source of numerous medicinally and pharmacologically significant compounds, including essential oils and terpenoids that have been used in aromatherapy. The pharmacological effects of various Eucalyptus species, including their analgesic, antifungal, anti-inflammatory, antibacterial, antidiabetic, antioxidant, antiviral, antitumor, antihistaminic, anticancer, cytochrome p450 inhibitor, and hepatoprotective properties, have also been extensively studied. Although there is no evidence that aromatherapy is useful in people undergoing medical procedures, it is enjoyable, affordable, and has few adverse effects (apart from uncommon sensitivities).

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