

Syzygium Zeylanicum (L.) Dc – A Comprehensive Review

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ABSTRACT

Syzygium zeylanicum is a member of the family *Myrtaceae*. It is a medicinally important plant which is widely distributed in the Indo Malaysian region and traditionally used for various folk medicine. The present review provides a comprehensive overview of the botanical features, geographical distribution, phytochemical composition, pharmacological activity of *Syzygium zeylanicum* (L.) DC. Available evidence indicates that the plant contains bioactive compounds like phenolic compounds, favonoids, tannins, steroids etc. Major phytoconstituents include gallic acid, ellagic acid, catechin, epicatechin, chlorogenic acid and related polyphenols. These contribute to a wider range of biological activities. The review highlights therapeutic potential of *Syzygium zeylanicum*. It is a promising natural source of bioactive compound with potential to develop plant based therapeutic agents.

I. INTRODUCTION

Syzygium zeylanicum is commonly known as *Eugenia spicata*, *Eugenia varians*, *Ceylon plum*, etc., which belongs to the family *Myrtaceae*. It is a shrubby tree that attains a height of 12 m (39 ft). The tree typically grows in moist areas and damp forests. The fruits of this plant can be eaten fresh, and the fresh leaves are also used as food. It is widely distributed in many southern and eastern Asian countries, including Sri Lanka. The plant possesses various medicinal properties.^(1,2)

Historical records are back from 13th century Sri Lankan manuscript for invigorating rasayana formulations and also used in digestive tonics. In Southern india, tribal communities in Kerala and Tamil Nadu have used the fruit for controlling blood sugar. In recent decades *Syzygium zeylanicum* has gathered considerable attention in pharmaceutical research. The pharmacological properties have been the subject of numerous

scientific studies. The phytochemical composition includes flavanoids, alkaloids, phenolic compounds, tannins, steroids etc and has been a focus of exploration as the bioactive compounds are believed to produce potential therapeutic effect.^(3,4)

This review paper aims to provide a comprehensive overview of medicinal potential of *Syzygium zeylanicum*. The paper will delve into phytochemical composition, pharmacological activities of this plant.^(5,6)

The overall objective of this paper is to synthesize the existing body of knowledge on *Syzygium zeylanicum* and contribute a better understanding of *Syzygium zeylanicum* in pharmaceutical contexts.⁽⁷⁾

GEOGRAPHICAL DISTRIBUTION

Syzygium zeylanicum (L.) DC is distributed in the Indo- Malaysian regions. The native range of this species is Madagascar, Indian subcontinent to China. Apart from its native range *Syzygium zeylanicum* (L.)DC has been cultivated in various regions worldwide.⁽⁸⁾

PHYTOCHEMICAL COMPOSITION

Syzygium zeylanicum is renowned for its rich phytochemical profile, containing various bioactive compounds that contribute to its potential medicinal properties. The major phytoconstituents include flavonoids, phenolic compounds, steroids, tannins, proteins, etc.⁽⁹⁾

FLAVONOIDS

Syzygium zeylanicum is abundant in flavonoid content and is responsible for antioxidant activity. The various flavonoids present in the plant include quercetin, rutin, apigenin, catechin, epicatechin, kaempferol. These compounds cause free radical scavenging activity, reduce oxidative stress and protect cells from damage.⁽¹⁰⁾

PHENOLIC COMPOUNDS

The various phenolic compounds in *Syzygium zeylanicum* includes gallic acid, ellagic acid,

chlorogenic acid, ethyl gallate, etc. They possess anti hyperglycemic, antidiabetic, antimicrobial activities.^(11,12)

TANNINS

The specific tannins identified in *Syzygium zeylanicum* includes Zeylanin A (Potent macrocyclic ellagitannin), Hydrolysable tannin (Found in bark and foliage), Ellagitannins (Complex polyphenol that breaks down into ellagic acid during metabolism), Gallo tannins (Poly carbohydrate bounded by gallic acid units). Tannins possess anti-inflammatory, antimicrobial, antidiabetic, antioxidant and wound healing properties.^(11,12)

STEROIDS

The various types of steroids seen in the plant include Beta- sitosterol, Sigmasterol, Campesterol etc. The beta sitosterol is the most abundant phytosterol found in lipid or non polar fractions of leaves and is structurally similar to cholesterol and possesses anti inflammatory and lipid lowering potential. Sigmasterol occurs along with beta sitosterol and is present in plant plasma membrane. Campesterol is present in minor traces.^(11,12)

MEDICINAL BENEFITS AND PHARMACOLOGICAL ACTIVITY

Syzygium zeylanicum (L.) DC possesses various medicinal benefits and is traditionally used for various ailments.

ANTIOXIDANT ACTIVITY

The *Syzygium zeylanicum* possesses potent antioxidant activity. The major antioxidants include gallic acid, ellagic acid, catechin, epicatechin, quercetin, apigenin etc. The antioxidant assay of this plant is detected by DPPH assay, ABTS assay, superoxide scavenging, hydroxyl radical scavenging assay, nitric oxide scavenging and lipid peroxidation inhibition assay. Antioxidants have a major role in neutralizing free radicals and preventing oxidative damage.⁽⁶⁾

ANTI-INFLAMMATORY ACTIVITY

Syzygium zeylanicum exhibits significant anti-inflammatory activity. It has been studied by using inhibition of cyclooxygenase, 5-lipoxygenase and by inhibition of protein denaturation. The plant has been used for inflammatory conditions like joint pain, head ache, arthritis etc. Phytoconstituents like ellagic acid, quercetin, terpenoids, tannins and saponins contribute to anti-inflammatory activity.⁽¹³⁾

NEUROPROTECTIVE ACTIVITY

The plant is rich in phenolic compounds and flavonoids such as gallic acid, quercetin, myricetin, zeylanin A etc, directly scavenge free radicals which help in protecting the neurons from oxidative

damage. Cholinesterase inhibition activity study has been conducted on this plant which supports the neuroprotective activity.⁽⁴⁾

ANTIMICROBIAL ACTIVITY

Syzygium zeylanicum has potential antimicrobial activity. The various phytoconstituents like gallic acids, ellagic acid, quercetin, rutin, etc., inhibit a broad range of pathogenic bacteria and fungi. Various studies like antibacterial efficacy, gram-negative and fungal resistance studies have been conducted on the plant.⁽¹⁴⁾

ANTICANCER ACTIVITY

The plant possesses anticancerous effect due to the presence of secondary metabolites. It contains polyphenols and flavonoids which interfere in cancer signaling pathways and slows down uncontrolled proliferation. The macrocyclic ellagitannins and tannins have demonstrated antitumour and chemoprotective traits.⁽⁴⁾

WOUND HEALING PROPERTY

Syzygium zeylanicum leaf is traditionally used for its wound healing properties. The leaf paste has been directly applied to cuts, skin ulcers etc. The tannins present in it provide a protective seal and control minor bleeding and physically draw the wound margins closer together. It also suppresses pro inflammatory mediators and swelling. Catechin and epicatechin stimulates fibroblast and keratinocytes. Gallic acid and ellagic acid protect cells at the site of injury.⁽¹³⁾

HEPATOPROTECTIVE ACTIVITY

Syzygium zeylanicum has the ability to shield liver cells from toxin induced damage. Gallic acid blocks pathway that trigger lipid peroxidation and prevent intracellular enzymes from leaking out into blood stream and maintain structural integrity of the cell.⁽¹⁴⁾

II. CONCLUSION

Syzygium zeylanicum (L.) DC is a medicinal plant which has various therapeutic importances. The plant contains various bioactive compounds like phenolic compounds, flavonoids, tannins, phytosterols, etc. The plant possesses antioxidant, antimicrobial, anti-inflammatory, antidiabetic, anticancer, hepatoprotective, wound healing properties. Traditionally the plant has been used for various ailments. Its long history of traditional use and ongoing scientific research make it a captivating subject for further investigation. Overall *Syzygium zeylanicum* represents a valuable natural resource with significant medicinal potential.

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