

Review on Antibacterial Activities of *Syzygium aromaticum*

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Abstract:- *Syzygium aromaticum* (clove), from Myrtaceae family is one of long used traditional medicine mainly used for reducing teeth related issues. This plant has rich source of Phenolic compounds which is the most important criteria for the antibacterial activity. This review article is presented to compile the various research articles of the *Syzygium aromaticum* particularly their antibacterial activities.

Index Terms- Medicinal, traditional, antibacterial; teeth and Phenol.

I. INTRODUCTION

Syzygium aromaticum is a wide known Spice which belongs to *Mirtaceae* family. It is popularly used in all over countries for centuries in the field of food and medicine.



Figure 1 : *Syzygium aromaticum*

It is flowering plant that are mostly available in the tropical regions of Asia, Africa and Pacific regions. It is grown in Indonesia, Pakistan, Sri-Lanka, India, Malaysia, and Madagascar. *Syzygium aromaticum* is an evergreen tree that has the tendency to grow from 8m to 12 m.

The flowers are mostly arranged in the form of clusters. They have antibacterial nature and hence they are used in mouth washes and tooth pastes so

that they have the tendency to kill microorganisms. Honey mixed with *Syzygium aromaticum* powder is found to have the tendency to cure skin related issues.

The major components present in the *Syzygium aromaticum* is eugenol, which plays an important role in the Bioactive nature. 76.8 %, of Eugenol, 17.4 % of β – caryophyllene, 2.1 % of α – humulene and 1.2 % of eugenyl acetate is present in the *Syzygium aromaticum*.

Botanical classification:

Kingdom : Plantae, Plants
 Subkingdom : Tracheobionta
 Division : Angiospermae
 Class : Eudicotyledons
 Order : Myrtales
 Family : Myrtaceae
 Genus : *Syzygium*
 Species : *S.aromaticum*

Table 1 : Common names for *Syzygium aromaticum* in different languages

S.No	Languages	Common Names
1.	Sanskrit	Lavanga, Devakusuma
2.	English	Cloves, Indian Cloves
3.	Hindi	Laung, Lavang
4.	Bengali	Labanga
5.	Gujarati	Lavanga
6.	Telugu	Lavangam
7.	Tamil	Lavangam, Grambu
8.	Karnataka	Lavanga
9.	Malayalam	Karampu, Grampoo
10.	Nepali	Launga Thel
11.	Marathi	Lavang
12.	Punjabi	Laung

Chemical Constituents

The major component present in the *Syzygium aromaticum* is eugenol (*Gaber El-Saber Batiha*, 2020) which plays an important role in the Bioactive nature. 76.8 %, of Eugenol, 17.4 % of β – caryophyllene, 2.1 % of α – humulene and 1.2 % of eugenyl acetate is present in the *Syzygium*

aromaticum. The bioactive molecules present in the *Syzygium aromaticum* is given below:

Compound	Formula
Eugenol	C ₁₀ H ₁₂ O ₂
β-Caryophyllene	C ₁₅ H ₂₄
Vanillin	C ₈ H ₈ O ₃
Cratogenic acid (Maslinic acid)	C ₃₀ H ₄₈ O ₄
Kaempferol	C ₁₅ H ₁₀ O ₆
Rhamnetin	C ₁₆ H ₁₂ O ₇
Compound	Formula
Eugenitin	C ₁₂ H ₁₂ O ₄
Eugenin	C ₁₁ H ₁₀ O ₄
Ellagic acid	C ₁₄ H ₆ O ₈
Gallic acid	C ₇ H ₆ O ₅
Biflorin	C ₁₆ H ₁₈ O ₉
Myricetin	C ₁₅ H ₁₀ O ₈
Campesterol	C ₂₈ H ₄₈ O
Stigmasterol	C ₂₉ H ₄₈ O
Oleanolic acid	C ₃₀ H ₄₈ O ₃
Bicornin	C ₄₈ H ₃₂ O ₃₀
Quercetin	C ₁₅ H ₁₀ O ₇
Carvacrol	C ₁₀ H ₁₄ O

Shahid Hussain et al. tested the antibacterial nature of *Syzygium aromaticum* and *Rosmarinus officinalis* oils against *Pseudomonas aeruginosa*, *Enterococcus faecalis*, *Acinetobacter baumannii* and *Staphylococcus aureus* using agar well diffusion method. The results show that MIC value ranges from 0.312 – 1.25 % for *Syzygium aromaticum* oils.

Rebecca Tshabalala et al. in their research work determined the antibacterial nature of spices against twelve species of pathogenic bacteria, especially *Escherichia coli* and *Enterococci* spp. Agar disk diffusion method is used to determine the antibacterial nature and among the selected spices, *Syzygium aromaticum* and black seed curcumin showed good activity against bacteria. The antibacterial nature of the clove, cinnamon and datura was determined using Pour plate method against Gram positive and Gram-negative pathogenic

bacteria. The results showed highest inhibition effect on clove and cinnamon.

According to *Rakib A*, the presence of Eugenol and cinnamic aldehyde in the clove and cinnamon can react with protein and other active groups which may stop the bacterial growth and rupture the cell wall and hence the cells collapse.

CONCLUSION

Zingiber officinale is known to be popularly as Ginger and the plant parts are mainly used in the antibacterial activities. The antibacterial nature of the plant is reported by various researchers and still many more researchers are interested in analyzing the biological activities of the plants.

REFERENCES

- [1] Shahid Hussain, Rafia Rahman and Ayesha Mushtaq. (2017), "Clove: A review of a precious species with multiple uses", *International Journal of Chemical Sciences*, 11: 129 – 133.
- [2] Gaber El-Saber Batiha, Luay M Alkazmi, Lamiaa G Wasef, Amany Magdy Beshbishy, Eman H Nadwa and Eman K Rashwan. (2020), "Syzygium aromaticum L. (Myrtaceae): Traditional Uses, bioactive Chemical Constituents, Pharmacological and Toxicological Activities", *Biomolecules*, 10(2): 202.
- [3] Rebecca Tshabalala, Adia Kabelinde, Christ Donals Kaptchouang Tchatchouang, Collins Njie Ateba and Madira Coutlyne Manganyi (2021), "Effect of Clove (*Syzygium aromaticum*) spice as microbial inhibitor of resistant bacteria and Organoleptic Quality of meat", *Saudi Journal of Biological Sciences*, 28 : 3855 – 3863.
- [4] Rakib A, Al-Ani, Mustafa A. Adhab and Haidar H. Nawar (2012), "Antibacterial activity of clove, cinnamon and datura extracts against *Erwinia carotovora* subsp. *atroseptica* causative agents of black stem and soft rot on potato", *Journal of Medicinal Plants Research*, 6(10) : 1891 – 1895.