



## Review Literature On Clove

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### Abstract

Clove are the aromatic flower buds of a tree in the family *Myrtaceae*, *Syzygium aromaticum*. They are native to the Maluku islands (or Moluccas) in Indonesia, and are commonly used as a spice. Clove are available throughout the year owing to different harvest seasons in different countries. Clove is use in antioxidants, help protect against cancer, it can also kill bacteria, helpful in liver health, regulate blood sugar, and help in many more health problems. The clove tree is an evergreen that grows up to 8- 12 meters tall, with large leaves and crimson flower grouped in terminal clusters. Clove have the essential oil extract named *Eugenol* comprises 72- 90%. Clove is a Volatile Oil. Zanzibar and Pemba are now the world's largest producers of clove.

**Key Words-** Syzygium aromaticum, Spice, Volatile, Antioxidant, Laung.

### Introduction

Clove is mainly used in Ayurvedics. It is usually known as "lavang". Clove (*Syzygium aromaticum*) a precious spice, it is a member of *Myrtaceae*. Clove is mainly used for preparation of food. Clove oil is used for antimicrobial, antiviral, anti-inflammatory, anti-diabetics and antioxidant properties [1]. *Syzygium* is the largest genus of *Myrtaceae* family, comprising of about 1200 to 1800 species of flowering plants, which are widely distributed in tropical and subtropical areas of Asia, Africa, Madagascar, and throughout Pacific and Oceanic regions [2,3]. Eugenol, the most important composition of Clove oil, has been accepted as food preservatives by China, US European Union, and other countries and regions(4).



Fig- Clove an Aromatic Flower buds.

Clove was originated from Indonesia. The name comes from the Latin word *clavus*. The name comes from the French “clou” meaning nail. Clove tree is monoecious, flowers are hermaphrodite and self- pollinating. The tree matures between 8-10 years after planting. Clove generally are dried flower buds from the clove tree [5]. Clove were important in the earliest spice trade and are believed to be indigenous to the Moluccas, or Spice Islands, of Indonesia [3]. Cloves are one of the world’s most important, popular, and useful plants. The flower is based on number of five petals [6].

**Synonyms-** Clovos, Caryophyllus, Lavang, Laung, Grambu, Grampus, Krambu.

**Biological source-** It consist of a dried flower bud of *Eugenia caryophyllus*.

### **Botanical Classification**

Kingdom- Plantae

Sub Kingdom- Tracheobionta

Super Division- Spermatophyta

Division-Magnoliophyta

Class- Magnoliopsida

Subclass- Rosidae

Order-Myrtales

Family- Myrtaceae

Genus- Syzgium

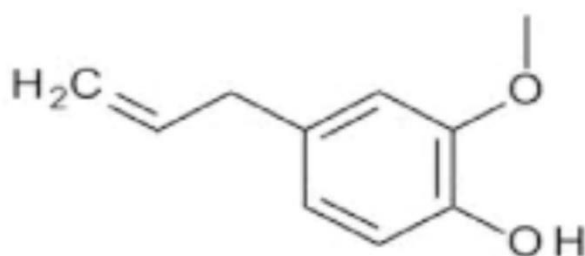
Species- aromaticum

## History & Origin

Clove is one of the most ancient and valuable spices of the orient, with its origin as old as the first century, before Christ. The ancient Chinese Han dynasty lasting from 207 B.C. to 220 A.D. gives us our first clue to the use of fragrant clove [8]. The use clove as a spice reached Europe around the 4<sup>th</sup> century A.D., when commercial trading really started with the Arabs, who in turn acquired these dried and fragrant buds from the cultures to the East in Asia [9]. For over 2,000 years, both Indian and Chinese traditional medicine made extensive use of clove flowers and clove oil. Clove introduced in India around 1800AD by the East India company in it's 'spice garden' in Courtallam, Tamil Nadu. [7]. Cloves are believed to be native to the Molucca Islands of Indonesia. Although Indonesia is the largest producer of Cloves, Zanzibar and Madagascar are the major exporters, where Clove trees cover thousands of acres of the islands. Historically, Clove originating from Madagascar have been considered superior [10].

## Chemical Composition

It consists of 82-88% **eugenol**, little amount of **eugenyl acetate**, and other minor constituents. Stem oils are evolved from the twigs of *Eugenia caryophyllus* [19]. It consists of 90-95% **eugenol**, and some other minor constituents. A major component of clove taste is imparted by the chemical **eugenol** [20]. **Eugenol** is the main bioactive compound of clove, which is found in concentrations ranging from 9 381.70 to 14 650.00 mg per 100 g of fresh plant material [6]. With regard to the phenolic acids, gallic acid is the compound found in higher concentration (783.50 mg/100 g fresh weight) [16]. The chemical composition of the essential oil from the bud of clove (*Syzygium aromaticum*). As can be seen from this table, 18 compounds, representing about 99.95% of the essential oil from clove, were characterized. The major components are as follows: eugenol (87.00%), eugenyl acetate (8.01%) and  $\beta$ -Caryophyllene (3.56%). This essential oil comprises in total 23 identified constituents, among them eugenol (76.8%), followed by  $\beta$ -caryophyllene (17.4%),  $\alpha$ -humulene (2.1%), and eugenyl acetate (1.2%) as the main components [17]



Eugenol

*Fig-Eugenol.*

## Pharmacological Activities of Clove

Pharmacologically, clove and its main constituents possess antimicrobial, antioxidant, anti-inflammatory, analgesic, anticancer & anesthetic effects. Moreover, they showed insecticidal, mosquito repellent, aphrodisiac, and antipyretic activities [14,1].

- I. ***Anti Cancer Activity***- To stay protected from cancer eat more cloves, as the eugenol in clove possess strong anticarcinogenic properties and helps control lung cancer, breast cancer, and ovarian cancer at its early stages. Clove also reduced the abnormal crowding of cells in particular regions of lung tissue and checked the growth of pre-malignant cells by more than 85 per cent [15]. In another in vitro study Trusted Source, researchers found that clove oil stopped the growth of several cancer cell lines, including but not limited to breast, cervical, and colon cancer. Clove extract also increased cell death and disrupted cell division in a colon cancer cell line [13].
- II. ***Anti diabetic Activity***- Cloves also help keep your blood sugar levels in check and are known to promote insulin production, further controlling diabetes [22]. research shows that the compounds found in cloves may help keep blood sugar under control. As little as one teaspoon of the super-star spice is enough to reap benefits [18].
- III. ***Anti Microbial Activity*** - Clove oil is used as an antiseptic in oral infections. This essential oil has been reported to inhibit the growth of molds, yeasts and bacteria. The high levels of eugenol contained in clove essential oil are responsible for its strong biological and antimicrobial activities. Cloves have been shown to have antimicrobial properties, meaning they can help stop the growth of microorganisms like bacteria [21].
- IV. ***Anti viral activity***- The antiviral activity of eugenin, a compound isolated from *S. aromaticum* and from *Geum japonicum*, was tested against herpes virus strains being effective at 5 µg/mL, and it was deduced that one of the major targets of eugenin is the viral DNA synthesis by the inhibition of the viral DNA polymerase [4]. Eugenol was virucidal and showed no cytotoxicity at the concentrations tested [15].
- V. ***Anti fungal activity***- The present study indicates that clove oil and eugenol have considerable antifungal activity against clinically relevant fungi, including fluconazole-resistant strains, deserving further investigation for clinical application in the treatment of fungal infections. Studies have shown that clove essential oil is both fast and effective in killing fungal infections [16].
- VI. ***Analgesic activity***-The results of the present study showed that aqueous extract of clove has analgesic effect in mice demonstrated by hot plate test which is reversible by naloxone [19]. The role of opioid system in the analgesic effect of clove might be suggested. Clove oil contains the active ingredient eugenol, which is a natural anesthetic. It helps numb and reduce pain to ease a

toothache. Eugenol also has natural anti-inflammatory properties. It may reduce swelling and irritation in the affected area [18].

## **Side Effects & Rick**

It is generally recommended not to ingest clove oil in large amounts, If swallowed, clove may cause a burning sensation. Applying it to the skin or using it as a wash is recommended instead [10- 13].

1. Increases Bleeding.
2. Lowers sugar level in the blood.
3. Toxicity.
4. Causes Allergic Reaction.
5. Causes Seizures.
6. Makes the skin sensitive.
7. Causes Mouth Sensitivity.
8. Cause Respiratory problem.
9. Loss of sensation.
10. Erectile /Ejaculation Issues.
11. Itching, rash.
12. Mouth irritation, sore gums.

## **Conclusion**

Based on the information presented, it could be concluded that clove represents a very interesting plant with an enormous potential as food preservative and as a rich source of antioxidant compounds. Clove flower buds at flowering stage had the highest yield, eugenol content, and refractive index. The main components of clove essential oils were eugenol, beta- cis-caryophyllene, & eugenol acetate. Further critical stages, namely the development of a better distillation method to improve oil quality and the application of clove essential oil as a natural antioxidant.

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