

## “Role of Clove in Medicine and Dentistry- An Interesting Review Article”

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### ABSTRACT

*Clove (Syzygium aromaticum) is a natural herb used in our day to day life. It has potential health benefits which are yet to be explored. Clove (Syzygium aromaticum) is the most valuable spices that has been used for centuries as food preservative and for many medicinal purposes. Clove is native of Indonesia but now a days is cultured in several parts of the world. This plant represents one of the richest source of phenolic compounds such as eugenol, eugenol acetate and gallic acid and possess great potential for pharmaceutical, cosmetic, food and agricultural applications. The antioxidant and antimicrobial activity of clove is higher than many fruits, vegetables and other spices and should deserve special attention. The major part of the world's consumption of the clove spice is in home kitchens. However, commercial use of the clove is for the production of clove oil that contain active constituents, which possess antioxidant, anti-fungal, anti-viral, anti-microbial, anti-diabetics, anti-inflammatory, anti-thrombotic, anaesthetic, pain relieving and insect repellent properties. A new application of clove as larvicidal agent is an interesting strategy to combat dengue which is a serious health problem in Brazil and other tropical countries. The uses of clove in dentistry are significant. This review furnishes the necessary concerning the uses of clove in oral care.*

### 1. Introduction

Clove is used worldwide as a cooking spice, condiment and herbal remedy. 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.<sup>(1)</sup> Cloves are commercially harvested in Indonesia, India, Pakistan, Sri Lanka, as well as in African countries, such as Comoro Islands, Madagascar, Seychelles, and Tanzania. Several therapeutic uses of *S. Aromaticum* have been recognized. The clove plant is used as a medicine in China and Western countries against many diseases, such as oral diseases or dental complaints. The plant also used to control nausea and vomiting, cough, diarrhoea, dyspepsia, flatulence, stomach distension, and gastrointestinal spasm; relieve pain; cause uterine contractions; and stimulate the nerves. The cloves are also used in folk medicine as a diuretic, odontalgic, stomachic, Tonic cardiac, and condiment with carminative and stimulant effects. Essential oil derived from this aromatic plant not only serves as a fragrance and flavour agent, but also as a dietary antioxidant expected to prevent several diseases caused by free radicals. It has been reported that the majority of cloves are used by kretek cigarette manufacturer in Indonesia and only about 10% for other purposes, such as folk medicine, food flavouring, food preservation, fragrance, and pharmaceuticals. Clove seeds contain at least 15% volatile oil, eugenol, a phytochemical responsible for its effective antiseptic and anaesthetic. Oil of clove has been used in dental plasters, fillings and cements for many years. Clove gel also provides an effective alternative to benzocaine for topical anaesthesia.<sup>(2)</sup>

### 2. Constituents

Three essential oils are available from clove species: Clove bud oil, Clove stem oil, and Clove leaf oil. Each has

different chemical composition and flavour. Clove bud oil, the most expensive and the best quality product, contain eugenol (80-90%), eugenol acetate (15%), and beta caryophyllene (5-12%). Another important compound found in the essential oil of clove in concentration up to 2.1% is alpha-Humulol. Eugenol composes 72-90% of the essential oil extracted from cloves and is the compound most responsible for aroma. 100% extraction occurs at 80 minutes in pressurized water of 125°C. Ultrasound-assisted and microwave-assisted extraction methods provide more rapid extraction rates with lower energy costs.<sup>(3)</sup>

### 3. Other important chemical constituents:

1. Volatile oil (Clove oil) : 15%-20%
  - a-Eugenol 70%-90%
  - b-Vanillin
  - c-Caryophyllene
  - d-Acetyl eugenol 4%
2. Tannin : 10-13% ( Gallo tannic acid)
3. Resin
4. Chromone
5. Eugenin
6. Small quantities of esters, ketones, alcohols
7. Other substances mainly methyl furfural and dimethyl furfural.<sup>(4)</sup>



Fig.1

#### 4. Properties

Cloves offer many health benefits, some of which include aiding in digestion, fighting against cancer, protecting the liver, boosting the immune system, controlling diabetes, and preserving bone quality. They also contain anti-mutagenic and anti-microbial properties, along with fighting against oral diseases and headaches, while also displaying aphrodisiac properties.<sup>(4)</sup>

Oils with higher activity were thyme, oregano and cloves. Clove oil has biological activities, such as antibacterial, antifungal, insecticidal and antioxidant properties, and is used traditionally as a savouring agent and antimicrobial material in food.<sup>(5)</sup> Clove is used as an anti-inflammatory agent, due to its high content of flavonoids. Clove can effectively cure digestive problems. Clove are good expectorants. Clove oil stimulates blood flow and circulation. Clove have anti-oxidant properties.<sup>(6)</sup>

#### 5. Medical uses

- Clove is known to possess antibacterial properties and is used in various dental creams, tooth pastes, mouth washes, and throat sprays to cleanse bacteria. It is also used to relieve pain from sore gums and improves overall dental health.<sup>(7)</sup>
- In dentistry, eugenol in combination with zinc oxide is used for temporary filling of cavities.
- Cloves are aphrodisiac (an agent for arousing or increasing sexual desire or potency)
- Clove is used as anti-inflammatory agent, due to its high content of flavonoids. Aroma therapists use pure clove oil to cure the symptoms of rheumatism and arthritis.
- Cloves can effectively cure many digestive problems. It is having medicinal qualities to cure flatulence, loose motions, indigestion and nausea.
- Cloves are useful in relieving the symptoms of diarrhoea, gastric irritability and vomiting.
- Clove and clove oil boost the immune system by purifying the blood and help to fight against various diseases.
- Cloves can effectively prevent the lung cancer as well as the skin cancer.
- Cloves are good expectorant that promotes the discharge of mucous and secretions in the respiratory passage.
- Clove oil stimulates blood flow and circulation making it useful for the people having cold extremities.
- Cloves benefit the diabetic patients by controlling the blood glucose levels. Eugenol is powerful enough for preventing blood clots.
- Cloves also help prevent the breakdown in retina of the eye, which slows down macular degeneration and aids vision in the old age. The underlying mechanism is through the prevention of the breakdown of docosahexaenoic acid, which preserves vision in elderly people.<sup>(8)</sup>
- Researchers found that sniffing the spicy aroma of cloves reduces drowsiness, irritability and headaches.
- Clove enhance memory retention. Research has shown that clove oil is an effective mosquito repellent.

#### 6. Uses of clove in dentistry

For treatment of tooth ache.

##### 1) Dental care:

The most prominent use of clove oil in dental care. The germicidal properties of the oil make it very effective for relieving dental pain, tooth ache, sore gums and mouth ulcers. Clove oil contains the compound eugenol, which has been used in dentistry since numerous years. Gargles with diluted clove oil help in easing the throat. The characteristics smell of clove oil helps removing bad breath. As a result, clove oil is added to numerous dental products and medications, including ,mouth washes, and tooth pastes. Dentists also mix clove oil with zinc oxide and prepare a white filling material as a temporary alternative to root canal.<sup>(9)</sup>

##### 2) Oral thrush:

Oral thrush, also called oral candidiasis, is a yeast infection of the mouth. It happens when there's a build-up of the *Candida albicans* fungus in the lining of the mouth. Oral thrush may occur in adults or children. Clove oil ,it's still in dentistry today as antiseptic and pain reliever. According to a 2005 in vivo and in vitro study on immunosuppressed rat, the main compound in clove oil (eugenol) was found to be as effective in treating oral thrush as the antifungal drug nystatin. Clove contain eugenol is the most powerful of these, with antiseptic properties that have been shown to kill the *Candida* yeast cells. Eugenol is also an immune system stimulant, which means it helps to increase the body's disease fighting powers.<sup>(10)</sup>

##### 3) Treat Infections:

Due to its antiseptic properties, clove oil is useful for wound, cuts, scabies, athlete's foot, fungal infections, bruises, prickly heat, scabies etc. It can also be used insect bites and stings.<sup>(11)</sup>

##### 4) Stress :

Clove oil is aphrodisiac in nature and hence serves as an excellent stress reliever. It has a stimulating effect on the mind and removes mental exhaustion and fatigue. When Taken internally, in appropriate amounts, it refreshes the mind. Clove oil also induces the sleeps and is helpful to insomnias patients. It is useful for treating mental problems such as loss of memory, depression and anxiety.<sup>(12)</sup>

##### 5) Respiratory problems:

Clove oil has a cooling and anti-inflammatory effect, and thereby clear the nasal passage. This expectorant is useful in various respiratory disorders including coughs, colds, bronchitis, asthma, sinusitis, and tuberculosis.<sup>(13)</sup>

#### 7. Dosage

The clove and clove oil are used safely. The level of clove used in foods does not exceed 0.24%; the oil is not used in amounts greater than 0.06%. Clove oil can be used topically, with a 1:1 ratio of clove oil to carrier oil(fractionated coconut oil), and applied to area of concern or reflex points.

Oral health- Clove oil is widely accepted as a beneficial solution for toothaches , dry sockets. Dilute 1 drop clove oil with 1 drop carrier oil and apply to area of concern.

Parasites- Take 2 drops clove oil internally, in capsules, for up to 10 days to create a inhospitable environment for parasites.

Oxidative stress-Dilute 2 drops with equal parts carrier oil, and apply topically to neck and chest to prevent free radical damage.

Fungal and Yeast – balance clove contain anti-fungal properties . Add 1 drop of clove oil to herbal tea and consume for up to 10 days.

Acne- Clove oil is a natural antibacterial and can help fight acne and other skin issues. Combine 3 drops of clove oil with 2 teaspoons of raw (local is best) honey and apply to face Let sit for 10 minutes, then rinse off.<sup>(14)</sup>

## 8. Side effects and interaction

- Common side effects of topically applied clove may include: Erection problems, trouble having an orgasm(delayed ejaculation), itching rash, mild skin irritation; or sore gum, mouth irritation, bleeding or swollen gums, or tooth changes after using clove inside the mouth.<sup>(15)</sup>

- If you have taken oral clove cause muscle pain or weakness, numbness or cold feeling in your arms and legs ,trouble breathing, stomach pain, nausea, vomiting, fast or uneven heart rate, dizziness , or feeling very weak or tired.<sup>(16)</sup>
- Clove might slow blood clotting. Taking clove oil along with medications that also slow clotting might increase the chances of bruising and bleeding<sup>(16)</sup>.
- Some medication that slow blood clotting include aspirin, clopidogrel (Plavix), diclofenac (Cataflam, voltaren), Ibuprofen (Advil, Motrin) Warfarin(Coumadin).<sup>(17)</sup>

## 9. Conclusion

This review gives of the uses of clove in dentistry. Even though the known uses are minimal, further research on this herb is required to know its potential benefits in both Medicine and Dentistry This review gives us valuable health benefits of clove herb and an interesting scientific research must do on this topic for convenient medical help.

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