Clove

*(Syzygium aromaticum* (L.) Merr. & L.M.Perry)*

Clove has also been used as a medicinal plant in many cultures including in Ayurveda and Traditional Chinese Medicine as well as western herbal medicine. The main applications were for digestive disorders and pain relief in tooth ache as the oil has an anaesthetic and antiseptic action.

The German Commission E has approved the use of clove as a topical antiseptic and anaesthetic.

**Constituents**
Clove has a range of constituents including volatile oils, tannins, ferulic acid, gallic acid and gums. The chemical components of the essential oil is primarily the phenol, eugenol (approximately 85%), but it also contains methyl salicylate, pinene and vanillin.

**Actions**
Astringent, anaesthetic, antioxidant, anti-inflammatory, vulnerary, carminative, antibacterial, antifungal.

**Pharmacological Activity**
The research into the whole plant extracts of clove is not as extensive as the research into the essential oil of clove or its chief constituent, eugenol. However, given the large percentage of essential oil in the extract, similar effects may be found with the extract.

**Antioxideant & immune modulating activity**
Extracts of *Syzygium aromaticum*, clove essential oil, and eugenol displayed strong free radical-scavenging antioxidant activity in a range of studies. Clove was also shown to inhibit lipid peroxidation and reduce cardiac and renal damage through antioxidant actions.

Clove extract and essential oil (eugenol) have been found to possess varying immune modulating actions in both cell mediated and humoral immune responses.

**Antibacterial & Antiviral activity**
A trial examined the effects of various toothpaste compositions on the presence of bacteraemia in 100 adult orthodontic patients. Bacteraemia was assessed before and after tooth brushing with or without using any toothpaste. While no bacteraemia was detected in pre-brushing blood samples, post-brushing bacteraemia was detected in some patients using standard toothpaste. No bacteraemia could be detected in the pre and post-brushing
cultures of the subjects in the essential oil toothpaste group (contained clove, tea tree and peppermint oils).12

Clove demonstrated inhibitory effects against hepatitis C virus (HCV) protease (PR) in vitro13 and also herpes simplex virus.14 Clove was also found to inhibit the replication of human cytomegalovirus (CMV) in vitro.15,16

Other Activity: Insect repellent

Essential oil of clove has been used in various trials along with other essential oils as an effective insect repellent.17,18 Undiluted clove oil repelled multiple species of mosquitoes for up to two hours.19 Eugenol has also demonstrated insecticidal activity against the house dust mites Dermatophagoides farinae and Dermatophagoides pteronyssinus. 20,21,22

Antifungal activity

Clove has been shown to prevent mycotoxin production by Aspergillus species and exhibit activity against other fungal pathogens, including Cryptococcus neoformans and Candida albicans.23, 24, 25, 26, 27, 28 Another study suggests that clove may have a high inhibitory effect on dermatophytic fungi.29

Eugenol was found to have an antifungal action by altering both the membrane and cell wall of yeast.30 Another study indicated that eugenol exerted an anti-candidal effect by damaging the yeast envelope and interfering with cell growth. The fungicidal activity was similar with the reference drug, nystatin.31,32

Antifungal activity

Clove may exert its anaesthetic action through varying mechanisms. Eugenol was shown to inhibit prostaglandin biosynthesis and thereby depress pain sensory receptors.33 Eugenol has also been shown to inhibit the formalin-induced nociceptive response an effect that may result from action via the capsaicin receptor.34,35,36 Other studies have shown that eugenol produces its antinociceptive effects via vanilloid receptors expressed by the sensory nerve endings in the teeth37 or through other effects.38

One randomized trial found that a homemade clove gel is as effective as an oral anesthetic benzocaine 20% gel.39 Another trial compared the occurrence and severity of postoperative pain after gingivectomy with different dressings. Some patients received a standard dressing and others received different dressings that contained eugenol plus local anesthesia. Patients receiving the eugenol dressings reported less pain and less need for analgesics.40

Vulnerary activity

A trial examined the effects of a 1% clove oil cream on healing of chronic anal fissure. Patients received 1% clove oil cream or stool softeners and 5% lignocaine cream for six weeks. Patients were included if they had symptoms (defecatory pain, bleeding, or both) lasting for more than six weeks and clinical examination revealed anal ulcer with fissure of anal sphincter. Primary outcome measures included healing of anal fissures. Healing occurred in 60% of patients in the clove oil group and in 12% of patients in the control group. Patients in the clove oil group showed significant reduction in resting anal pressure compared with patients in control group. Two patients in the study group developed allergic reactions to clove oil (itching and burning).41

Digestive activity

Syzygium aromaticum reduced ulcer number and area in ethanol and HCl-ethanol models and in an indomethacin model.42

Eugenol has been found to exert a gastroprotective effects against indomethacin-induced ulcer in rats. It was found to reduce gastric mucosal lesions, gastric acid outputs, and pepsin activity associated with a significant increase in mucin concentration.43 Clove was also found to relax the tracheal and smooth muscles of the ileum.44

Male reproductive activity

Clove has been studied in combination with other herbs in a topical cream for the treatment of premature ejaculation.

Actions

Astringent, anaesthetic, antioxidant, anti-inflammatory, vulnerary, carminative, antibacterial, antifungal.

Indications

• Tooth aches & gum disorders
• Candida and other fungal infections
• Bacterial and viral infections
• Digestive disorders, especially ulcers
• Anal fissures (topical)
• Immune modulation
• Oxidative stress

Toxicity

Most cases of toxicity or problems with clove have been reported with the essential oil and not the extract. Some individuals have been reported with allergic reactions to clove oil and nephrotoxicity and hepatotoxicity have been noted in case reports of accidental ingestion of clove oil.46,47,48

Use in Pregnancy

While culinary use is safe, medicinal dosages of clove in pregnancy should be avoided as there is insufficient safety data and some animal studies have shown clove can interfere with implantation or have teratogenic effects.49,50
Clove (Syzygium aromaticum) full monograph

Contraindications
Clove should be avoided in those with a known allergy or hypersensitivity.

Drug Interactions
Based on its actions, Clove has theoretical potential to inhibit or potentiate some drugs with similar actions. An animal study found clove could induce cytochrome P450 enzymes, particularly CYP2E1 and potentially decrease levels of drugs metabolized by these enzymes.51,52

Administration and Dosage
Dried herb: 1 to 3g daily.
Liquid extract: 1:1 45% alcohol 5 to 80mL weekly

References


