

# Clove

## Species (Family)

*Syzygium aromaticum* (L.) Merr. & Perry (Myrta-

## Synonym(s)

*Caryophyllus aromaticus* L., *Eugenia aromatica* (L.) Baill., *Eugenia caryophyllata* Thunb., *Eugenia caryophyllus* (Spreng.) Bull. & Harr.

## Part(s) Used

Clove (dried flowerbud), leaf, stem

## Pharmacopoeial and Other Monographs

BHP 1996<sup>(G9)</sup>

BP 2001<sup>(G15)</sup>

Complete German Commission E<sup>(G3)</sup>

Martindale 32nd edition<sup>(G43)</sup>

PDR for Herbal Medicines 2nd edition<sup>(G36)</sup>

Ph Eur 2002<sup>(G28)</sup>

## Legal Category (Licensed Products)

GSL<sup>(G37)</sup>

## Constituents<sup>(G2,G22,G41,G48,G58,G64)</sup>

**Volatile oils** Clove bud oil (15–18%) containing eugenol (80–90%), eugenyl acetate (2–27%),  $\beta$ -caryophyllene (5–12%). Others include methyl salicylate, methyl eugenol, benzaldehyde, methyl amyl ketone and  $\alpha$ -ylangene.

Leaf oil (2%) containing eugenol 82–88%.

Stem oil (4–6%) with eugenol 90–95%. A more comprehensive listing is provided elsewhere.<sup>(G22)</sup>

**Other constituents** Campesterol, carbohydrates, kaempferol, lipids, oleanolic acid, rhamnetin, sitosterol, stigmasterol and vitamins.

## Food Use

Clove is listed by the Council of Europe as a natural source of food flavouring (category N2). This category indicates that clove can be added to foodstuffs in small quantities, with a possible limitation of an active principle (as yet unspecified) in the final

product.<sup>(G16)</sup> Clove is commonly used in cooking, and as a flavouring agent in food products. In the USA, clove is listed as GRAS (Generally Recognised As Safe).<sup>(G41)</sup>

## Herbal Use

Clove has been traditionally used as a carminative, anti-emetic, toothache remedy and counter-irritant.<sup>(G2,G41,G64)</sup>

Clove oil is stated to be a carminative, occasionally used in the treatment of flatulent colic<sup>(G54)</sup> and is commonly used topically for symptomatic relief of toothache.<sup>(G45)</sup>

## Dosage

Clove 120–300 mg.<sup>(G44)</sup>

Clove oil 0.05–0.2 mL.<sup>(G44)</sup>

## Pharmacological Actions

### *In vitro* and animal studies

The anodyne and mild antiseptic properties documented for clove oil have been attributed to eugenol.<sup>(G41)</sup> Clove oil is stated to possess antihistaminic and antispasmodic properties.<sup>(G41)</sup> Eugenol, eugenol acetate and methyl acetate are reported to exhibit trypsin-potentiating activity.<sup>(G41)</sup>

Antibacterial, hypoglycaemic and potent CNS-depressant activities have been documented for *Syzygium cuminii* L., a related species cultivated in India.<sup>(1)</sup>

### Clinical studies

A tincture of cloves (15% in 70% alcohol) was effective in treating athlete's foot.<sup>(G41)</sup>

## Side-effects, Toxicity

None documented for the bud, leaf or stem of cloves. Clove oil is stated to be a dermal and mucous membrane irritant;<sup>(G58)</sup> contact dermatitis, cheilitis, and stomatitis have been reported for clove oil.<sup>(G51)</sup> The irritant nature of the oil can be attributed to the eugenol content. Eugenol is also stated to have sensitising properties.<sup>(G51)</sup> An LD<sub>50</sub> (rat, by mouth)

value for clove oil is stated as 2.65 g/kg body weight.<sup>(G22)</sup>

In humans, the accepted daily intake of eugenol is up to 2.5 mg/kg body weight.<sup>(G45)</sup>

### **Contra-indications, Warnings**

None documented for the bud, leaf or stem. It is recommended that clove oil should be used with caution orally and should not be used on the skin.<sup>(G58)</sup> Repeated application of clove oil as a toothache remedy may result in damage to the gingival tissue.<sup>(G45)</sup> In view of the irritant nature of the volatile oil, concentrated clove oil is not suitable for internal use in large doses. Eugenol is a powerful inhibitor of platelet activity and it is recommended that caution be taken for patients on anticoagulant therapy.<sup>(G58)</sup>

**Pregnancy and lactation** There are no known problems with the use of clove during pregnancy or

lactation, provided that doses taken do not greatly exceed the amounts used in foods.

### **Pharmaceutical Comment**

The pharmacological properties documented for cloves are associated with the volatile oil, in particular with eugenol which has local anaesthetic action. Cloves should not be taken in doses greatly exceeding those used in foods and caution should be exerted in patients taking anticoagulant or anti-platelet therapy.

### **References**

*See also* General References G2, G3, G9, G15, G16, G22, G25, G31, G36, G37, G41, G43, G48, G51 and G64.

- 1 Chakraborty D *et al.* A new neuropsychopharmacological study of *Syzygium cuminii*. *Planta Med* 1986; 52: 139–143.