

# Thyme

## Species (Family)

*Thymus vulgaris* L., *Thymus zygis* L. (Labiatae)

## Synonym(s)

Common Thyme, French Thyme, Garden Thyme, Rubbed Thyme

## Part(s) Used

Flowering top, leaf

## Pharmacopoeial and Other Monographs

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

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

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

ESCOP 1996<sup>(G52)</sup>

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

Mills and Bone<sup>(G50)</sup>

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

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

WHO volume 1 1999<sup>(G63)</sup>

## Legal Category (Licensed Products)

GSL<sup>(G37)</sup>

## Constituents<sup>(G2,G22,G41,G52,G58,G64)</sup>

**Volatile oils** 0.8–2.6%. Pharmacopoeial standard, not less than 1.2%.<sup>(G15)</sup> Phenols as major components (20–80%) primarily thymol and carvacrol; others include *p*-cymene and  $\gamma$ -terpinene (monoterpenes), linalool,  $\alpha$ -terpineol, and thujan-4-ol (alcohols); biphenyl compounds of monoterpene origin.<sup>(G52)</sup> A detailed analysis of the volatile oil components is given elsewhere.<sup>(G22)</sup>

**Flavonoids** Cirsineol, 8-methoxycirsineol, thymonin and eriodictyol.

**Other constituents** Caffeic acid, oleanolic acid, ursolic acid, rosmarinic acid, resins, saponins and tannins.

## Food Use

Thyme is commonly used as a culinary herb, and thyme oil is used in food flavouring. In the USA,

thyme is listed as GRAS (Generally Recognised As Safe).<sup>(G65)</sup>

## Herbal Use<sup>(G2,G4,G7,G32,G43,G50,G52,G64)</sup>

Thyme is stated to possess carminative, antispasmodic, antitussive, expectorant, secretomotor, bactericidal, anthelmintic and astringent properties. Traditionally, it has been used for dyspepsia, chronic gastritis, asthma, diarrhoea in children, enuresis in children, laryngitis, tonsillitis (as a gargle), and specifically for pertussis and bronchitis. The German Commission E approved internal use for treating symptoms of bronchitis, whooping cough and catarrh of the upper respiratory tract.<sup>(G3)</sup> Thyme is used in various combinations with anise oil, eucalyptus oil, fennel oil, fennel fruit, Iceland moss, lime flower, liquorice root, marshmallow root, primrose root and star anise fruit for catarrh and diseases of the upper respiratory tract.<sup>(G3)</sup>

## Dosage

**Dried herb** 1–4 g or by infusion three times daily;<sup>(G7)</sup> 1–2 g.<sup>(G3,G52)</sup>

**Liquid Extract of Thyme** (BPC 1949) 0.6–4.0 mL.

**Elixir of Thyme** (BPC 1949) 4–8 mL.

**Tincture** 2–6 mL (1:5 in 45% alcohol) three times daily,<sup>(G7)</sup> four drops.<sup>(G3,G52)</sup>

## Pharmacological Actions

### *In vitro* and animal studies

Antitussive, expectorant and antispasmodic actions are considered to be the major pharmacological properties of thyme,<sup>(1)</sup> and have been associated with the volatile oils (e.g. thymol, carvacrol) and flavonoid constituents. Thyme oil has produced hypotensive and respiratory stimulant effects in rabbits following oral or intramuscular administration, and in cats following intravenous injection,<sup>(G41)</sup> an increase in rhythmic heart contraction was also observed in rabbits.<sup>(G41)</sup> Hypotensive activity in rats has been reported for *Thymus orospedanus*; this action was attributed to adrenaline (epinephrine) antagonism.<sup>(2)</sup>

*In vitro* antispasmodic activity of thyme and related *Thymus* species has been associated with the phenolic components of the volatile oil<sup>(3)</sup> and with the flavonoid constituents; their mode of action is thought to involve calcium-channel blockage.<sup>(1,4,5)</sup> The flavonoids thymonin, circilineol and 8-methoxycircilineol have potent spasmolytic activity in guinea pig trachea preparations *in vitro*.<sup>(G52)</sup>

Analgesic and antipyretic properties in mice have been reported for a thyme extract.<sup>(6)</sup>

Thymol possesses anthelmintic (especially hookworms), antibacterial, and antifungal properties.<sup>(G41)</sup> The antibacterial activity of thymol and thyme oil have been reviewed.<sup>(G50)</sup> Thymol, carvacrol and thyme oil have antifungal activity against a range of organisms.<sup>(G50)</sup>

Thyme oil inhibits prostaglandin synthesis; rosmarinic acid has anti-inflammatory activity, inhibiting complement in rats and some of the functions of polymorphonucleocytes.<sup>(G52)</sup> Rosmarinic acid reduced oedema produced by cobra venom factor in rats, and inhibited passive cutaneous anaphylaxis and impairment of *in vivo* activation of mouse macrophages by heat killed *Corynebacterium parvum*.<sup>(G52)</sup> Activity may relate to complement inactivation.<sup>(G50)</sup>

### Clinical studies

Generally, well-designed clinical studies assessing the effects of thyme are lacking. A randomised, double-blind, controlled trial involving 60 patients with productive cough compared syrup of thyme and bromhexine over a five-day period. Both groups were similar in self-reported symptom relief.<sup>(G30)</sup>

Thyme oil has been used for the treatment of enuresis in children.<sup>(G44)</sup>

### Side-effects, Toxicity<sup>(G58)</sup>

Thyme oil is a dermal and mucous membrane irritant.<sup>(G58)</sup> Toxic symptoms documented for thymol include nausea, vomiting, gastric pain, headache, dizziness, convulsions, coma, and cardiac and respiratory arrest.<sup>(G22)</sup> Thymol is present in some toothpaste preparations, and has been reported to cause cheilitis and glossitis. Hyperaemia and severe inflammation have been described for thyme oil used in bath preparations.<sup>(G51)</sup>

A concentrated extract of thyme decreased locomotor activity and caused a slight slowing down of respiration in mice following oral administration of doses of 0.5–3.0 g/kg, equivalent to 4.3–26.0 g dried plant material.<sup>(G52)</sup> In rats, oral LD<sub>50</sub> values stated for thyme oil include 2.84 g/kg<sup>(G52)</sup> and 4.7 g/kg in rats, and >5 g/kg following dermal administration.<sup>(7)</sup> In mice, oral administration of a concentrated ethanol

extract of herb in subacute toxicity tests resulted in increased weights of liver and testes. Also in mice, a dose of 0.9 g daily for three months resulted in mortality rates of 30% and 10% in males and females, respectively. Thyme oil had no mutagenic or DNA-damaging activity in either the Ames test or *Bacillus subtilis* rec-assay.<sup>(G52)</sup>

### Contra-indications, Warnings

Thyme oil is toxic and should be used with considerable caution. It should not be taken internally and only applied externally if diluted in a suitable carrier oil.

*Pregnancy and lactation* There are no known problems with the use of thyme during pregnancy and lactation, provided that doses do not greatly exceed the amounts used in foods. Traditionally, thyme is reputed to affect the menstrual cycle and, therefore, large amounts should not be ingested.

### Pharmaceutical Comment

Thyme is commonly used as a culinary herb and is characterised by its volatile oil. Documented pharmacological actions support some of the traditional medicinal uses, which have been principally attributed to the volatile oil and flavonoid constituents. However, the oil is also toxic and should not be ingested and only applied externally if diluted in a suitable carrier oil. It has been suggested that standardised thyme extracts based on the phenolic volatile components may not be appropriate because antispasmodic actions previously attributed to these compounds may be attributable to other constituents.<sup>(3)</sup>

### References

See also General References G2, G3, G5, G9, G11, G15, G22, G28, G31, G36, G37, G41, G43, G50, G51, G52, G58, G63 and G64.

- 1 Van Den Broucke CO. The therapeutic value of *Thymus* species. *Fitoterapia* 1983; 4: 171–174.
- 2 Jimenez J *et al.* Hypotensive activity of *Thymus orospedanus* alcoholic extract. *Phytother Res* 1988; 2: 152–153.
- 3 Van Den Broucke CO, Lernli JA. Pharmacological and chemical investigation of thyme liquid extracts. *Planta Med* 1981; 41: 129–135.
- 4 Cruz T *et al.* The spasmolytic activity of the essential oil of *Thymus baeticus* Boiss in rats. *Phytother Res* 1989; 3: 106–108.
- 5 Blázquez MA *et al.* Effects of *Thymus* species extracts on rat duodenum isolated smooth muscle contraction. *Phytother Res* 1989; 3: 41–42.

- 6 Mohsin A *et al.* Analgesic, antipyretic activity and phytochemical screening of some plants used in traditional Arab system of medicine. *Fitoterapia* 1989; 60: 174.
- 7 Opdyke DLJ. Thyme oil, red. *Food Cosmet Toxicol* 1974; 12: 1003–1004.