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**FILE: ■Thyme (*Thymus vulgaris*)
■Thymol**

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RE: Review of Thyme (*Thymus vulgaris*)

Basch E, Ulbricht C, Hammerness P, Bevins A, Sollars D. Thyme (*Thymus vulgaris*), thymol. *J Herb Pharmacother.* 2004;4(1):49-67.

The leaf of thyme (*Thymus vulgaris*) is a popular culinary herb that has a history of use in traditional herbal medicine, particularly in the treatment of coughs and bronchial catarrh. Both Germany's Commission E and a wide assortment of herbal texts support thyme's traditional use as an expectorant.¹ Thymol, a constituent of thyme essential oil, is an ingredient in popular mouthwashes and cosmetics.

The authors of this evidenced-based systematic review of thyme discuss its clinical uses, pharmacology, adverse effects, scientific evidence, and its history of use as an herbal medicine dating back to ancient times.

Clinical Bottom Line/Effectiveness

Although there are "no well-defined controlled clinical trials to support thyme monotherapy for clinical use in humans," thyme has been used in herbal medicine for thousands of years. According to the authors, there is not enough evidence to support thyme's use as a monotherapy for many of its historical and theoretical indications including gingivitis, upper respiratory tract infection, halitosis, dermatitis, depression, and cancer.

Germany's Commission E approves thyme's traditional use as a treatment for coughs and upper respiratory tract congestion and also for symptoms of bronchitis, whooping cough, and catarrh (inflammation of upper respiratory tract mucous membranes).¹ Thymol, a constituent of thyme, is an ingredient in the combination mouthwash Listerine®, which has demonstrated antibacterial activity. Despite a lack of controlled clinical evidence, thyme has been recommended as a treatment for fungal conditions of the fingernails and toenails.

Thyme is generally recognized as safe (GRAS) status in the United States when prepared in food. The authors regard thyme as "possibly safe" when used orally or topically

in doses that do not exceed 10 g of dried thyme leaf containing 0.03% phenol (calculated as thymol) daily. The authors state that the use of undiluted thymol oil is "likely unsafe."

Dosing/Toxicology

Thyme dosage is often based on traditional doses, due to a lack of clinical evidence. However, standardized amounts of thyme oil are found in topical commercial products, such as mouthwashes and topical cosmetics: 0.6-1.2% volatile oil and 0.5% phenol content.

The oral dose for adults is generally 1-2 g/day of thyme extract. A tea made of 1-2 g dried thyme herb steeped in 150 ml of boiling water for 10 minutes has been recommended for upper respiratory tract infections, although clinical evidence is lacking. Traditional doses of liquid extracts range from 1-2 g or 20-40 drops of liquid extracts or tinctures daily. Traditional liquid formulations include: tinctures (1:10 weight/volume of thyme: 70% ethanol) and liquid extracts (1:1 weight/volume fresh leaf, 1:4 dry leaf). Thyme oil is highly toxic, but has been administered in sugar cubes (2-3-drops/sugar cube, 2-3 times daily). The authors also note a study involving an unstated dose of Bronchipret®, a tablet formulation of *Primulae radix* (*Primula veris* or *Primula elatior* roots) and thyme.

Thymol is an ingredient in Listerine® mouthwash, which is effective in reducing oral bacteria. A 5% infusion of thyme in water has been recommended for "periodontal prophylaxis." Topical treatments that include thyme oil as an ingredient (1-2% thyme oil) have been recommended for a variety of skin conditions ranging from baldness to paronychia (inflammation of tissue surrounding fingernail or toenail). The medicinal use of thyme is not recommended for children due to insufficient evidence.

Precautions/Contraindications

Adverse effects linked to thyme or thyme oil include headache, dizziness, conjunctivitis, allergic contact dermatitis, asthma, allergic hay fever, cardiac effects, gastrointestinal complaints, and muscle weakness.

Thyme is considered safe in food and limited medicinal use. Caution is recommended when using thyme oil, which should never be used orally or in an undiluted form. People with known allergies or hypersensitivity to plants from the mint family (Lamiaceae) should not use thyme or thyme constituents. People with gastrointestinal irritation, thyroid disorders, or peptic ulcers should exercise caution with thyme. Topical preparations should not be used on damaged or injured skin. Pregnant and lactating women should not take thyme.

Interactions

A lack of clinical trials has led to a lack of evidence on possible drug-herb and herb-herb interactions of thyme. Thyme has been shown to decrease levels of thyroid hormones and prolactin, and to have estradiol and progesterone receptor-binding activities in rats, and to decrease per cutaneous absorption of 5-fluorouracil in pigs, but these interactions have not been studied in humans.

Mechanism of Action

Key constituents of thyme include phenols (thymol, carvacrol), flavonoids, borneol, linalool, rosmarinic acid, saponins, tannins, terpenoids, and acetophenone glycosides.

Thyme and thymol have shown antibacterial activity in vitro against *Salmonella typhimurium*, *Staphylococcus aureus*, *Helicobacter pylori*, *Porphyromonas gingivalis*, *Selenomonas artemidis*, *Streptococcus sobrinus*, and *Streptococcus mutans*. This activity is possibly related to cell membrane perforation. Thymol has also demonstrated antifungal activity against *Candida albicans*, *Aspergillus parasiticus*, and *Aspergillus flavus*.

In vitro and in vivo studies show that thyme flavonoids relax tracheal and ileal smooth muscles. The mechanism of action may be inhibition of acetylcholine and histamine receptors, calcium channel antagonism, or inhibition of phasic contractions. This antispasmodic activity may be dependent on flavone aglycone concentrations.

In vitro and in vivo studies of thyme have also demonstrated antioxidant effects and anti-inflammatory effects including inhibition of prostaglandin synthesis. There are few studies on pharmacodynamic effects of thyme or thyme constituents. One study of the thyme phenolic constituents thymol and carvacrol showed rapid urinary excretion of metabolites.

History

The ancient Sumerians and Egyptians used thyme as a medicine and to embalm the dead. The ancient Romans used thyme to flavor cheese and alcoholic beverages, burned it to deter wild animals, and bathed in it to "provide vigor." Medieval women embroidered thyme on gifts for knights. Today, thyme oil is used in the production of cosmetics including soaps, mouthwash, and toothpaste; red thyme oil is used in perfumes.

Evidence Discussion

Current clinical evidence does not support the use of topical thyme oil as a treatment for hair loss, either alone or in combination products. Clinical evidence does support the broad-spectrum antibacterial activity of Listerine, a combination product containing thymol that shows activity against dental plaque and gingivitis. Thymol has shown in vitro activity against oral bacteria, but there is no clinical evidence supporting thyme as a monotherapy mouthrinse.

In vitro evidence shows that thymol and thyme essential oil have antifungal activity, and thymol is a traditional treatment for paronychia and onycholysis. However, the authors write, "there is insufficient evidence to recommend for or against thyme/thymol as a treatment for fungal infections.

Despite the German Commission E's approval of thyme as a bronchitis treatment, the authors also find insufficient evidence to recommend for or against using thyme as a monotherapy for bronchitis or coughs. Bronchipret® is a combination product including thyme and primula root that has demonstrated comparable results and fewer side effects compared to conventional drug treatments. The authors write that initial results "may merit follow-up with a prospective controlled trial."

Thyme is used as traditional topical medicine for a variety of skin conditions, but the authors also find a lack of evidence to support or refute thyme as a treatment for skin conditions.

The lack of clinical evidence demonstrates a need for controlled clinical trials of thyme, following up on potential medicinal uses as a treatment for skin conditions including fungal infections and as a treatment for coughs and bronchitis. Future clinical trials on the safety and tolerance of thyme are also needed.

—*Marissa Oppel, MS*

REFERENCES

1. Blumenthal M, Goldberg A, Brinckmann J, editors. *Herbal Medicine: Expanded Commission E Monographs*. Austin, TX: American Botanical Council; Newton, MA: Integrative Medicine Communications; 2000.

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