

THYMOL MONOGRAPH



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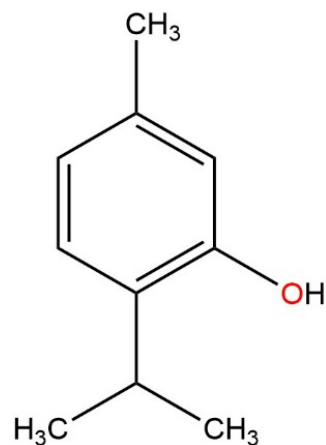
THYMOL

Chemical Family: Phenol

Molecular formula: C₁₀H₁₄O

Aroma: spicy-herbal, slightly medicinal odor reminiscent of thyme

Taste: pungent, caustic; sweet, medicinal, spicy¹



Research

Thymol has exhibited the following activity:

- potent antioxidant and anti-inflammatory activity^{2,3}
- neuroprotective⁴
- antioxidant⁵
- wound healing and anti-inflammatory activity⁶
- antispasmodic activity and bronchial secretomotoric (respiratory clearance) effects⁷
- local analgesic and antinociceptive activity^{8,9}
- potent antibacterial activity¹⁰
- cognitive-enhancing activity¹¹
- effective antimicrobial against oral pathogens¹² - Think about Listerine, its active ingredients are the essential oil components: thymol, eucalyptol, menthol, and methyl salicylate.
- potent antifungal against molds in damp dwellings - Essential oil of thyme and thymol could be used for disinfection of moldy walls in the dwellings in low concentration.¹³

Essential Oils

Essential oils rich in thymol:

- Thyme ct. thymol (*Thymus vulgaris*): thymol (30-50%)
- Monarda (*Monarda fistulosa*): thymol (55+%)
- Monarda (*Monarda didyma*): thymol (55+%)
- Ajowan (*Trachyspermum ammi*): thymol (35-87.75%) and carvacrol (11.17%)^{14,15}

Pharmacology of Thymol

Thyme enjoys centuries-old prestige as potent medicine. Widely regarded as the most significant constituent in the thyme species, thymol has been found to exert numerous pharmacological effects. Affectionately known by acolytes of chemical nomenclature as 2-isopropyl-5-methylphenol, thymol is a colorless crystalline monoterpene phenol with antioxidant, free radical scavenging, anti-inflammatory, analgesic, antispasmodic, antibacterial, antifungal, antiseptic, and antitumor activities.

Thymol's expedient biochemical actions are attributed to the following mechanisms:

- Anti-inflammatory activity via the inhibition of cytokine recruitment.
- Antioxidant activity via free radical scavenging, enhancement of endogenous enzymatic and non-enzymatic antioxidants, and chelation of metal ions.
- Antihyperlipidemic activity via increasing HDL cholesterol and decreasing LDL cholesterol in the circulation, membrane stabilization, and maintenance of ionic homeostasis.

On a molecular level, the pharmacological properties of thymol are largely ascribed to its phenolic hydroxyl group. There are numerous reports in the literature that phenols negate the deleterious effects of free radicals by directly neutralizing them, as well as by augmenting endogenous antioxidant activity. Thymol has specifically been found to increase the activities of endogenous antioxidants superoxide dismutase (SOD), catalase, glutathione peroxidase (GPx), glutathione-S-transferase (GST), and the non-enzymatic antioxidants vitamin C, vitamin E and reduced glutathione (GSH).

Following oral administration and degradation in the stomach/intestine thymol is rapidly absorbed, likely in the upper component of the gut. It is readily metabolized to thymol sulfate; free thymol is generally undetectable in human plasma. Thymol sulfate is measurable in the blood 20 minutes after oral ingestion, with the maximum concentration (T_{max}) achieved at 30 min. Thymol conjugates are slowly eliminated in urine via the kidneys within 24 hours.

Thymol metabolites have been found in the liver, lungs, kidneys, and muscles. These were measured at higher concentrations in the mucosa and inner contents of the intestines, indicating partial absorption. Correspondingly, the bioavailability of thymol was only 16%, as measured by plasma thymol sulfate. Thymol is considered to be safe, with negligible toxicity.¹⁶

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