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The communication between chemical composition and supportive effects of *Thymus vulgaris* on immune system

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Core tip

Thymus vulgaris exhibit strong antimicrobial effects due to its chemical structure. Many experimental investigations reported bactericide, antiviral and antioxidant effects of *Thymus vulgaris* in a dose dependent manner.

Introduction

Thymus vulgaris (German thyme, garden thyme or simply thyme) is a species of seed plant within the family Lamiaceae, native to southern Europe from the western Mediterranean to Italy. It is a bushy, woody-based evergreen subshrub with tiny, extremely aromatic, green leaves and clusters of light purple or pink flowers in early summer. *Thymus vulgaris* (garden thyme) has a strong, spicy taste and odor. This plant is native to the Mediterranean region of Europe and extensively exists in the United States, Iran and Morocco (1).

Antimicrobial activity and chemical structure

The best-known primary constituents of the thyme include oil, tannin, flavonoids and saponins (Figure 1). The oil and extracts from leaves and flowers is used as prescription drugs and cosmetics. *Thymus vulgaris* has antispasmodic agent, carminative, diaphoretic, medication, and sedative properties. As an extract, or infusion, thyme is widely used in throat and bronchial issues, that is included acute respiratory disorder, laryngitis and infectious disease, and additionally for diarrhea, gastritis, and loss of appetency. Thymus species are commonly used as herb tea too. The ancient studies reveal that major volatile constituents that obtained from the aerial components of the plant area are geraniol, linalool, γ-terpineol, carvacrol, thymol essential oils and extracts are used for many thousands of years, particularly in pharmaceuticals, alternative medicine and natural therapies (2). It is long been known that some plant essential oils exhibit antimicrobial properties and it is necessary to analyze those plants scientifically, which had been used in ancient drugs to enhance the quality of health care. Oils are sources of unique antimicrobial compounds particularly against pathogenic microorganisms. Recent studies have shown that thymus species have strong bactericide, antioxidant, antiviral, anti-parasitic and inhibitor activities (3). These results can enable chemical components are probably contribute to the antimicrobial influences and assign any relationships between the components and their antibacterial actions (3). The results obtained in studies showed that the gram negative bacteria were more sensitive to the essential oil of thyme and showed less sensitivity to any property of gram positive bacteria (3). The antibacterial action from the oil *Thymus vulgaris* depends on their chemical structures that is determined by the genotype and influenced by environmental and agricultural conditions. Lot of antimicrobial activity in oil from *Thymus vulgaris* seems to be associated with phenol structures. The antibacterial effects of the oil thyme is outwardly associated with its terpenes type elements like, myrcene and camphene therefor there is a joint between the chemical structures of the most plentiful oils and their antimicrobial activities. Although the action mechanism of terpenes is not certainly understood, it has been assumed to involve membrane disruption by the lipotropic components. The oil from *Thymus vulgaris* containing terpenes are revealed to possess antimicrobial effects and also there is an absolute relationship between the synergistic effects of those active chemicals with different consideration for the antimicrobial activities (3).

Restrictive ability of the oil from *Thymus*

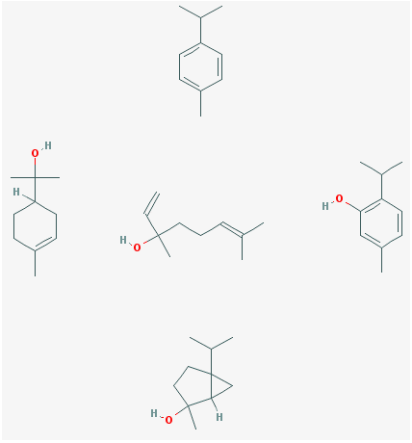

Figure 1. Chemical structure of *Thymus vulgaris* (4).

vulgaris were assayed adding eosin and viable trophozoites of *E. histolytica* were dead and dead cells were detected red in color. It has been shown the incubation of *E. histolytica* trophozoites in treatment (0-10 mg/mL) of extracts and essential oil caused inhibitory growth. When the concentration range enhanced, the quantity of living trophozoites reduced. The oil from *Thymus vulgaris* was the most bactericide material against the trophozoites of *E. histolytica* and inhibition seemed to be dose-dependent. Moreover, the results discovered that an extended treatment of *Thymus vulgaris* decreases the quantity of viable trophozoites (3). The thyme extracts have strong influence of tetracycline against drug-resistant *Staphylococcus aureus* (5). The oil from *Thymus vulgaris* had antiprotozoal activity on the viability of blood types of *Trypanosoma brucei* and *Trypanosoma cruzi* (6). Methanolic extract of *Thymus vulgaris* showed average activity on *E. histolytica* and *Giardia lamblia* (7). *Thymus vulgaris* suppressed growth of *E. histolytica* at low concentrations. Especially, the oil of *Thymus vulgaris* exhibited stronger influence against *E. histolytica* trophozoites than the extracts. In fact, previous studies showed that the oil of *Thymus vulgaris* has larger antioxidant activity in comparison with its extracts. It appears seemingly that anti-amebic activity of *Thymus vulgaris* is related to phenol, carvacrol, borneol, and linalool that are the most plentiful ingredients in oil of plant.

Conclusion

According to the on top of findings, *Thymus vulgaris* oil appears to be smart antimicrobial agent than its extract because of phenol, carvacrol, borneol and linool structures.

Author's contribution

SMA was the single author of paper.

Conflicts of interest

The author declared no competing interest.

Ethical considerations

Ethical issues (including plagiarism, data fabrication, double publication) have been completely observed by the author.

Finding /Support

None.

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