

## Mini review

**The medicinal importance of Thyme plant (*Thymus vulgaris*)**

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**ABSTRACT**

Medicinal and aromatic plants are a group of the oldest plants known and used by man throughout the ages for different fields, as they are used as food and medicine, in the middle and modern ages. The importance of these plants has increased, and their uses varied. The term medicinal plants include different types of plants that have therapeutic activities. These medicinal plants are considered among the sources rich in chemical components that can be used for the treatment of a specific disease or to reduce it if they are used in pure extract or in the form of fresh, dried, or partially extracted vegetable herbs. In addition to its medicinal importance, some plants have great nutritional value. One of the important medicinal plants is the thyme plant which contains many benefits that treat many health conditions. So, this article aimed to explain the most important components of thyme, in addition to its extreme role as a medicinal plant and its multiple uses as food and medicine, as well as its importance in preventing viruses, especially Corona virus.

**Keywords:** Thyme; corona virus; medicinal plants; food; medicine.

**INTRODUCTION**

Thyme includes more than 350 species spread in many countries of the world which includes several genera, Summer Savory (*Satureja*), *Oregano* and *Thymus*. Genus *thymus* belongs to common thyme or garden thyme *T. vulgaris*, *T. citriodorus*, *T. capitellatus*, *T. herbabarona*, *T. scrpyllum*, *T. pseudolanuginosus* (1). Genus thyme is one of the most famous plants around the world because of the medicinal, aromatic, and nutritional properties. Common thyme is a small perennial herb with a low height of about 30 cm according to the climate and nature of the place in which it is located, with abundant branches, upright or crawling, the stem is square, the leaves are small in size and simple and the edges are complete, the color is greenish gray or silver due to the presence of the vines on their surfaces, the flowers are small and medium-sized, with white or somewhat purple color and are carried on terminal bulges. Thyme fruits are capsule-shaped, small in size, containing many wrinkled seeds black in color, morphologically distinguishable in terms of the external shape. Its essential oil content is 2.5%, thyme is an evergreen aromatic medicinal herbs that belongs to the family *Lamiaceae* it is derived from the Greek word *thymus* (2,3). The Greeks, ancient Egyptians and Romans used herb thyme in medicine, the ancient Egyptian pharaohs used the thyme plant in the mummification process, and the Greeks also used it in their baths and burned it as incense in their temples. Thyme contains a good amount of vitamin A, which is necessary for the integrity of the mucous membranes and for maintenance and for the integrity of the nervous, digestive, skin and mouth systems. In addition to eyesight and hair, it also contains vitamin

B, which helps in healing wounds and prevent winter diseases. Thyme contains iron, calcium, phosphorus and vitamin C. Thyme was used since ancient times to add flavor to yogurt and cheese (4) wines (5) pork, bunny and lamb.

**Active substances**

Thyme leaves and its aromatic oil contain 40 active phenolic and terpenoid compounds, the concentrations of which vary according to the types of thyme, including phenols such as Thymol and Carvacrol 51.34% and Pinen, Limonene, Cymen, monoterpene hydrocarbons, oxygenated monoterpenes (56.53%), sesquiterpene, hydrocarbons (5.04%) and oxygenated sesquiterpenes (1.84%), also four acetophenone glycosides were isolated from the soluble fraction of butanol of thyme extracts and percentage of essential oils in thyme ranges from 0.32-49% (6).

**Uses of thyme**

Chemical medicines have been used in treatment of many diseases, but their harmful side effects and emergence of bacteria and viruses resistant to them, in addition to their high economic cost and other factors caught the attention of researchers and scientists to the importance of medicinal plants because of its anti-viral, anti-bacterial and anti-fungal properties, and this is due to the essential oil resulting from the secondary metabolism of the plant (7). Previous studies indicated that fresh thyme is high in antioxidants and contains 29 active compounds especially carvacrol (32%) and thymol (30%), for this it is widely used in traditional medicine to treat different diseases like gastrointestinal diseases, respiratory disorders like bronchitis, asthma, cystic fibrosis, etc., (8,9). In another study, the aqueous extract of thyme showed

antiviral activity especially virus HSV-1, HSV-2 and resistant strain from HSV-1. Thyme is used medicinally to treat laryngitis, pertussis, diarrhea, chronic gastroenteritis and anorexia (10). And it has anti-fungal, anti-yeast efficacy *Candida albicans* (11), antiparasitic and antiviral, it also affects different types of fungi that produce mycotoxins (12). The aqueous extract of thyme leaves is used to relieve headache (13) stomach upset and intestinal disorders, repellent for head lice and kill fungi that cause skin diseases when used externally (2). Aromatic oil, leaf extracts and plant flowers also are used as herbal tea and as aromatic additives for foods, pharmaceuticals, and cosmetics. As a medicinal plant, thyme has the advantage of being an analgesic, antiseptic, expectorant and a cough sedative, anti-worms, intestinal parasites and it reduces prostaglandin, which causes muscle cramps. Therefore, it is beneficial for athletes (10). Thyme has been used for centuries as a spice for fish, poultry, vegetables, and for soups (13). Thymol is also used in the manufacture of toothpastes, because it is an antiseptic and a relieving substance for teeth pain (2).

### Thyme essential oil

Thyme oil is among the top ten essential oils in the world as it is used as a food additive (12). It is used in the manufacture of perfumes and cosmetics because its aromatic properties and characteristics (14). Aromatic oils are volatile substances that are found in the leaves and plant flowers and are responsible for the aromatic smell in plants, which distinguish them from each other, and have nutritional, industrial or commercial uses as they are used as spices, flavoring materials and food flavorings in various types of food and beverages as they are considered natural active substances in pharmaceutical industry (15). Thyme has several mechanisms in treatment of respiratory disorders, including the reduction of interleukin, which is activated by reducing the level of the nuclear factor B (NF- $\kappa$ B) (8). Besides that, the aromatic oil of thyme helps inhibit the reproduction of some viruses. (16). Other research also indicated the role of thyme in boost the immune system and studying the relationship between the reticuloendothelial system, the immune system and the spleen (17, 18).

### Thyme and germination problems

One of the biggest challenges facing the cultivation and spread of thyme is its weak ability to germinate in terms of rate and speed of germination. Therefore, many studies were carried out to stimulate the plant to have better performance, including the study carried out by researchers at the College of Agricultural Engineering Sciences at the University of Baghdad, where the seeds were exposed to different levels of gamma rays, electric shock and the interference between them and the treatments showed their positive effect after planting the seed (19).

### Thyme and COVID-19

Over time, beliefs and tradition have played a role in confronting epidemics that have passed on humanity and left their mark (20). Covid-19 was not an exception to this rule, as we are witnessing today, all over the world, a deep attachment to popular legacies for the prevention of the emerging virus. Alternative medicine has been effective in combating infectious diseases, reducing their severity and shortening the course of their development, and even avoiding their recurrence, but how does that work? The success of alternative medicine mainly focused on choosing products that improve the immune system and strengthen its ability to respond (8). Herbal medicines, aromatherapy, traditional Chinese medicine, all these therapies have an excellent reputation for their ability to stimulate the immune system and are primarily used to treat infectious diseases and their symptoms, such as influenza, colds, nasopharyngitis, sore throats, tonsillitis, laryngitis, and bronchitis. Viral infections are estimated to be about 60% of human infections that result in respiratory infections and has caused the death of nearly 1.5 million people in the world. Recently a new strain of Corona virus has appeared, which is known as COVID-19. This strain is characterized by its rapid spread, causing infections and severe damage to the respiratory system, which resulted in the death of many people during the past months around the world (21,22). For this, many studies have been conducted on some medicinal plants in this field and because this medicinal herb contains the antioxidant phenolic compounds of thymol, carvacrol etc. (23, 24) which is characterized by its antimicrobial, antiviral and antispasmodic properties. It also reduces smooth muscle contraction, bronchospasm, bronchitis and cough symptoms and infections in upper respiratory tract (25, 26).

To study the effect of thyme in treatment of respiratory diseases, Sardari *et al.*, did a questionnaire in the hospital for a group of people infected with COVID-19 and another group who were admitted to intensive care unit (ICU) the questionnaire also included a group of pregnant women and patients refused to participate in questionnaire, the samples were divided into the control group (receiving routine medications prescribed by their doctors) and the interaction group (taking 5 ml of thyme essential oil every eight hours for seven days, in addition to the medications prescribed by their doctors). Based on the results of the questionnaire, the rate of improvement in the group for which thyme was prescribed as a medicine was much higher in the control group, and the results showed, after a week of the trial, a significant decrease in blood urea nitrogen (BUN) for the group that was prescribed thyme compared to the control group. Lymphocytes and calcium were significant (27). Other studies have provided similar results. The research conducted by Schonknecht *et al.*, to find out the effect of the

effective compound of thymol on upper respiratory infection and its role in reducing coughing, shortness of breath and shortening the duration of disease, the results showed that thyme has an effective medicinal effect in reducing respiratory diseases. There are many studies that gave the same results, including the research conducted by Schonknecht et al., to find out the effect of the active compound of thymol on upper respiratory tract infection while reducing coughing and shortness of breath and shortening the duration of the disease. The results showed the medicinal effect of thyme in reducing these symptoms, with the synergistic effect of thymol with synthetic ambroxol, its safety has been proven (28). In addition, another study confirmed the role of thyme as an anti-bacterial, antimicrobial, and antioxidant that contributes to strengthening the immune system (29).

### Dosing

Although there are many studies on the dosage of thyme, the optimal dose has not been determined, and most of the listed doses are based on experiences in herbal medicine and that the real challenge is how to achieve a balance between the effectiveness of these doses and safety and it should also be noted that there is a difference in the preparation of products from one factory to another and from one product to another within the same factory. In general, the Posology for adolescents, adults and elderly (Herbal substance and comminuted herbal substance for tea preparation) is 1-2 g, several times daily (30).

### How to use?

In the form of tea: For people suffering from upper respiratory infection or symptoms of bronchitis, it is recommended to steep 1-2 grams of dried thyme herbs in 150 ml, then boil for 10 minutes, filter and drink several times a day as needed, as it contributes to relieving symptoms.

In liquid extract form: conventional dosages for various diseases including respiratory infection range from 1-2 grams of extract in liquid / cup of water (1: 1 weight / volume of fresh leaf or 1: 4 dried leaf) three times daily.

In the form of oil: two to three drops of thyme oil on a sugar cube 2-3 times a day in the form of a gargle / mouthwash to prevent bacteria and viruses in the mouth, it is recommended to soak 5 grams of dried leaves per 100 ml of boiling water for 10 minutes and filter it (31).

### Toxicity

According to studies and specialized organizations, it has been suggested that oral doses should not be exceeded of 10 grams of dried leaves which contain phenols in form thymol. Thyme oil is highly toxic and a symptom of toxicity is nausea. According to animal studies, thyme oil causes rapid breathing and low blood pressure (32). The lethal dose of thyme essential

oil is 2.84 g / kg of body weight (33) and as an oral dose (0.5-3 g / kg body weight) of concentrated thyme extract. In an experiment conducted on mice, it was observed that after 3 months of taking 0.9 grams of thyme extract by mouth daily in 95% of ethanol, there was a significant increase in the weight of the liver and testicles in 30% of male rats and 10% of females was died (34).

### Precautions, warning, contraindications

Avoid using thyme in people with hypersensitivity from the Lamiaceae family or any component of thyme. Avoid taking it by mouth or undiluted topical use of thyme oil because of the toxicity. Avoid topical use on areas of broken skin or injury. Use with caution in patients with gastrointestinal irritation or peptic ulcers, and patients with thyroid disorders. Thyme is not recommended during pregnancy or breastfeeding due to lack of sufficient data for this. There is a review in 1975 that classified thyme as both emetic and abortive (35).

### CONCLUSION

Studies have shown that thyme plant and its oil are of great importance as an antidote to many pathogens, and that it has an important role in preventing fungal and viral infections, including virus COVID-19.

### CONFLICT OF INTEREST

Authors declare no conflict of interest.

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