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REVIEW PAPER OPEN ACCESS

A review on health effects of Thyme (*Thymus vulgaris*) on human lifestyle

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Abstract

Thyme is a perennial aromatic herbaceous plant for medicinal, culinary, and for ornamental purposes. *Thymus vulgaris* is the most prevalent species. Thyme is a member of the genus, Thymus, of the mint family (Lamiaceae). Thyme leaves are one of the richest sources of metallic elements, iron, calcium, manganese, metallic element, and antioxidants. Phenols are the main synthetic resin element that is primarily blamed for antioxidant activity. The oil of thyme, the oil of Thymus vulgaris (Thymus vulgaris), contains 20-50% thymol, thymol is one of all naturally occurring categories of compounds referred to as biocides, substances that will destroy harmful organisms. Prior to the introduction of modern antibiotics, thyme oil was used to treat bandages. Thyme has chemical constituents like Thymol, carvacrol, linalool, apigenin, eugenol, and Rosmarinic acid has antiseptic, antibacterial, antifungal, antimicrobial, anti-inflammatory, antithrombotic, antiallergic, antimutant, antioxidative properties. Thyme is packed with antioxidants, vitamin C, and a decent supply of vitamin A. Another health advantage of thyme is that it also has a decent supply of copper, fiber, iron, and metallic element. Traditionally Thymus linearis Benth is used for the treatment of assorted diseases as well as high blood pressure. Thyme extract supplementation magnified endurance exercise tolerance in intact animals. Thyme also has a significant antithrombotic effect.

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Introduction

Thymus vulgaris L. (Thyme) is an aromatic small perennial woody plant belonging to the Lamiaceae family, used for medicinal and spice purposes globally Khosravipour and Direkvand-Moghadam, 2016. Thyme grows well under dry and sunny climatic conditions in unshaded areas Dauqan and Abdullah, 2017. Thyme is a perennial bush with greenish-gray aromatic leaves. It originates from Southern Europe and Mediterranean countries; however, it is now cultivated in temperate climatic zones throughout the world Singletary, 2016.

Among medicinal plants, thyme stands out as a well-known medicinal shrub with its high content in interesting natural compounds and with its various applications in the traditional medicine Al-Shahrani *et al.*, 2017. Thymus vulgaris L., a member of the Thymus genus, is the focus of this review, which also covers its biological characteristics, nutrients, and bioactive substances. It also discusses how this plant is used in several industries, including as the food, cosmetic, and medicinal ones. This study also discusses the most recent clinical investigations on *Thymus vulgaris* in order to provide readers with a current picture of the possibilities of this fragrant plant. The uniqueness of this work rests on presenting a comprehensive grasp of the most significant potential uses for *T. vulgaris*, their potential drawbacks, and the requirement for additional research studies. Due to their accessibility and affordability, plant-based medications, sometimes known as "herbal medicines," conventional therapies, and traditional practitioners, provide the primary or only form of healthcare for many millions of people, particularly in developing nations Hosseinzadeh *et al.,* 2015.

Nowadays, the demand for functional food ingredients that will impart health advantages apart from basic nutrition is now on verge of rising. Thyme contains of several flavonoids, and synthetic resin antioxidants like carotenoid, lutein, apigenin, and naringenin. Thyme is a rich source of minerals and vitamins (beta carotene, B-complex, vitamins A, K, E, and C, and folic acid,) that are essential for optimum health. Thyme leaves are one of the richest sources of manganese, iron, calcium, and antioxidants. Phenols are the major bioactive compounds which exhibit potent antioxidative activity Dauqan and Abdullah, 2017. Thyme has been reported to exhibit pharmacological applications in drug development, especially in the preparation of antifungal medicinal formulations Khosravipour and Direkvand-Moghadam, 2016. Thymol is one of the chief bioactive compounds of thyme acting as biocides to cause the destruction of harmful microorganisms. Hence, it might be inferred that thymol will be helpful in mitigating the microbial resistance common medications like antibiotics Zhang *et al.*, 2018.

Thymus vulgaris was the subject of a thorough bibliographic search for this review, which focused on both its nutrients and bio-actives. The description, distribution, and cultivation of plants as well as their functions in traditional medicine were covered. Biochemical processes, medical research, potential applications, and potential restrictions all received special consideration. The diet lifestyle and disease prevention are emerging topic in these days therefore the current situation for *Thymus vulgaris* plant to be investigated and urge the researcher to conduct trials on effects of *T. vulgaris*

Plant History

Thyme has historically been used to perform cosmetic, culinary, and for medicinal functions. Early Sumerian and Egyptian cultures used thyme for health purposes and for the preservation of deceased bodies. Roman people burned thyme to discourage dangerous animals and the aroma of cheese and alcoholic beverages. Ancient Romans bathed with thyme because it was thought to give vigor. The common name for thyme is also derived from the Greek word thymon, which signifies bravery or a cure Basch, *et al.*, 2004.

Chemical Compostion of Thymus vulgaris

Chemical compostion of Thyme is important for the treatment of various diseases. The chemicals that contains in *thymus vulgaris* are enlisted in Table 1.

Therapeutic significance of Thyme

Children's dosing (Younger than the 18 Years)

There is some evidence to support the significant positive use of thyme in kids suffering from infection. In the dentistry bar, a combination of the product containing one chlorhexidine and thymol varnish (Cervitec®) was tolerated in 110 healthy kids, ages 8-10 years, once taken three times at intervals of two weeks which led to improvement in pediatric ability to fight microbial infections Basch *et al*., 2004.

Adult dosing (18 years and older)

In the case of adults, one to two grams of thyme extract per dosage was recorded on daily basis in a separate dose fashion Basch *et al*., 2004.

Anticancer activity of Thyme

Thyme has been identified by the National Cancer Institute of United States as effective modality with improved cancer-preventive properties. Researchers have identified a host of cancer chemoprotective phytochemicals in these herbs Craig, 1999.

Antihypertensive and cholesterol-lowering effects of aerial parts of Thymus linearis Benth

Alamgeer *et al*., 2014 studied the antihypertensive effects of T. linearis Benth and found out that traditionally T. linearis Benth are used for the treatment of assorted diseases as well as high blood pressure to judge the hypotensive and medicinal Results of the binary compound methanolic extract of aerial thymus components in normotensive and hypertensive rats. The binary compounds of methanolic extract of thyme led to decreases in spontaneous bacterial peritonitis. Diastolic blood pressure, mean blood pressure, and vital signs of each normotensive and hypertensive rat. Additionally, the extract showed a decrease in hepatic enzymes including ALP, AST, ALT, and also lower triglycerides (LDL levels), although a significant rise in HDL level was identified. Moreover, these findings suggested that thyme could be used in alternative and complementary drug development.

Stanojevic *et al*., 2013 studied the total phenolic and flavonoid contents, inhibiting potential, radical scavenger activities, and therapeutic possible effects of a liquid extract that is made from the *Thymus serpyllum* L. (wild thyme extract) in normotensive Wistar rats and hypertensive rats.

Total phenolic level and caffeinated acids and rosmarinic were predominantly phenolic compounds. Strong antioxidant properties of TE were shown by an investigation of ferric reducing/antioxidant power and antioxidant capacity. Bolus injection of TE that is 100mg/kg body weight induced significant reductions in the diastolic and systolic blood pressures in normotensive Wistar rats. All experimental rats that received TE treatment experienced no change in their cardiac index. Our study suggests that TE could prevent hypertension.

Moreover, Miloradovic *et al*., 2010 studied a relationship between elevated vital signs and aerophilic stress that has been urged in hypertensive animals as well as in humans. Rosmarinic acid, the predominant phenolic resin compound of thyme extract have a broad spectrum of biological activities and is understood as an antiviral, medicinal drug inhibitor, anti-inflammatory and immuno-stimulating agent, examination of consequences of bolus injection of TE on systolic, diastolic and plus pressure and aerophilic stress within the model of high blood pressure, results showed that thyme extract induces normalization of blood pressure and current levels of thiobarbituric acid reactive substances.

Immunity boosting of Thyme

Thyme is highly enriched with antioxidants, vitamin C, and an ample supply of vitamin A. Moreover, thyme is also comprised of other immune-boosting elements like copper, fiber, iron, and metallic element Butler, 2016.

Thyme and liver disease

Rakovi *et al*., 2015 studied the effects of thyme and its components on the liver, focusing on how two regularly used formulations containing thyme, tincture, and syrup, and the acute liver injury in rats caused by the carbon tetrachloride. Thymol was found to be the major active constituent.

Investigating thyme preparations exerted inhibitor effects on the liver by inhibiting the induced carbon tetrachloride. increases of macromolecule peroxidation. Furthermore, the activities of aerophilic stress-related enzymes such as glutathione peroxidase, peroxidase, and catalase enzyme for liver enhancement have also been inverted through co-treatment with thyme preparations.

The Co-administration of thyme tincture led to a sudden exacerbation of AST and ALT while thyme syrup controlled the activities of aminotransferases, comparatively to animals given carbon tetrachloride

The impact of thyme extract supplementation on endurance exercise performance in rats

Khani *et al.*, 2017 studied the impact of thyme extract on the performance of endurance exercises in rats. Twenty male Winstar rats were randomly assigned to two groups receiving either standard drinking water or thyme extract at the dose of 400 mg/kg.

Rats in each team were subjected to endurance treadmill coaching (27m/min, 5 days/week for eight weeks determine endurance capacity, and the treadmill burn-out time at 36m/min speed was assessed at the peak of endurance capability for body fluid and striated muscle samples. It was concluded that supplementation with thyme extract (TE) increased tolerance for endurance exercise in intact animals.

Thyme for Antithrombotic effect

Yamamoto *et al.*, 2005 reviewed thyme for its antithrombotic effect. The regulatory adoption of an anti-thrombotic regime can provide a suitable and real means of prevention. The filtrate results for the formation of thrombocyte-rich coagulum were evaluated in an in vitro shear-induced platelet function assay (Hemostatometry).

Filtering with significant antithrombic activity was evaluated based on a laser-induced in vivo thrombose test in rats. Thyme demonstrated important antithrombotic activity both in vitro and in vivo and did not affect flow-mediated vasodilation.

Table 1. List of selected chemical constituents in Thymus vulgaris Javed, 2013.

Chemical constituent	Biological activities
Thymol	Antifungal, and antioxidant properties, antiseptic and antibacterial
Carvacrol	Acetylcholinesterase inhibitory properties. Antimicrobial, antithrombotic, anti-inflammatory,
Linalool	The antiviral effect, antioxidant, anti-nociceptive, anti-inflammatory as well as analgesic activity.
Apigenin	Anti-carcinogenic, anti-inflammatory, anti-progression, anti-inflammatory, anti-viral and antioxidant properties.
Eugenol	Anti-bacterial, anti-cancer, neuroprotective, anti-anaphylactic properties.
Rosemeranic Acid	Anti-allergic, anti-inflammatory, astringent, anti-mutagen, anti-oxidative,

Conclusions and Future Approach

The numerous possible health advantages of *Thymus vulgaris* are well documented in this review. Antioxidant, antibacterial, anti-inflammatory, anti-cancer, and hepatoprotective qualities are a few of these health advantages. They enable *T. vulgaris* to be utilised for a wide range of purposes, including as an expectorant, an anti-acne agent, a fungicidal, an antiviral medication, a pest deterrent, and in the food, food packaging, and cosmetics industries. It is the demand of future to use *T. vulgaris* and other beneficital herbal plant in the development of food product to increase the quality and nutrionuish value of human consumable food.

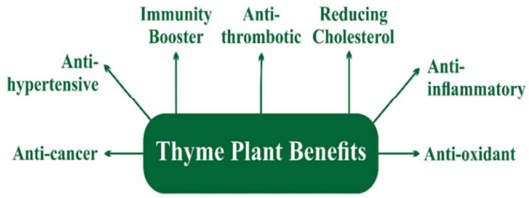

Fig. 1. Thyme plant's properties related to health benefits.

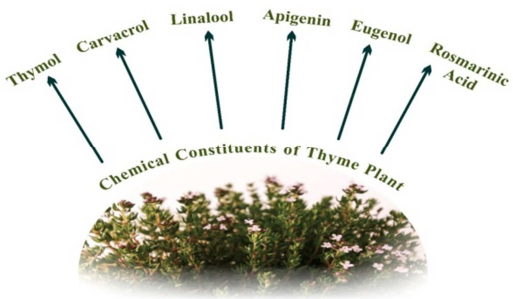

Fig. 2. Chemical constituents of thyme plant extract.

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