

# Impacts of the Alcoholic Extract and Essential Oil of *Thymus vulgaris* L. Against the Causative Agent of Acne Formation (*Staphylococcus aureus*)

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## ABSTRACT

Medicinal plant life have performed an integral role in the development of human lifestyle being used as resources for the manufacturing of contemporary medicines, antibiotics. Microorganisms are responsible for many issues in industry and remedy because of biofilm formation. This study aimed to take a look at the results of *Thymus vulgaris* alcoholic extract on *Staphylococcus aureus* the causative markers of acne in human particularly the women. The extract was acquired mixing 25 g of Thyme powder with 350 ml of 80% ethanol for 6 hours at 40°. Antimicrobial activities of the plant extract and integral oil towards the *S. aureus* were decided using the agar diffusion technique. The consequences proven that special concentrations of alcoholic extract (5, 10, 15 mg/ml) prompted accelerated diameters of bacterial boom inhibition zones (20, 40, 27.7, and 30 mm respectively) as compared to the control (20mm). Increased diameters of inhibition zones (20.6, 32.33, 22 mm) have been additionally determined in response to remedy with extraordinary concentrations of plants crucial oil (0.5, 1.5, and 2 p.c respectively) in evaluation to the manage (0.0%).

The inhibitory consequences of the extracts and vital oil had been directly correlated to their concentration. Two an fascinating end result bought in this study that alcoholic extract showed superior antibacterial exercise against the examined gram-positive bacterium than thyme oil. Two According to the workable of *T. Vulgaris* extracts to inhibit the tested bacteria, it can be suggested that these extracts can be applied as antimicrobial retailers towards the effects of pathogenic bacteria specifically acne formation.

**Keywords:** *Thymus vulgaris*, Antimicrobial effect, *Staphylococcus aureus*, essential oil

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## INTRODUCTION

*Thymus vulgaris* L., generally regarded as backyard thyme or common thyme, is a perennial fragrant plant from the Lamiaceae family frequently cultivated for its ornamental, culinary and medicinal makes use of.<sup>(1,2)</sup> Thyme quintessential oil is being intensively used in quite a few fields—mainly in the medication, agriculture, and food industries.<sup>(3,4)</sup> It is historically used for the treatment of a range of complaints of the respiratory tract and digestive system issues and for its antimicrobial effects, amongst others.<sup>(5,6)</sup> Thyme (*Thymus vulgaris*) is a fragrant plant belonging to the household Lamiaceae, whose homes are well studied for their antifungal and antioxidant properties, due to the presence of phytochemicals in the vital oil.<sup>(7,8)</sup> There are over 350 species of thyme grown in many parts of the world however is more indigenous to Europe and the Mediterranean basin. It has been used in medicine and culinary packages for many centuries.<sup>(9,10)</sup> Thyme oil has business importance partly due to the fact of its aroma and therefore regularly brought to exceptional kinds of nutriment and drinks. It is additionally used as a herbal meals preservative in the meals industry.<sup>(11,12)</sup>

## MATERIALS AND METHODS

### Plant Extract

Plant samples of dry leaves of thyme were obtained from a local herbarium market in Baghdad city. After the samples were air derided and powdered, they were kept at 4° until further investigations.<sup>(13,14)</sup>

### Alcoholic extracts

Thyme herbs had been delivered into the extraction reactor (Soxhlet). Alcohol extract was got from putting 25 g of thyme powder in the Soxhlet and adding 350 ml of 80% ethanol. The extraction continued for 6 hours at 40°. The extracts were filtered through a Whitman filter paper No. forty two (125 mm) and centered by using Vacuum Rotary Evaporator at 35 °C. the extracts had been then weighed, transferred to glass flasks, and stored at 4°C for in addition learn about 8.<sup>(15,16)</sup>

### Antibacterial activity

The chromatogram is a qualitative technique to take a look at the antimicrobial recreation of a substance towards a particular microorganism. This approach was once utilized the use of alcohol extracts and indispensable oils of thyme. The bacterial pressure used, *S. aureus* had been accumulated from ladies with acne. Wells with 5mm diameter had been made on agar media pre-inoculated with *S. aureus*. Each properly was filled with 50µL of the extracts or oils concentrations. After a latency length at 37°C±1 for 24h, the diameter of the inhibition sector of *S. aureus* used to be measured with a caliber.<sup>(17,18)</sup>

### Statistical analysis of data

All experiments were repeated in triplicates, where mean values of diameters of inhibition zones were calculated. Results were analyzed using the statistical software SPSS

(version 20.0). The results are expressed as mean value  $\pm$  standard deviation or as a geometric mean. Comparison of groups was performed by analysis of variance (ANOVA); differences were considered statistically significant at  $p < 0.05$  <sup>10</sup>.

## RESULTS AND DISCUSSION

### Antibacterial activity of thyme alcohol extraction

The antibacterial undertaking was estimated in phrases of the diameter of the area of inhibition after 24 hours of incubation at 37°. The consequences printed that *S. aureus* looks sensitive closer to the tested extract, with the diameters of the inhibition zones of *S. aureus* various between 20 and 33 mm as proven in desk 1 and figures 1, 2. Using the concentrations ranging from zero to 15 mg/ml, the alcoholic extract of thyme exhibited sturdy antibacterial activity, which can be in most cases attributed to thyme and to the wide variety of free hydroxyls. It was until now proven that the least hydroxylated flavonoids are most active, in the case of

chrysin 7 OR' which has only one free OH at the carbon assumed that thyme extracts have flavonoids that possess higher antimicrobial activity, which leads to elevated chemical affinity for membrane lipids. Thus, it can be assumed that the goal microbial shape of these flavonoids in the cytoplasmic membrane. Conducted scan the place aqueous extracts from species of the Lamiaceae family were examined for their antiviral activities in opposition to Herpes simplex virus (HSV). Extracts from thyme showed inhibitory pastime in opposition to Herpes simplex virus kind 1 (HSV-1) and type 2 (HSV-2).

Table 1- Effects of thyme alcoholic extract on the growth of *S. aureus*.

Concentration (mg/ml)	Inhibition zone (mm) $\pm$ sd
control	20.000 $\pm$ 0.058 c
5	40.000 $\pm$ 5.000 a
10	27.667 $\pm$ 1.33 bc
15	33.000 $\pm$ 3.000 ab
<b>LSD P <math>\leq</math> 0.05</b>	9.754

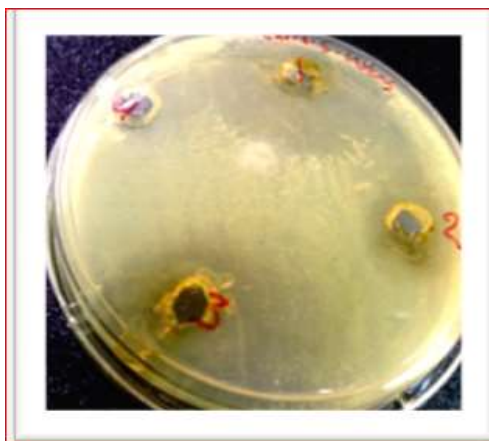


Figure 1. The inhibitory effect of extract of *T. vulgaris* on *S. aureus*

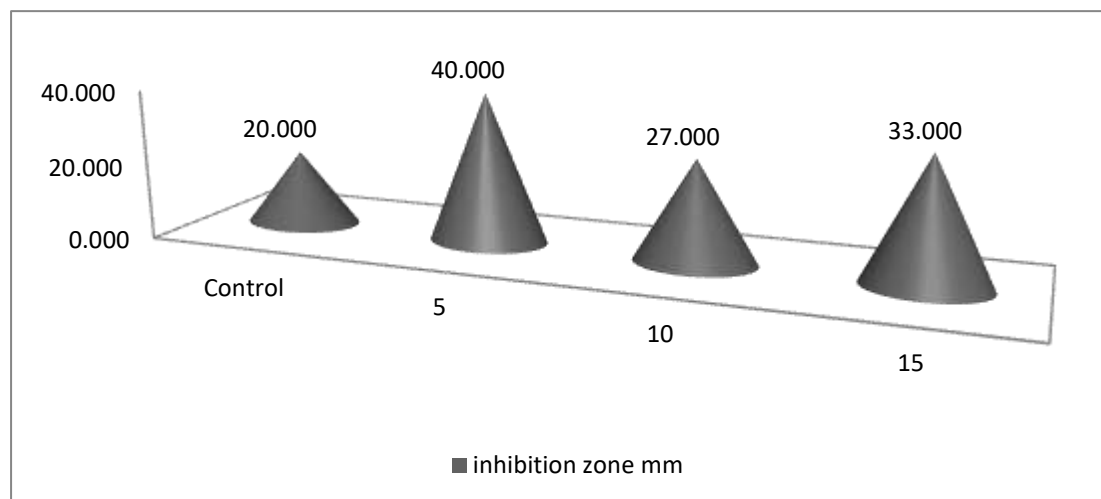


Figure 2. Effects of thyme alcoholic extract on the growth of *S. aureus* antibacterial activity of thyme oil

The antibacterial endeavor of thyme critical oil used to be estimated in terms of the diameter of the zone of inhibition after 24 hours of incubation at 37°. The consequences printed that *S. aureus* was once touchy in the direction of the examined oil, with the diameters of the inhibition zones various between 0 and 22 mm as proven in desk 2 and figures 3, 4 Using concentrations ranging from zero to 2%, the thyme oil exhibited robust antibacterial things to do that would possibly be basically attributed to the fact that thyme oil is a aggregate of monoterpenes determined that thyme quintessential oil had antibacterial things to do towards Methicillin-resistant *Staphylococcus aureus* (MIC 18.50 µg/ml), to countless multidrug-resistant bacterial traces remote from sufferers from the sanatorium environment. The leafy components of thyme and its oil are utilized in ingredients for the flavor, aroma, and preservation, whilst they have additional uses in folk medicines. *Thymus* species are

good sources of one-of-a-kind phenolic acids such as catechin, caffeine acid, p-coumaric acid, rutin, rosemary acid and quercetin . Also, it has been tested that thyme oil possesses robust antimicrobial activity, which is steady with findings where thyme critical oil tested a low endeavor against moisture strains. Recognized thymol, p-cymene, linalool, terpinene and cineole as compounds located in thyme oil that had been generally accountable for the antimicrobial effect. Tested the antimicrobial things to do of various imperative oils and their primary aromatic imperative constituents. An interesting result obtained in that learn about used to be that alcoholic extract confirmed a more suitable antibacterial exercise in opposition to gram-positive bacterium that of the thyme oil.

Table 2- Effects of thyme oil on the growth of *S. aureus*.

Concentration (%)	Inhibition zone (mm) ± sd
control	0.000±0.000 c
0.5	20.667±2.33 b
1.5	32.333± 1.333 a
2	22.000± 2.517 b
<b>LSD P ≤ 0.05</b>	6.003

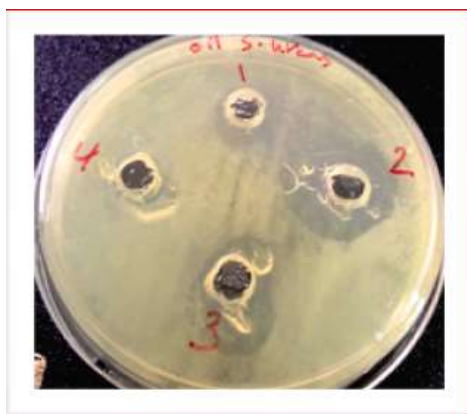


Figure 3. Effects of thyme oil on the activity of *S. aureus*.1: 0.5%, 2:1.5%, 3:2%, and 4: control.

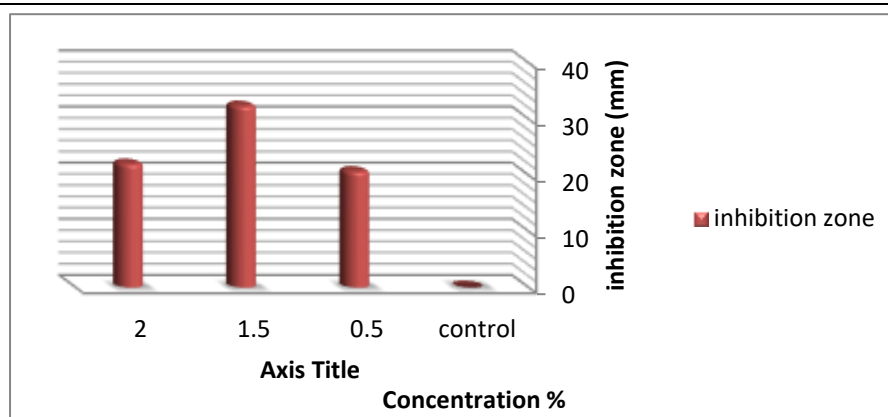


Figure 4. Effects of thyme oil on the growth of *S. aureus*.

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