

# EFFECTS OF THYMUS VULGARIS EXTRACT AGAINST ROOT CANAL MICROORGANISM ENTEROCOCCUS FAECALIS

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## ABSTRACT

**Aim:** Enterococcus faecalis is occasionally isolated from primary endodontic infections but frequently recovered from treatment failures. This study aimed to determine the effect of thymus vulgaris extract against root canal microorganism enterococcus faecalis. we evaluated the effect of thymus vulgaris on enterococcus in the statements of 25% , 50% and 75%.

**Materials and Methods:** This study was an experimental – in vitro design. Data was collected by observation. the samples were grouped in 3 concentration of thymus vulgaris extract: 25% , 50% and 75%. Then Mueller Hinton Agar culture media was prepared. Then the disk diffusion was tested.

**Results:** The results showed that 75% concentration of thymus vulgaris got the highest mean of 24.67. the highest concentration give the highest zone of inhibition which is susceptible and the lowest concentration give lower zone of inhibition which is resistant while the 50% give moderately zone of inhibition which means not to high and not too low.

**Conclusion:** It can be concluded that there is significant difference on the effect of thymus vulgaris at different concentrates to inhibit the enterococcus faecalis microorganism.

**Keywords:** Enterococcus faecalis, Thymus vulgaris, Root canal.

## Introduction

Enterococcus Faecalis is a gram positive anaerobe and part of the mouth's normal flora. It is usually found in small numbers in root canals before preparation. It's role in the outcome of endodontic treatment has yet to be clearly determined but it seems that this strain is the most common bacteria detected in root canals that develop chronic apical periodontitis following endodontic treatment.<sup>1</sup>

Data from culture studies have revealed that enterococcus faecalis is occasionally isolated from primary endodontic infections but frequently recovered from treatment failures.<sup>2</sup>

In recent years there on is a much focus on synthetic food additives which might have adverse effects with those of plant based natural ones.<sup>3</sup> The increasing uses of herbal products demand extra attention with particular focus replacing their safety, effectiveness and drug interaction. Thymus vulgaris is a species of flowering plant in the mint family lamiaceae.<sup>4</sup> Thymus species are considered as medicinal plants due to their pharmacological and biological properties. Minimum inhibitory concentration are important in diagnostic laboratories to confirm resistance of microorganism to an antimicrobial agent and also to monitor the activity of new antimicrobial activity.<sup>3</sup>

Okazaki *et al* investigated on anti-aggregant compounds in thymus vulgaris. The result shown thymol and 3,4,3,4-tetrahydroxy-5,5- diisopropyl-2,2- dimethylbiphenyl were isolated from the leaves of thym. These compounds inhibited platelet aggregation induced by collagen, ADP, arachidonic acid (AA) and thrombin except that compound 2 did not inhibit platelet aggregation induced by thrombin.<sup>5</sup>

The results of study confirmed by Cogulu *et al* (2007) that both culture and pcr methods are sensitive to detect E. faecalis in root canals. The presence of E. faecalis in

necrotic deciduous and permanent teeth root canals was studied using culture and polymerase chain reaction-/+methods.<sup>6</sup>

Mangali *et al* (2014) investigated the inhibiting property of thymus vulgaris, a perennial evergreen shrub, on the growth of trichophyton mentagrophyte, a kind of fungi belonging to phylum asccmycota, it is a dermatophyte which inhabits the soil, humans or animals. Result shown thymus vulgaris inhibited the growth of the trichophyton which has a clearing zone of >55mm meaning that it exceeded the area of the well which is only 10mm and it has an antimicrobial index of > 4.5.<sup>7</sup>

This study aimed to determine the effect of thymus vulgaris extract against root canal microorganism enterococcus faecalis. we evaluated the effect of thymus vulgaris on enterococcus in the statements of 25%, 50% and 75%.

## Materials and Methods

This study was an experimental – in vitro design. Observation was used as the main tool for data gathering. There were 15 samples of enterococcus faecalis used; the samples were grouped in 3 concentration.

- Group 1: 5 samples in 75% concentration of thymus vulgaris extract.
- Group 2: 5 samples in 50% concentration of thymus vulgaris extract.
- Group 3: 5 samples in 25% concentration of thymus vulgaris extract.

**The following materials were used for preparing thymus extract.**

Thymus vulgaris/ herbal grinder/ 95% ethanol/muller hilton agar/enlenmeyer flask/rotary evaporator/filter paper. Then Mueller Hinton Agar culture media was prepared. Enterococcus faecalis starin was purchase from philippines

national collection of microorganism (PNCM), University of the Philippines Los Banos, Laguna, Philippines.

Then the disk diffusion was tested. The disk agar gradient method of the disk diffusion test can accurately and reproducibly determine the susceptibility of bacteria to antibacterial agents. Then the data was analyzed by SPSS software version 19.

**Results**

Table 1 shows the zone of inhibition to enterococcus faecalis microorganism by concentration of thymus vulgaris.

Concentration of Thymus Vulgaris	No. of Observation	Mean	Standard Deviation	Interpretation
20%	15	9.73	1.82	Resistant
50%	15	19.13	3.82	Intermediate
75%	15	24.67	2.32	susceptible

Table 1: The zone of inhibition to enterococcus faecalis microorganism by concentration of thymus vulgaris.

The results showed that 75% concentration of thymus vulgaris got the highest mean of 24.67, while second is the 50% with mean of 19.13 and last is 25% concentration with 9.73, the computed f-value of 136.02, probability of <0.0001 is interpreted significant . this implies that there is a significant difference between the three concentration used in the experiment. The three concentration of thymus vulgaris give different zone of inhibition to the enterococcus faecalis . based on the results the highest concentration give the highest zone of inhibition which is susceptible and the lowest concentration give lower zone of inhibition which is resistant while the 50% give moderately zone of inhibition which means not to high and not too low.

Concentration of Thymus Vulgaris	Mean	f-Value	p-value	Interpretation
25%	9.73	136.02	<0.0001	significant
50%	19.13			
75%	24.67			

Table 2: The three concentration of thymus vulgaris give different zone of inhibition to the enterococcus faecalis

The Bonferroni results showed for the Group 1(with 25% concentration) versus group 2 (with 50% concentration) the mean difference is 9.4 and 5.53 with significance level of <0.001 and interpreted as significant. For the group 2 and group 3 (with 75% concentration) there is a big mean difference of 9.4 and 14.83 with significant level of <0.001 interpreted as significant. This shows that the 50% and 75% concentration are pairwise by the intermediate and

susceptible results of zone of inhibition they give to the enterococcus faecalis.

Airwise Comparison of Concentration of Thymus Vulgaris		Mean Difference	p-value	Interpretation
25%	50%	9.4	<0.001	significant
	75%	14.83	<0.001	significant
50%	75%	5.53	<0.001	significant

Table 3: The intermediate and susceptible results of zone of inhibition they give to the enterococcus faecalis.

**Discussion**

The results of this study showed that the mean measurement of thymus vulgaris in 25%concentration was 9.73±1.82, 50% concentration was 19.13±3.18 and 75% concentration was 24.67±2.32.

According to the zone of Inhibition to enterococcus faecalis microorganism. 75% concentration of thymus vulgaris got the highest mean of 24.67, while second is the 50% with mean of 19.13 and last is 25% concentration with 9.73, the computed f-value of 136.02, probability of <0.0001 is interpreted significant.

Also, for the group 1 (with 25% concentration) versus group 2 (with 50% concentration) the mean difference is 9.4 and 5.53 with significant level of <0.001 and interpreted as significant . for the group 2 and group 3 (with 75% concentration) there is a big mean difference of 9.4 and 14.83 with significant level of <0.001 interpreted as significant. This shows that the 50% and 75% concentration are pairwise by the intermediate and susceptible results of zone of inhibition they give to the enterococcus faecalis.

**Conclusion**

It can be concluded that there is significant difference on the effect of thymus vulgaris at different concentrates to inhibit the enterococcus faecalis microorganism

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