



Republic of Iraq  
Ministry of Higher  
Education  
And Scientific  
Research  
University of Baghdad  
College of Dentistry



## **EVALUATING THE ANTIBACTERIAL ACTIVITY OF THYMUS VULGARIS L. ESSENTIAL OIL AGAINST STREPTOCOCCUS SPECIES. (*IN VITRO* STUDY)**

Athesis

Submitted to the council of the College of Dentistry at the University of Baghdad, in partial fulfilment of requirements for the Degree of Master of Science in Periodontics

Submitted by

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## **ABSTRACT**

### **Introduction**

Dental biofilm plays a major role in the etiology of periodontal diseases and the early colonizers of dental biofilm are of great importance in the succession stages of biofilm formation. *Streptococci* constitute major part of oral bacteria present in the biofilm formed on tooth surface. Mechanical and chemical anti-biofilm agents were used for dental biofilm control, gingivitis prevention which then prevent periodontitis. The aim of the study was evaluation of the antibacterial activity of *Thymus vulgaris* L. essential oil against *Streptococcus oralis* and *Streptococcus sanguinis*.

### **Material and methods**

The bacterial species was isolated by collection of supragingival biofilm samples. Presence of the target microorganisms is confirmed using morphological characteristics, Gram stain, Catalase test, hemolytic ability, antibiotic sensitivity test and conventional polymerase chain reaction test. Agar susceptibility test was used to study the sensitivity of *Streptococcus oralis* and *Streptococcus sanguinis* to *Thymus vulgaris* L. essential oil as compared to Chlorhexidine 0.2% as a positive control and 10% Dimethyl sulphoxide as a negative control. Two-fold serial micro-dilution method was used for minimum inhibitory concentration determination. The minimum bactericidal concentration was also determined.

**Results**

The *Thymus vulgaris* L. essential oil showed antibacterial activity against *Streptococcus oralis* and *Streptococcus sanguinis* hence, it was higher than that for Chlorhexidine. Both species were sensitive to different concentrations of the oil starting from 12.5% to 100% concentration but the sensitivity of *Streptococcus sanguinis* higher than that for *Streptococcus oralis*.

The minimum inhibitory concentration and the minimum bactericidal concentration demonstrated the same value which was (0.09%) for both *Streptococcus oralis* and *Streptococcus sanguinis*.

**Conclusion**

The *Thymus vulgaris* L. essential oil was effective against *Streptococcus oralis* and *Streptococcus sanguinis* with bacteriostatic and bactericidal action, so it can be used as a natural dental biofilm control agent which may be more acceptable to consumers in comparison to synthetic chemical compounds.



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