Effect of Thymus Vulgaris Extract on Streptococci and Mutans Streptococci, in Comparison to Chlorhexidine Gluconate

(A comparative in vitro and in vivo study)

A Thesis
Submitted to the Council of the College of Dentistry, University of Baghdad in the Partial Fulfillment of the Requirements for the Degree of Master of Science in Preventive Dentistry

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1432 2011

Abstract

Background: Thymus vulgaris L. (Thyme) is an aromatic plant which has been used since ancient times for its culinary and medicinal effects almost everywhere in the world. Thyme is used in the food and aroma industries; it is widely used as a preservative for foods especially due to its antioxidant effect. In Medicine, it is used as antispasmolytic, antibacterial, antifungal, expectorant, and antiseptic. The plant is used in the treatment of dry coughs, bronchitis, asthma, gastritis and diarrhea. Externally, it is used in the treatment of tonsillitis, gum diseases, and fungal infections.

Aim of the study: This study was conducted to test the effects of ethanolic extract of Thymus Vulgaris on growth, adherence and acidogenicity of *Mutans Streptococci* in comparison to Chlorhexidine Gluconate 0.2% and De-ionized water.

Materials and methods: From saliva of ten volunteers (Dental students 20-24 years); *Mutans Streptococci* were isolated, purified and diagnosed according to morphological characteristic and biochemical tests. Leaves of Thyme (Thymus Vulgaris) were powdered and extracted. Different concentrations of Thymus Vulgaris extract were prepared and estimated in gm/100 ml of Deionized water. Chlorhexidine Gluconate 0.2% used as a control positive; while deionized water was used as a control negative. In this study four *in vitro* and one *in vivo* experiment were conducted. In vitro experiment, agar well technique was used to study the sensitivities of *Mutans Streptococci* to different concentrations of Thymus Vulgaris extract and other control agents; also effects of Thymus Vulgaris extract on the viable counts, adherence, and acidogenicity of *Mutans Streptococci* were studied. *In vivo* experiment, the effect of the study agent and control agents as a mouth rinse was tested on the saliva of group of volunteers to determine the level of salivary *Streptococci* and *Mutans streptococci*. Also the salivary flow rate and PH were measured.

Abstract

Results: Sensitivities of *Mutans Streptococci* to different concentration of Ethanolic Thymus Vulgaris extract were tested; the result showed that *Mutans Streptococci* were sensitive to different concentrations of ethanolic extract of Thymus Vulgaris. *Mutans Streptococci* were more sensitive to Thymus Vulgaris extract at higher concentrations than 0.2% Chlorhexidine. The effects of different concentrations of Thymus Vulgaris extracts on the viability counts of *Mutans Streptococci* in comparison to control *in vitro* were studied, statistically a significant reduction in the viability counts of bacteria was recorded for Thymus Vulgaris extract at concentration 5%, and highly significant reduction at concentrations (5.5%, 6%) and for Chlorhexidine. An *in vitro* experiments conducted to evaluate the effect of these agents on adherence and acid production of *Mutans Streptococci*, showed that all concentrations of Thymus Vulgaris extract tested were not effective in preventing the adherence of *Mutans Streptococci* to teeth surfaces , also Thymus Vulgaris extract at concentrations (5.5% and 6%) were weakly effective in preventing the acid formation by *Mutans Streptococci*. chlorhexidine was effective in preventing adherence of bacteria and retardation of acid formation. Thymus Vulgaris extract had a significant antimicrobial activity against *Streptococci and Mutans Streptococci* in *vivo* after15 minutes and 30 minutes and a highly significant reduction in the counts of these bacteria had been found after one hour, but Chlorhexidine is still more effective than other agents in reduction of counts of these two types of bacteria. Salivary flow rates and pH were measured for the three agents before and after rinsing for five time intervals. Immediately after rinsing, salivary flow rates and pH increased for the three mouth rinses. The increase in Salivary flow rates and pH continued after half an hour and then started to decrease after one hour for Chlorhexidine and Thymus Vulgaris extract.

Conclusions: Thymus vulgaris extract was effective against both *Streptococci* and *Mutans Streptococci* and Chlorhexidine is still more effective than other agents.