

***Effect of Derum (Juglan Regia L. Bark)
Extracts on Mutans Streptococci in
Comparison to Chlorhexidine Gluconate
(A Comparative in vitro and in vivo study)***

A Thesis

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Abstract

Derum is bark of walnut tree (*Juglan regia* L.), used traditionally for teeth cleaning and for cosmetic reasons with females since it gives a purplish color of lips after application. Derum have been used for many years in different area around world, for example Arabian peninsula, north Africa and south Asia in traditional medicine; it have some of pharmaceutical properties such as treatment of skin disease, anti-ulcer, anti-carcinogenic, anti-viral and anti-bacterial effects. This study was conducted to test the effects of derum extracts on growth, adherence and acidogenicity of mutans streptococci in comparison to chlorhexidine gluconate 0.2% and de-ionized water. Derum extracts were prepared by two methods (water and alcoholic), stimulated saliva were collect from volunteers of dental students/University of Baghdad (21-23years), from which mutans streptococci were isolated, purified and diagnosis according to morphological characteristic and biochemical test. Different concentration of derum extracts were prepared and estimated in gram per 100 milliliter de-ionized water, where as chlorhexidine gluconate use in this study as a control positive, de-ionized water was used as a control negative.

Sensitivities of mutans streptococci to different concentration of derum extracts (water and alcohol) were tested according to Agar Well Technique, the result showed that, both types of derum extracts were effective in the inhibition of mutans streptococci and inhibition increased with the increasing concentrations start from (5%) to (50%) which more effective, mutans streptococci were more sensitive to chlorhexidine compare to both types of derum extracts excepted for high concentrations.

The effects of different concentrations of derum extracts (10%, 20% and 30%) on the viability counts of mutans streptococci in comparison to control *in vitro* were studied, statistically non significant reduction in the viability counts was record when derum extracts (water and methanol) at concentration 10%, at

higher concentrations of both types of derum extracts (20% and 30%) showed statistically a significant reduction in the counts of mutans streptococci ($P<0.05$), chlorhexidine gluconate (0.2%) showed highly significant reduction in the counts of these bacteria ($P<0.001$). An *in vitro* experiments were conducted to evaluate the effect of these agents on adherence and acid production of mutans streptococci, the result showed that chlorhexidine gluconate (0.2%) and both types of derum extracts at concentrations 10% and 20% were effective in prevent adherence and retardation of acid formation.

The study involved one *in vivo* experiment to test the effect of water derum extract 20% against the salivary mutans streptococci in comparison to 0.2% chlorhexidine gluconate and de-ionized water. Stimulated saliva was collected from 30 volunteers (21-23years), they were divided into three groups each group rinse with one of the tasted agents for one minute. The counts of bacteria were recorded at different time point (one minute prior to rinse, one minute after rinse, 30 minute, one hour and two hour). A highly significant reduction in the counts of mutans streptococci ($P<0.001$) found between water derum extract and de-ionized water after half an hour, chlorhexidine with a highly significant reduction of the bacteria were more effective than other agents after half an hour and the following time. The antibacterial effects of derum seem to last for more than two hours.

Salivary pH was measured for the three agents between groups of volunteers before and after rinsing for five time intervals. Immediately after rinsing, salivary pH increased for the three mouth rinses and continue to increase after half an hour until they become to proximate the base line after more than two hours for three agents, in which chlorhexidine the highest increase in salivary pH follow by derum then de-ionized water.