

**Effect of Water Clove Extract on the
Microhardness and Microscopic Features
of Initial Caries Like Lesion of
Permanent Teeth Compared to
Fluoridated Agent**

A Thesis

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Abstract

Background: Clove has long traditional in use. It has powerful oil; as researches showed that viruses, bacteria, and fungi cannot survive in the presence of clove oil. Clove has been used in humans for dentistry applications for over two thousand years to alleviate the pain of toothache and also widely used to disinfect root canals in temporary fillings and as an oral anesthetic. Clove has long been popular as mouthwash and breath freshener, as well as for food flavoring. In addition to its medical benefits, it contains high nutritional values such as calcium, phosphorous, magnesium, iron, vitamins, fiber and others.

Aims of the study: Test the effect of water extracts of clove on the microhardness of artificially initiated caries-like lesion of the outer enamel surface, in addition to the examination of the microscopic changes. Clove extracts effect was compared with that of sodium fluoride, while de-ionized water was used as a control.

Materials and methods: The teeth sample consisted of 31 upper first premolars extracted from 11-14 years old patients, referred from Orthodontic Department, College of Dentistry, University of Baghdad. Teeth were randomly divided to four study groups and one control group. For production of initial carious like lesion of outer enamel surface, the pH cycling procedure was followed. Then teeth were immersed individually in 20ml of estimated solution of selected agents which were, water clove extract (1%, 5% and 10%), sodium fluoride 0.05% and de-ionized water. The time of immersion was four minutes, and then each tooth was rinsed with de-ionized water for two minutes and stored in the de-ionized water at 37°C for the next day. This procedure was repeated daily for one week. Teeth were subjected to Vickers microhardness test and microscopic examination before and after the pH cycle and following the treatment with the

selected solutions.

Results: Showed that water clove extract and sodium fluoride were successful in elevation of the microhardness values of demineralized enamel surface, this was statistically highly significant for water clove extract at (1%, 5%, 10%), and sodium fluoride 0.05%. However, none of the mentioned agents able to increase the microhardness to approximate the original values of sound enamel. Sodium fluoride 0.05% concentration caused highest change, while water clove extract at 10% resulted in lowest change in the microhardness for all study groups. Microscopic examination of enamel ground section under light microscope revealed that both sodium fluoride 0.05% and water clove extract at 5% produce the best enamel surface remineralization, while water clove extract at 10% and 1% concentrations resulted in less remineralization of enamel.

Conclusions: It can be estimated that water clove extracts were effective in remineralization of the initial carious lesion of enamel which was reflected by increase in enamel microhardness values.