

**An Evaluation of Ultrasonic Water  
Extract of Ginger on Microhardness and  
Microscopic Features of Enamel and  
Root-Dentin Caries Like lesions,  
Compared to Fluoridated Agent  
*An*  
*(In Vitro Study)***

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## *Abstract*

**Background:** Ginger (*Zingiber Officinale*) is one of the most commonly used herbal supplements; it is a plant with strongly aromatic content due to its pungent ketones including gingerol, which is the extract that primarily has being used in research studies. The consumed portion of the ginger plant is the rhizome which is the horizontal stem of the plant that sends out the roots. It was successfully and safely being used for thousands of years in cooking, folk medicine and home remedies.

**Aims of the Study:** To evaluate the effect of different concentrations of ultrasonic water extract of ginger on the microhardness of enamel and root-dentin surfaces after the initiation of caries like lesions compared with that of sodium fluoride and de-ionized water (control neutral) in addition to the examination of the microscopic changes.

**Materials and Methods:** The teeth sample consisted of (62) upper first premolars extracted from (11- 14) year old patients, referred from Orthodontic Department, College of Dentistry, Baghdad University. Two teeth were directly used for microscopic examination, one for sound enamel and the other one for sound root, while the remaining teeth were randomly divided into two groups, A and B.

**Results:** Ultrasonic water extract of ginger in concentrations of (0.5%, 1% and 5%) and sodium fluoride were successful in the elevation of the microhardness values of demineralized enamel and root-dentin surfaces. For teeth enamel with caries like lesion, this elevation was statistically highly

significant for ginger extract at (0.5%, 1%, 5% and sodium fluoride), but for root-dentin of teeth with caries like lesion, this elevation was statistically highly significant for (1%) ginger extract and for sodium fluoride, but significant for 5% ginger extract and not significant for 0.5% ginger extract. Although, none of the above agents were able to increase the microhardness values to about the original values of sound enamel and root-dentin surfaces, but when the matter of change between remineralization and demineralization was taken into account, ginger extract 0.5% concentration caused highest change, while ginger extract at 5% was resulted in lowest change in the microhardness values in both enamel and root-dentin teeth with caries like lesion.

Microscopic examination of enamel and root-dentin ground sections under light microscope revealed that zones of remineralization in enamel and root-dentin were seen after treatment with all concentrations (0.5%, 1% and 5%) of ultrasonic water extract of ginger, and sodium fluoride, but it was more obvious with 0.5% concentration of ginger extract.

**Conclusions:** The three concentrations of ultrasonic water extract of ginger were effective in remineralization of the outer enamel and root-dentin surfaces; which were in turn resulting in an increase in the enamel and root-dentin microhardness values, so ginger extract could be tried as a safe mouth wash.