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Effect of Cardamom Extracts on Lactobacilli and Streptococcus mutans in Comparison to Chlorohexidine gluconate and De-ionized water (in vitro study)

A Thesis

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Abstract

Background: Various herbal extracts are known to provide therapeutic benefits in the oral cavity when used topically. One of these herbs is cardamom which is a dried fruit of the tall permanent herbaceous plant, have its place in the family Zingiberaceae. There are two kinds of cardamom green (small) and black (large), both act as antimicrobial agents use in medical and dental applications to prevent many types of diseases as heart disease and cancer in addition to their role in protecting the immune system.

Aims of study: To test the effect of both green and black cardamom extracts on *Lactobacilli* and black cardamom on *Streptococcus mutans* in comparison to chlorhexidine glugonate (0.2%) and de-ionized water (in vitro).

Materials and Methods: Saliva was collected from seven volunteers and subcultured on selective media by which *Streptococcus mutans* and *Lactobacilli* were isolated, refined and identified in relation to morphological characteristic and biochemical test. Dried fruits of green and black cardamom were extracted by using alcohol (70% ethanol). Agar well technique with different concentrations of black cardamom extracts was used for the sensitivity test of *Streptococcus mutans* and *Lactobacilli* at different concentrations of green and black cardamom extracts compared with chlorhexidine as positive control and de-ionized water as negative control. The effects of green cardamom extracts on viable counts of *Lactobacilli* and effect of black cardamom extracts on viable counts for both *Streptococcus mutans* and *Lactobacilli* were studied. Laboratory analysis for black cardamom was assessed to determine its essential oil and other chemical elements.

Results: Sensitivity test for *Streptococcus mutans* and *Lactobacilli* to different concentrations of alcohol extracts of black cardamom and sensitivity test for *Lactobacilli* to different concentrations of green cardamom in vitro starting with (5%) to (40%) were tested in conjunction with agar well diffusion technique. Both types of cardamom extracts (green and black) were effective on inhibition growth

of *Streptococcus mutans* and *Lactobacilli* but with slight inhibition growth compared with chlorhexidine gluconate 0.2%. The effects of 10%, 15%, 20%, 25%, 30%, 35% and 40% concentrations of alcohol extracts of green and black cardamom on viable counts of *Lactobacilli* and black cardamom only on viable counts of *Streptococcus mutans* were tested in vitro. Highly significant reduction in the counts of bacteria were reported of both cardamom extracts and chlorhexidine in comparison to neutral control after 2 hrs. Both cardamom extracts showed less effective than chlorhexidine. The minimum inhibitory concentration of green cardamom on *Lactobacilli* and black cardamom on *Streptococcus mutans* and *Lactobacilli* was 5%.

Conclusions: Both types of cardamom (green and black) showed the same minimum inhibitory concentration on *Lactobacilli* but green cardamom showed more effect than black. Black cardamom was more effective on *Streptococcus mutans* than its effect on *Lactobacilli*, however both types still less than chlorhexidine.