

***Effects of Menthol Crystals Aqueous
Extracts on Salivary Streptococci and
Mutans Streptococci in Comparison to
Chlorhexidine Gluconate
(in vitro and in vivo study)***

A Thesis

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Abstract

Background: Menthol is a chemical compound derived from mint family; it has been applied as a medicinal remedy for many conditions for more than 3 thousands years ago, including skin infections and burns, digestive problems and localized pain. Menthol is also used in oral hygiene products and bad breath remedies like mouth wash, tooth paste, and more generally as a food flavor agent like in chewing gum and candy.

Aims of the study: This study was conducted to test the effects of menthol crystals aqueous extracts on growth, adherence and acidogenicity of mutans streptococci in comparison to chlorhexidine gluconate 0.2% and de-ionized water.

Materials and method: From saliva of ten volunteers of dental students (20-24years), mutans streptococci were isolated, purified and diagnosed according to morphological characteristic and biochemical tests. Menthol crystals aqueous extracts were prepared in different concentrations and estimated in mg/ ml, where as chlorhexidine gluconate used in this study as a control positive, de-ionized water was used as a control negative.

Results: Sensitivities of mutans streptococci to different concentration of menthol crystals aqueous extracts in vitro were tested according to Agar Well Technique, the result showed that, menthol extracts were effective in the inhibition of mutans streptococci, and the inhibition increased with increasing concentrations starting from 18% to 28%. The effects of different concentrations of menthol extracts (18%, 20% and 22%) on the viability counts of mutans streptococci in vitro were tested, the counts of bacteria for 20% menthol extracts were found to be significantly reduced, and highly significantly reduced for 22%

and CHX, while not significant reduction for 18% menthol extracts and de-ionized water when compared to initial control counts of bacteria, however all tested agents were effective in reducing counts of bacteria after 24 hr. with a statistically highly significant difference compared to control. Menthol extract at 22% concentration, was effective in preventing the adherence of mutans streptococci to teeth surfaces, while 20% and 22% menthol extracts were able to retard the process of acid production in vitro. In vivo experiment, test the effect of 18% menthol mouth wash against the salivary streptococci and mutans streptococci. Stimulated salivary samples were collected from 15 volunteers (20-24 years), they were divided into three groups each group rinse with one of the tested agents for one minute. Counts of bacteria were recorded at different time point (before rinsing, one minute, 15 minutes, 30 minutes, and one hr. after rinsing). Results showed that 18% menthol mouth wash had significant antimicrobial activity against salivary streptococci after 15 and 30 minutes of rinsing and highly significant after 1 hr, while for MS, a significant antimicrobial activity was found after 30 minutes of rinsing and highly significant after 1 hr. Salivary flow rates and pH were measured for the three test and control groups of volunteers before and after rinsing for five time intervals. There was an increase in the salivary flow rates and PH immediately after rinsing, and continue to increase after 30 minutes of rinsing, then decrease after 1 hr to approximate the base line.

Conclusion: Menthol proved to possess antimicrobial activities against salivary streptococci and mutans streptococci, and reduces their viable counts.