

**Review Article****Effects of green tea and chamomile tea on plaque pH, salivary pH, *Streptococcus mutans* count**

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ABSTRACT

Aim: Green tea is healthy beverage and is a part of our day to day life. Similarly, chamomile tea is known for its aspirin like properties. Beneficial effects of these tea includes protection against dental caries, periodontal disease and tooth loss and found that can a decrease in streptococcus mutans count as well as increase in pH. Hence the present study was to compare the pH of saliva and plaque, before and after the intake of green tea and to evaluate the role of green tea and chamomile tea on growth of s.mutans in culture using saliva. **Material and Methods:** Salivary samples were collected from 30 healthy individuals aged 20-30 years with certain criteria. The pH of saliva was determined by collecting samples before, immediately after and 15 min, 30 min after drinking tea using pH meter. Similarly the microbial colonies were also counted. The Data obtained were analyzed using Wilcoxon's, Friedman's and Mann Whitney test. **Results:** There was statistically no significant difference between salivary streptococcus mutans count before and after ($p < 0.001$) intake of green tea and chamomile tea. **Conclusion:** The result of the present study has proved that consumption of green tea and chamomile tea inhibit salivary Streptococcus mutans count and cause reduction of pH in saliva. So, it is advisable to encourage the regular consumption of this widely available, tasty and inexpensive beverage as an interesting alternative to other drinks.

Introduction

Green tea is a healthy beverage [1] which has a significant role in human history. It was found by a Chinese emperor when a few leaves were accidentally blown from a nearby tree in a boiling pot of water. Green tea has many benefits apart from its antioxidant capacity. It plays an important role in weight loss, boosting immunity, reduces the risk of arthritis, anti cancer property[2]and increases bone density[3].It has low caffeine content[4]than other teas. In dentistry its anti-cariogenic property plays a major role [5]. It increases the pH [6] and thereby decreases the acid production and protecting the enamel [7].

It also reduces *s.mutans* count [8] Chamomile tea also known as herbal aspirin has similar properties of that of green tea. It slows down halitosis and promotes oral health [9].

It is also proven to be the least acidic of all herbal teas [10]. Studies suggested that extracts from green tea might be especially helpful in preventing tooth decay by preventing the development of bacterial plaque. (Rosy Sirisha Neturi *et al* has conducted a study based on effect of green tea a randomised control trial, Nayakss *et al* based on effect of *Terminalia*

chebula rinse on *S. mutans* count, AD Haffajee *et al* on effect of herbal essential oil and chlorhexidine on gingival microbes). But there are not many articles citing the equal importance of chamomile tea on dental health.

Hence the aim of the present study was to compare the beneficial effects of green tea and chamomile tea on plaque pH, salivary pH and *s.mutans* count.

Methodology

Ethical clearance and consent was obtained before the study. The study was a single blinded randomized control triad with a crossover conducted at sathyabama dental college in the department of public health dentistry.

30 subjects of age from 18-25 years were selected for the study. The subject selected were caries-free population who are not under antibiotic for past one month with no history of dental treatment. The subjects were divided into two groups based on lot system into group-A and group-B; Group A being

green tea and Group B being chamomile tea. Fresh green tea and chamomile tea commercially available in the form of tea bags were dipped in boiling water for about two minutes. 5 ml of each green tea and chamomile tea were given for 1 minute to swish and spit. The plaque samples were collected using a dental spoon excavator¹¹ on the 1st molar tooth before, after 15 min and after 30 min of rinsing with green tea and chamomile tea. The pH values were recorded using AMAR digital and portable pH meter. After a washout period 24 hours, the

subjects were interchanged for both groups A and B. Microbial analysis was done in department of Microbiology in Sathyabama dental college. Plaque samples and saliva samples were diluted in sterile saline in a ratio of 1: 1000 and streaked on mitis salivarius agar incubated for 48 hours at 37c and the number of bacterial *s.mutans* colonies were counted. The data was analyzed using SPSS software. Friedman's test, Mann-Whitney U test and Wilcoxon matched pairs test were used and a p value of (p< 0.05) was considered as significant.

Results

Table 1: Shows comparison of plaque pH – baseline, 15 min and 30 min with green tea and chamomile tea

Sample	Green tea	Chamomile tea	P value
Baseline	6.19	6.23	0.412376
15 mins	6.40	6.46	0.201679
30 mins	6.21	6.29	0.232812

Table 2: Shows comparison of SALIVARY pH baseline, 15 min and 30 min with green tea and chamomile tea

Sample	Green tea	Chamomile tea	P value
Baseline	6.19	6.23	0.412376
15 mins	6.40	6.46	0.201679
30 mins	6.21	6.29	0.232812

Table 3: Shows difference in S MUTANS COUNT with green tea and chamomile tea baseline, 15 min, 30 min after rinse

Sample	Green tea	Chamomile Tea	P value
Baseline	6.48	6.47	0.967417
15 mins	6.71	6.75	0.249556
30 mins	6.54	6.73	0.000113

From the above tables there is statistically significant difference in salivary pH level after 30 mins where chamomile tea retains the salivary pH level higher than the Green tea. Also, there is significant difference before and immediately after the intake of green tea and chamomile tea in plaque pH, salivary pH, and *S.mutans* count.

Discussion

In the last few years, an increased attention has been focused on the natural plant extracts, especially those containing phenolic compounds with antimicrobial and antioxidant properties. Tea is one of the important dietary sources of these compounds. In recent years, there is a growing interest in green tea due to scientific findings, which shows the health potentials of the beverage. Green tea polyphenols act as anticariogenic and antibacterial agents [12,13]. Catechins present in green tea represent marked effect on PH value of saliva and dental plaque concern its reduction after eating towards acidic state and preserve it within normal range. Moreover, green tea extracts usage showed enhancement in Gingival Bleeding Index (GBI) due to it is high content of

catechins, so, oral application of catechins posses positive influence on the gingival and periodontal structures concerning gingivitis and periodontitis [14,15].In our study, there was statistically significant increase in pH of saliva after intake of green tea and chamomile tea.(Effects of Green Tea on salivary pH by sangameshwar manikya et al) . When the microbial count was considered, there was notable reduction in the streptococcus mutans count after the intake of both green tea and chamomile tea. Decrease in the microbial load could be due to the inhibitory and bactericidal effect of catechins present in green tea and chamomile tea. Based on the above findings, we conclude that both green tea and chamomile tea could be effective in reducing the plaque pH, salivary pH, and *S.mutans* count.

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