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Original Research

Assessment of changes in salivary pH after chewing guava leaves (Psidium Guajava) and xylitol gum

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ABSTRACT:

Background: Saliva is important for oral and dental health. Chewing sugar-free gum is a convenient way to increase salivary flow, and is promoted as an oral health aid. The present study was conducted to assess changes in salivary pH after chewing guava leaves (Psidium Guajava) and xylitol gum. **Materials & Methods:** 60 subjects of both genders were divided into 2 groups of 30 each. Group I was given guava leaves and group IIxylitol chewing gum. One millilitre of stimulated saliva samples was collected immediately after chewing, after 30 min of chewing, and after 60minutes of chewing. Salivary pH was estimated within 5minutes of collecting samples using litmus test strips. pH estimates were determined by comparing the color change of litmus strips over a gradient scale. **Results:** Group I had 16 males and 14 females and group II had 15 males and 15 females. Salivary pH immediately after pH was 8.38 in group I and 8.22 in group II, after 30 minutes was 7.23 in group I and 7.08 in group II and after 60 minutes was 7.12 in group I and 7.12 in group II. Inter- group comparison revealed non- significant difference (P> 0.05) and intra- group comparison showed significant difference (P< 0.05). **Conclusion:** Chewing guava leaves showed a similar effect when compared to xylitol chewing gum at different time intervals.

Key words: Chewing guava, xylitol chewing, pH

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INTRODUCTION

Saliva is important for oral and dental health. Chewing sugar-free gum is a convenient way to increase salivary flow, and is promoted as an oral health aid.[1] As well as stimulating salivary flow, gum chewing raises salivary and plaque pH and promotes enamel remineralization. Chewing gum can also be used as a vehicle for delivering substances such as chlorhexidine, enzymes and fluoride or bicarbonate ions.[2] The protective effects of saliva are due in large measure to the presence of a variety of antimicrobial substances, growth factors and inorganic ions such as calcium, phosphate and bicarbonate.[3]

A number of methods have been studied to neutralize the pH immediately after food consumption.[4] Chewing gums have been known to act as gustatory and mechanical stimuli increasing salivary flow and also elevating salivary pH, thereby reducing the risk for dental caries. Distinctively, the salivary pH remains elevated for 15–20 min. The medicinal benefits of guava have been discussed in many ethnopharmacological studies.[5] Extract from the guava leaves is known for its spasmolytic, antioxidant, antimicrobial, anti-inflammatory, and antibacterial properties. Paste of guava leaves has been used in the past for maintenance of oral hygiene, to treat bleeding gums and bad breath. Recent in vitro studies have showed antibacterial activity of guava leaves against Streptococcus mutans.[6]The present study was conducted to assess changes in salivary pH after chewing guava leaves (Psidium Guajava) and xylitol gum.

MATERIALS & METHODS

The present study comprised of 60 subjects of both genders. All gave their written consent for the participation in the study.

Data such as name, age, gender etc. was recorded. Subjects were divided into 2 groups of 30 each. Group I was given guava leaves and group IIxylitol chewing

gum. One millilitre of stimulated saliva samples was collected immediately after chewing, after 30 min of chewing, and after 60minutes of chewing. Salivary pH was estimated within 5minutes of collecting samples using litmus test strips. pH estimates were determined by comparing the color change of litmus strips over a gradient scale. Data thus obtained were subjected to statistical analysis. P value < 0.05 was considered significant.

RESULTS

Table I Distribution of patients

Groups	Group I	Group II
Agent	guava leaves	xylitol chewing gum
M:F	16:14	15:15

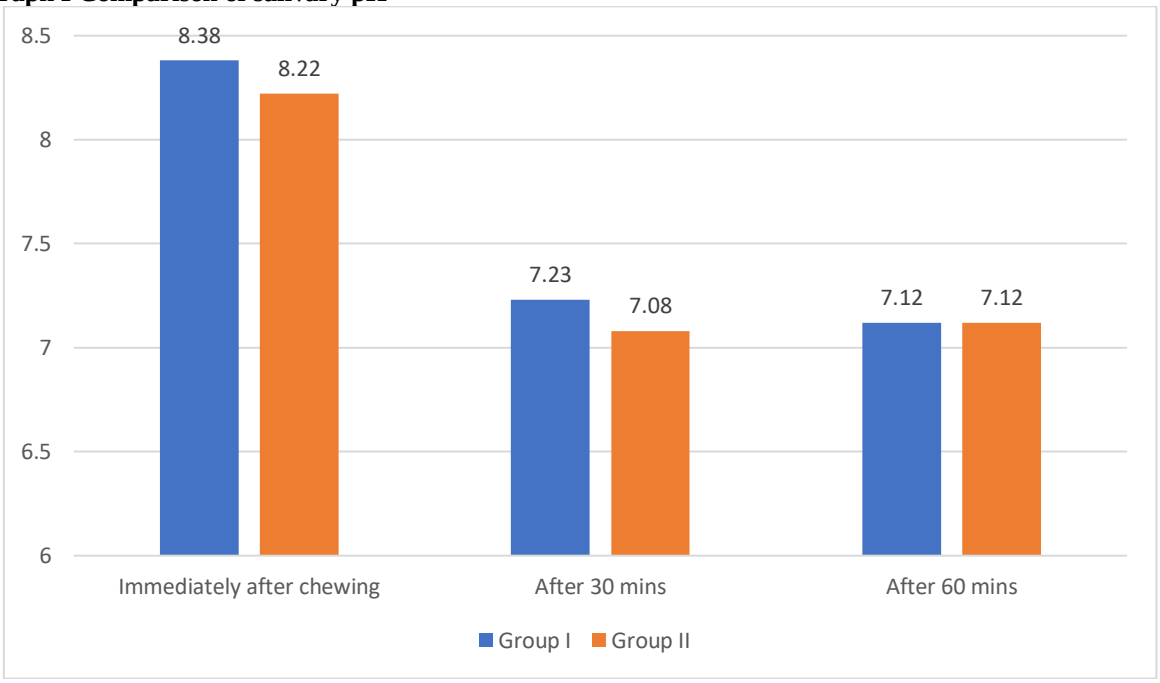
Table I shows that group I had 16 males and 14 females and group II had 15 males and 15 females.

Table II Comparison of salivary pH

Period	Group I	Group II	P value
Immediately after chewing	8.38	8.22	0.82
After 30 mins	7.23	7.08	0.94
After 60 mins	7.12	7.12	0.97
P value	0.05	0.02	

Table II, graph I shows that salivary pH immediately after pH was 8.38 in group I and 8.22 in group II, after 30 minutes was 7.23 in group I and 7.08 in group II and after 60 minutes was 7.12 in group I and 7.12 in group II. Inter- group comparison revealed non- significant difference (P> 0.05) and intra- group comparison showed significant difference (P< 0.05).

Graph I Comparison of salivary pH



DISCUSSION

Saliva plays an important role in maintenance of good oral health.[7] It prevents bacterial invasion, growth, and metabolism through various mechanisms.[8] The constant salivary flow is one such mechanism that can efficiently dilute and eliminate the products of bacterial metabolism within the oral cavity.[9] Saliva also has buffering capacity; the pH of saliva ranging between 6.2 and 7.6, which neutralizes acids in the mouth.[10] Ingestion of carbohydrate-rich foods such as breads, pastas, animal proteins, candies, and sodas enhance bacterial glycolysis, thereby inducing demineralization of tooth enamel.[11]The present study was conducted to assess changes in salivary pH after chewing guava leaves (Psidium Guajava) and xylitol gum.

We found that group I had 16 males and 14 females and group II had 15 males and 15 females. SenthilkumarS et al[12] in their study forty-five volunteers were chosen and the participants were asked to chew guava leaf and sugar free xylitol chewing gum for about 90 seconds and the salivary pH was assessed. There was no statistically significant difference in pH on comparing the two groups. pH

comparisons between different time intervals showed significant differences in both groups. Post hoc comparisons of pH after chewing guava leaves showed significant differences between different time intervals except between 30 and 60 minutes. Post hoc comparisons in the xylitol group showed significant differences between different time intervalsexcept between baseline and 30 min and between 30 and 60 minutes.

We found that salivary pH immediately after pH was 8.38 in group I and 8.22 in group II, after 30 minutes was 7.23 in group I and 7.08 in group II and after 60 minutes was 7.12 in group I and 7.12 in group II. Inter- group comparison revealed non- significant difference (P> 0.05) and intra- group comparison showed significant difference (P< 0.05). Poland et al[13]determined how whole mouth salivary flow rate and pH might adapt during prolonged gum chewing. Resting saliva was collected over 5 min; gum-stimulated saliva was collected at intervals during 90 min, chewing a single pellet of mint-flavoured, sugar-free gum. Subjects chewed at their own preferred rate and style. Both salivary flow rate and pH were increased above resting levels for the entire 90 minutes. The salivary flow was significantly greater than resting flows up to 55-min chewing. The saliva pH remained significantly higher than the resting pH even after 90-min chewing. When the experiment was repeated with the gum pellets replaced at 30 and 60 minutes, similar increases in salivary flow rate and pH were found. In the latter experiment, there was no evidence of any cumulative effects on flow or pH. The persistent increase in salivary pH in particular could be beneficial to oral and dental health.

Hegde et al[14]aimed to compare and evaluate the changes in the salivary flow rate, pH, and buffering capacity before and after chewing casein phosphopeptide-amorphous calcium phosphate (CPP-ACP) and xylitol-containing chewing gums in children. Sixty children aged between 8 and 12 years were selected for the study. They were randomly divided into Group 1 (CPP-ACP chewing gum) and Group 2 (xylitol-containing chewing gum) comprising thirty children each. Unstimulated and stimulated saliva samples at 15 and 30 minutes interval were collected from all children. All the saliva samples were estimated for salivary flow rate, pH, and buffering capacity. Significant increase in salivary flow rate, pH, and buffering capacity from baseline to immediately after spitting the chewing gum was found in both the study groups. No significant difference was found between the two study groups with respect to salivary flow rate and pH. Intergroup comparison indicated a significant increase in salivary buffer capacity in Group 1 when compared to Group 2.

The limitation the study is small sample size.

CONCLUSION

Authors found that chewing guava leaves showed a similar effect when compared to xylitol chewing gum at different time intervals.

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