

The Difference in Salivary Flow Rate Before and After Stimulate Between Chewing Pineapple (*Ananas comocus*) dan Papaya (*Carica papaya*)

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INTRODUCTION

Saliva is the mixture of fluids that originates from major and minor salivary glands and nonglandular sources such as crevicular fluids, oral microorganism, and host cells.¹ Saliva is importance

to maintain oral health, and saliva has multiple functions.²

Saliva have two functions that is digestive and protective functions and additional functions.³ Digestive functions include chewing of food, bolus

ABSTRACT:

Context: Salivary flow rate is a measure of salivary flow rate in ml/minute that collected in the oral cavity. Salivary flow rate can be increased by using different stimuli such as mechanical and chemical stimuli. One natural way to increase the salivary flow is to use pineapple and papaya. Pineapple and papaya is a fruit that is consumed daily.

Aims & Objectives: The purpose of the study is to examine changes in the salivary flow rate students of the Faculty of Dentistry, University of Syiah Kuala force in 2013-2016 before and after chewing pineapple (*Ananas comocus*) and papaya (*Carica papaya*).

Materials & Methods: Type of research is pre-experimental research with two group pretest post test design. The population in this study were all of the students in Faculty of Dentistry, University of Syiah Kuala. Subjects included in the criteria for inclusion of 100 people.

Results: The results of data analysis on a statistical test by paired t test showed that there are differences in salivary flow rate between before and after chewing pineapple (*Ananas comocus*) with a value of $p = 0,000$ ($p < 0.05$) and there are differences in salivary flow rate between before and after chewing papaya (*Carica papaya*) with a value of $p = 0.000$ ($p < 0.05$) and also independent sample test showed a significant difference between the flow rate of saliva after chewing pineapple (*Ananas comocus*) and after chewing papaya (*Carica papaya*) with a value of $p = 0.035$ ($p < 0.05$).

Conclusion: The study concluded that chewing pineapple can increase salivary flow rates higher than chewing papaya.

Key words: Pineapple (*Ananas comocus*), papaya (*Carica papaya*), salivary flow rate

formation, and swallowing. To the protective functions include self cleansing, lubricate the oral tissues by mucins,¹ ability of the buffer to maintain salivary pH around 7.0, and antimicrobial action.³ Additional functions include articulate speech and excretion.³ Saliva is very influential on the dental health because of the chemical composition, the buffer capacity (buffer), antimicrobial activity, and salivary flow rate (flow rate).⁴

Salivary flow rate can be obtained with or without stimulus, that is the stimulated and the unstimulate salivary flow.⁵ Reduced salivary flow rate can be cause impedes the mastication and swallowing of food, neutralization of acids, and leads to oral diseases such mucosal lesions, caries, candidiasis, gingivitis, and periodontal diseases.^{6, 7}

One effort that can be done to overcome the problem of reduced salivary flow is by stimulating saliva with citric acid and vitamin C in patients xerostomia.^{5, 8} Citric acid content is widely available in the pineapple and papaya with citric acid content of 346 mg pineapple and papaya is 335 mg.⁹ Pineapple and papaya also contains vitamin C with the 24 mg pineapple and papaya is 61.8 mg.^{10, 11} Lewapadang et al (2015) research stated that the consumption of pineapple juice in the elderly can reduce xerostomia and increase secretion saliva.¹² Widya research (2013) that eating papaya can lower the debris index, and to chew papaya can stimulate to produce more saliva.¹³ The present study was aimed to determine the presence of differences in salivary flow before and after stimulation between chewing pineapple (*Ananascomocus*) and chew papaya (*Carica papaya*).

METHODS

Type of research is pre-experimental study with two group pretest posttest design. This research was conducted in the building of the Faculty of Dentistry Unsyiah. The sample in the present study were all students from Faculty of Dentistry, University of Syiah Kuala. Subjects who met the inclusion criteria obtained as many as 100 people.

Subjects were instructed not to eat, drink, chew, smoking, brush of teeth, and physical exercise for at least one hour prior to the saliva collection time.¹⁴ Saliva collection were obtained at 9-11 am, in a ventilated and well illuminated room.⁵ The first group was given 100 grams of pineapple that has been cut and the second group was given papaya

100 grams. Both groups were asked to chew pineapple and papaya for 2 minutes, then given time to rest for 5 minutes. Spitting saliva collection methods were conducted with a total of 5 minutes, with the way the subjects were instructed to remain silent for one minute, then every 1 minute subjects were asked to remove the accumulated saliva in the mouth and ejected into a measuring cup.¹⁵

RESULTS

Result of difference in salivary flow rate before and after stimulation between chewing pineapple and chewing papaya on the students of the Faculty of Dentistry, University of Syiah Kuala generation from 2013 to 2016.

Data about salivary flow rate before and after chewing pineapple (*Ananascomocus*) and flow rate of saliva before and after chewing papaya (*Carica papaya*) tested the normality using the Shapiro-Wilk test. Normality test results demonstrate the significant value of salivary flow were obtained before and after chewing pineapple (*Ananascomocus*) and flow rate of saliva before and after chewing papaya (*Carica papaya*) $p > 0.05$, which indicates that the normal distribution of data.

Table 1.1. Normality test of salivary flow rate

Difference Variable	Number of Subject	p
Salivary flow rate before and after chewing pineapple (<i>Ananascomocus</i>)	50	0,118
salivary flow rate before and after chewing papaya (<i>Carica papaya</i>)	50	0,053

The results of the analysis of differences in salivary flow before and after chewing pineapple (*Ananascomocus*) showed a significant result ($p < 0.05$).

Table 1.2. Results of difference salivary flow rate before and after chewing pineapple

	Subject	p
Salivary flow rate before and after chewing pineapple (<i>Ananas comocus</i>)	50	0,0000

The results of the analysis of differences in salivary flow before and after chewing papaya (*Carica papaya*) showed a significant result ($p < 0.05$).

Table 1.3. Results of difference salivary flow rate before and after chewing papaya

	Subject	p
Salivary flow rate before and after chewing papaya (Carica papaya)	50	0,0000

The results of the analysis of average in salivary flow before and after chewing pineapple (Ananas comocus)) showed difference is 0,4460.

Table 1.4. Results of average salivary flow rate before and after chewing pineapple

	Subject	Average
Salivary flow rate before chewing pineapple	50	0,3520
Salivary flow rate after chewing pineapple (Ananas comocus)	50	0,7980
Salivary flow rate before and after chewing pineapple (Ananas comocus)	50	0,4460

The results of the analysis of average in salivary flow before and after chewing pineapple (Ananas comocus)) showed difference is 0,4460.

Table 1.5. Results of average salivary flow rate before and after chewing papaya

	Subject	Average
Salivary flow rate before chewing papaya (Carica papaya)	50	0,2840
Salivary flow rate after chewing papaya (Carica papaya)	50	0,7000
Salivary flow rate before and after chewing papaya (Carica papaya)	50	0,4160

To determine difference in salivary flow rate after chewing pineapple with salivary flow rate after chewing papaya then tested the T unpaired against both results are pineapple (Ananascomocus) different from papaya (Carica papaya). Unpaired T test results obtained significance value of $p < 0.05$.

Table 1.6. Result of difference salivary flow rate after chewing pineapple and papaya

Variable 1	P	Variabel 2
Salivary flow rate after chewing pineapple (Ananas comocus)	0,035	Salivary flow rate after chewing papaya (Carica papaya)

DISCUSSION

This study was conducted to see the effect of chewing pineapple (Ananascomocus) and papaya (Carica papaya) against salivary flow.

Table 1.2 shows the differences in salivary flow before and after stimulation of chewing pineapple (Ananascomocus). This is related to a chemical stimulus in the form of citric acid that is found in pineapple, where the acid is the most powerful stimulus in increasing the secretion saliva¹⁶ and to chewing pineapple as a mekanis stimulus.² This is in accordance with Lewapadang W et al (2015) stated that the citric acid content pineapple fruit can stimulate the salivary glands are parotid, submandibular, sublingual, and minor glands.¹²

Table 1.2. shows that there are differences in salivary flow before and after stimulation of chewing papaya (Carica papaya). This is related to a chemical stimulus in the form of citric acid and vitamin C in papaya as well as chewing movements papaya.^{2,5, 12} Visvanathan (2010) stated that vitamin C in pineapple and papaya can increase the saliva flow rate.^{8,10,11}

This study shows there are differences in salivary flow rate after stimulation of chewing pineapple (Ananascomocus) and papaya (Carica papaya), with a flow rate of saliva after chewing pineapple (Ananascomocus) higher than after chewing papaya (Carica papaya). Ana (2010) states that the greater the concentration of citric acid causes the salivary volume increased to higher than citric acid in a concentration low.¹⁷ This is consistent with citric acid content is higher in the 346 mg in pineapple compared in papaya is 335 mg.⁹

CONCLUSIONS

1. There are differences in salivary flow before and after stimulation of chewing pineapple (Ananascomocus).
2. There are differences in salivary flow before and after stimulation chewing papaya (Carica papaya).

RESULT OF DATA EXAMINATION

Number	Pineapple Before chewing pineapple	Papaya After chewing pineapple	Difference	Before chewing papaya	After chewing papaya	Difference
1	0,2	0,5	0,3	0,2	0,5	0,3
2	0,3	0,7	0,4	0,3	0,4	0,1
3	0,4	0,5	0,1	0,3	0,6	0,3
4	0,3	0,6	0,3	0,3	0,8	0,5
5	0,3	1,0	0,6	0,4	0,9	0,5
6	0,3	0,4	0,1	0,3	0,8	0,5
7	0,3	0,6	0,3	0,3	0,4	0,1
8	0,2	0,5	0,3	0,3	0,4	0,1
9	0,4	1,1	0,7	0,2	0,6	0,4
10	0,3	0,8	0,5	0,3	0,5	0,2
11	0,5	1,0	0,5	0,2	0,9	0,7
12	0,4	0,5	0,1	0,2	0,4	0,2
13	0,5	0,6	0,1	0,3	0,8	0,5
14	0,4	0,7	0,3	0,3	0,5	0,2
15	0,4	0,9	0,5	0,5	1,0	0,5
16	0,5	1,0	0,5	0,3	0,6	0,3
17	0,4	1,1	0,7	0,3	0,9	0,6
18	0,3	0,5	0,2	0,3	0,5	0,2
19	0,3	0,8	0,5	0,2	0,5	0,3
20	0,3	0,6	0,3	0,3	0,8	0,5
21	0,3	0,7	0,4	0,1	0,3	0,2
22	0,5	0,8	0,3	0,3	0,6	0,3
23	0,3	0,9	0,6	0,5	0,9	0,4
24	0,4	1,1	0,7	0,3	0,8	0,5
25	0,3	1,0	0,7	0,3	0,3	0
26	0,3	0,7	0,4	0,2	0,3	0,1
27	0,5	1,3	0,8	0,2	0,9	0,7
28	0,3	1,1	0,8	0,2	1,0	0,8
29	0,3	0,9	0,6	0,2	0,3	0,1
30	0,2	0,5	0,3	0,3	0,7	0,4
31	0,2	0,7	0,5	0,4	0,8	0,4
32	0,3	0,7	0,4	0,3	0,7	0,4
33	0,4	0,9	0,5	0,3	0,6	0,3
34	0,5	1,0	0,5	0,3	0,4	0,1
35	0,3	0,7	0,4	0,4	0,8	0,4
36	0,3	1,0	0,7	0,2	0,5	0,3
37	0,2	0,4	0,2	0,1	0,7	0,6
38	0,5	1,1	0,6	0,3	0,9	0,6
39	0,3	0,8	0,5	0,2	0,7	0,5
40	0,4	0,9	0,5	0,5	0,9	0,4
41	0,4	0,7	0,3	0,2	0,8	0,6
42	0,3	0,8	0,5	0,2	1,1	0,9
43	0,3	0,7	0,4	0,2	0,8	0,6
44	0,4	1,0	0,6	0,3	0,7	0,4
45	0,4	0,9	0,5	0,4	0,8	0,4
46	0,3	0,8	0,5	0,3	1,4	1,1
47	0,4	0,7	0,3	0,4	1,0	0,7
48	0,5	0,9	0,4	0,3	1,1	0,8
49	0,3	1,0	0,7	0,2	0,5	0,3
50	0,4	0,8	0,4	0,3	0,9	0,6

- There are differences in salivary flow with stimulation of chewing pineapple (*Ananascomocus*) and papaya (*Carica papaya*), with chewing pineapple (*Ananascomocus*) can increase the salivary flow rate higher than chew papaya (*Carica papaya*).

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