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COMPARISON OF THE EFFECTIVENESS OF PEAR (PYRUS COMMUNIS) AND MINUTE (CUCUMIS SATIVUS L) ON PH SALIVA AT THE PANTI ASUHAN CINTA KASIH FOUNDATION TELUK DALAM IN 2021

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ABSTRACT

Caries is a common dental and oral disease. The main etiology of caries is plaque. Chewing fibrous fruits can prevent plaque accumulation, by increasing the pH of saliva, one of which is eating pears and cucumbers. The purpose of this study was to determine the difference in the effectiveness of consuming pears with cucumbers on increasing salivary pH at the Panti Asuhan Cinta Kasih Foundation, Teluk Dalam District. This type of research is a quasi-experimental design with a pretest and posttest control group. The number of samples is 60 people who live in the Panti Asuhan Cinta Kasih. Data were analyzed by statistical test T Test. Based on the results of the statistical paired t test, the average salivary pH before chewing pears was 6.94±0.53 after 7.44±0.42 with a mean of 0.50±0.11. Meanwhile, the average pH of saliva before chewing cucumber was 6. 81±0.22 after 7.02±0.16 with a mean of 0.16±0.21. The results of the independent statistical test t test obtained p values = 0.007 and 0.037, which means that there is a difference between chewing pears and cucumbers in increasing salivary pH. The conclusion of this study is that consuming pears has a higher effectiveness than cucumbers in increasing salivary Ph.

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1. Introduction

Based on the results of the 2018 National Riskesdas, periodontal disease is the second most common dental and oral disease after dental caries suffered by the Indonesian people. The prevalence of caries disease was 88.8%, followed by periodontal disease at 74.1%. Currently, periodontal disease and caries are the highest prevalence of dental and oral diseases caused by the presence of dental plaque (Panjaitan et al., 2020).

With plaque control which consists of three ways, namely mechanical, chemical, and natural, plaque and caries can be removed. One of the natural ways that can be done is by chewing fresh, fibrous and juicy fruit which can help clean the oral cavity, and stimulate the secretion of saliva which is useful for protecting teeth (Koagouw et al., 2016). Consuming fibrous foods that have good cleaning power on the teeth found in fruits is an important factor in preventing dental and oral diseases. Fruits are not only a source of high vitamins, but also a natural source of fiber.

According to Alhamda (2011) and Astawan (2008) explained that, fruits that have good teeth cleaning abilities include pineapple, pear, apple, strawberry, papaya, watermelon and yam because they contain a lot of water. The content in some of these fruits has many benefits for both body health and dental and oral health. The content in apples that are beneficial for dental and oral health is tannin. This tannin substance is a substance that functions to clean and refresh the mouth, so it can

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prevent tooth decay and gum disease caused by plaque buildup (Panjaitan, 2020). M MAccording to the results of research by Bela in Nurasiki & Amiruddin (2017), chewing fibrous fruits such as apples, watermelons, melons, pears is very effective in reducing plaque index on teeth, it is proven that before chewing fruit 2.30 plaque index, after chewing fruit 0.39 plaque index. Meanwhile, according to Hidayati's research in Nurasiki & Amiruddin (2017), chewing pears can reduce plaque index, before chewing pears 1.77 with moderate criteria and after chewing pears with plaque index 0.80 with good criteria.

Saliva is a thick fluid produced by the salivary glands, parotid glands, sublingual glands, and submandibular glands. It is located under the tongue, near the cheek muscles, and near the palate. Saliva contains 99.50% of water, other substances consist of calcium, phosphorus, sodium, magnesium (Cahyati, 2012). Saliva functions as a lubricant, protector, buffer, cleanser, and anti-bacterial. If there is no saliva or the amount decreases drastically and stops protecting the teeth, bad things will happen, including reduced activity of cleaning bacteria and food residue from the mouth, reduced buffering due to changes in oral acid, so that oral activity becomes more acidic (Khasanah, 2013).

The flow of saliva that occurs in the mouth is closely related to the pH of the saliva. The potential of hydrogen (pH) is a way of measuring the degree of acidity or alkalinity of body fluids. Saliva has a pH in normal conditions with an average pH of 06.7. Ordinary saliva is alkaline (alkaline). Haryani's research (2014) showed that there was a significant effect of salivary pH between before and after chewing cucumber p=0.001 and salivary pH before and after chewing tomatoes p=0.000 (Haryani, 2014).

Based on some of the explanations above, eating fruits that contain high fiber can increase saliva production and pH, including cucumbers and pears. Therefore, researchers are interested in comparing the effectiveness of consuming pears (Pyrus Communis) with cucumbers (Cucumis sativus L) on salivary pH at the Panti Asuhan Cinta Kasih Foundation, Teluk Dalam District.

2. Method

This research is pre-experimental and the research design used is Cross Sectional, data collection was carried out at one time at the Panti Asuhan Cinta Kasih, Teluk Dalam District in 2021. The research time was from October 2021 to February 2022. In this study the research population was all people who are at the Panti Asuhan Cinta Kasih Foundation, Teluk Dalam sub-district, with a sampling technique that is total sampling with a total sample of 60 respondents. The data analysis technique used was bivariate analysis to determine differences in salivary pH scores before and after chewing pears and cucumbers using paired sample t-test, data with normal distribution had p>0.05.

3. Result and Discussion

Based on the results of a comparison study of the effectiveness of pears and cucumbers on salivary pH at the Teluk Dalam Orphanage Foundation in 2021 with a total of 60 respondents.

Table 1.

Frequency distribution by age and gender at the Panti Asuhan Cinta Kasih Foundation, Teluk Dalam District.

Characteristics Respondents	ofn	%
Age (Years)		
<16 Years	49	81.7%
17-35 Years	8	13.3%
>35 Years	3	5%
Gender		
Man	31	51.7%

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Woman	29	48.3%
Total	60	100

Based on Table 3.1 above, it can be seen that the majority of respondents aged <16 years were 49 people (81.7%), and the minority aged >35 years were 3 people (5%). based on gender, the majority were male as many as 31 people (51.7%) and female minority as many as 29 people (48.3%).

Table 2.
Frequency of Saliva pH Before and After Consuming Pears at the Panti Cinta Kasih

Pretest (before)		Posttest (after)	
pH	Frequency (f)	pH	Frequency (f)
7.1	1	6.7	1
6.9	3	7.4	1
7.2	3	6.8	3
6.7	5	7.2	4
6.8	5	6.9	5
6.6	6	7.1	7
7.0	7	7.0	9
6.85±0.19	30	7.017±0.14	30

Based on table 3.2 above, it shows that the average salivary pH before eating pears is 6.85±0.19 and after 7.017±0.14. It can be concluded that there is an increase in salivary pH after eating pears at the Panti Asuhan Cinta Kasih.

Table 3.
Frequency of Saliva pH Before and After Consuming Cucumber at the Panti Asuhan Cinta Kasih

Pretest (before)		Posttest (after)	
pH	Frequency (f)	pH	Frequency (f)
6.4	2	7.3	1
7.2	2	7.4	1
6.7	4	6.7	2
6.8	4	6.8	2
6.9	5	6.9	4
6.6	6	7.2	4
		7.1	7
7.0	7	7.0	9
6.81±0.20	30	7.02±0.16	30

Based on table 3 above, it shows that the average salivary pH before consuming cucumber and after is 7.02±0.16. It can be concluded that there is an increase in salivary pH after consuming it at the Panti Asuhan Cinta Kasih.

Table 4.
Differences in Average Saliva pH Before and After Consuming Cucumber in Children at the Panti Asuhan Cinta Kasih Foundation.

Consumption	saliva pH	$\bar{X}$±SD	*mean diff*	*p value*
Pear	Before	6.94±0.53	-0.50±0.11	0.007
	After	7.44±0.42		
	Before	6.81±0.20		

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	After	7.02±0.16		
Cucumber			-0.16±-0.21	0.037

Based on table 3.4 above, it shows that the average salivary pH before eating pears was 6.94±0.53 and after 7.44±0.42 with an average difference of 0.50±0.11. The results of the statistical paired t test obtained p value = 0.007 which means that there is a significant difference in the average salivary pH before and after eating pears. From these results it can be stated that there is an effect of eating pears on increasing salivary pH at the Panti Asuhan Cinta Kasih. While the average salivary pH before consuming cucumber fruit was 6.81±0.20 and after 7.02±0.16 with an average difference of -0.16±-0.21. The results of the statistical paired t test obtained p value = 0.037 which means that there is a significant difference in the average salivary pH before and after consuming cucumber.

3.1 Effect of Consumption of Pears (Pyrus Communis) on Saliva pH

The measurement results in this study stated that the pH of saliva before consuming pears was 6.94±0.53 and after 7.44±0.42, meaning that there was an increase in salivary pH in respondents who consumed pears, this indicates that there is an increase in salivary pH. the effect of consumption of pears with an increase in salivary pH. Pears contain catechin compounds that can inhibit the attachment of Streptococcus mutans bacteria to the formation of teeth and denature bacterial cell proteins so that the bacteria die. The number of colonies of Streptococcus sp. in pears more, because pears only contain catechins that function as antibacterial. Catechins are polyphenol derivatives that have antibacterial properties. The antibacterial properties of catechins are due to the presence of pyrogallol and galloil groups.

The mechanism of action of catechins is capable of denaturing bacterial cell proteins so that bacteria will die. Denatured proteins will lose physiological activity so they cannot function properly. Changes in the structure of proteins in the bacterial cell wall and cytoplasmic membrane will increase cell permeability, resulting in leakage of cell contents and cell growth will be inhibited and damaged. Damage to the cytoplasmic membrane can prevent the entry of food ingredients or nutrients needed by bacteria to produce energy as a result of which bacteria will experience growth inhibition and even death. Pears contain chlorogenic acid which is a derivative of hydroxy cinnamic acid which tends to collect on the skin of the pear. This acid binds to nitrates in the stomach, then inhibits the conversion of cariogenic potential, namely nitrosamines so that this acid also acts as an antioxidant that can prevent the formation of cancer cells (Murni, 2020). According to Meishi (2011), pear is a fruit that has properties as a natural cleanser. Both of these fruits can help the occurrence of self-cleansing in the oral cavity, so as to improve the oral hygiene of each individual.

3.2 Effect of cucumber consumption on saliva pH

This study was conducted to compare the effectiveness of pears (Pyrus Communis) and cucumbers (Cucumis sativus L) on salivary pH at the Panti Asuhan Cinta Kasih. The results of the measurement of salivary pH before consuming cucumber fruit with an average of 6.81±0.20 and after 7.02±0.16. Cucumber is a crunchy fruit that works like a natural toothbrush and teeth whitener. The liquid released by this cucumber contains sufficient acid solution (Erwana, 2013; Margareta, 2012). Based on the results of the study, it was seen that there was an increase in the pH of the respondents' saliva after consuming cucumber. The results of this study are in line with research conducted by Haryani et al (2016) which stated that before consuming cucumbers, the average pH of the respondents' saliva was 6.7 and afterward 6.8.

Saliva is a complex oral fluid. A combination of various fluids and components that are excreted into the mouth (Afrina et al., 2018). The normal value of salivary pH is 6.7 to 7.4. Salivary pH values will change after consuming food (Hans et al., 2015, Ward, 2011). The increase in salivary pH after consuming cucumber in this study may be caused by the high water content of cucumber, which is 96.2% (Haryani et al., 2016). Fruits that contain water when eaten and chewed can help clean the teeth and mouth which is known as the self-cleansing effect because it can stimulate salivary secretion which affects the pH of saliva (Khasanah, 2013).

The above statement is supported by the results of the statistical analysis of the paired t test which can be stated that there is an effect of cucumber on increasing salivary pH in children at the Panti Asuhan Cinta Kasih. From the results of this study, it was seen that there was an increase in salivary pH after consuming cucumber fruit with an average increase of 0.16 ± 0.21. An increase in

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salivary pH after consuming cucumber fruit was also obtained from the results of research conducted by Haryani et al (2016) which stated that there was an effect of consuming cucumber on salivary pH.

Fruits that contain fiber, water and vitamin C such as cucumbers can affect the pH of saliva, help clean teeth and mouth because they can stimulate salivary secretion, and have a taste that can stimulate saliva to secrete more saliva and make the viscosity of saliva lower. et al., 2016). In addition, foods that require large chewing power or foods that taste quite striking can increase salivary flow by stimulating saliva to secrete more saliva than under unstimulated conditions so that the pH of saliva in the mouth can change and also change its composition (Khasanah, 2013; Nugraha, 2013). 2012).

Saliva contains substances including antibacterial substances, glycoprotein compounds, calcium, and fluoride (Cahyati, 2013). The acidic condition of the oral cavity can facilitate the growth of Streptococcus mutans and Lactobacillus bacteria which will result in demineralization of the tooth surface so that caries formation can occur (Afrina et al., 2018). Saliva has the ability to regulate the buffer balance of saliva, so as to minimize acid-base and clean acids produced by microorganisms so as to prevent demineralization of tooth enamel (Ramadhani et al., 2019).

Sharma et al (2012) reported that cucumber has a strong antacid effect against acid. In addition, cucumber fruit also contains phytochemicals such as alkaloids, flavonoids, tannins,

saponins, vitamins A, B3, B5, B6, B7, D and K (Imo et al., 2019; Maheshwari et al., 2014). These ingredients have been shown to have a hypoglycemic effect, a pH neutralizing effect, and an antibacterial effect against cariogenic bacteria such as S. mutans (George et al., 2017; Maheshwari et al., 2014; Sharma et al., 2012; Sharmin et al, 2012, Subramaniam et al. , 2012). From the results of this study, it was found that the pH of saliva before consuming cucumber fruit was acidic and after it was alkaline, so, from the results of this study it appears that consuming cucumber can prevent dental caries.

4. Concolusion

The average pH before eating pears was 6.94±0.53 but after eating pears the average pH was 7.44±0.42, The average pH before eating cucumbers was 6.81±0.20 but after consuming cucumber the average pH was 7.02±0.16. There is an effect of consuming pears and cucumbers on increasing salivary pH in everyone at the Panti Asuhan Cinta Kasih with a value consuming pears p=0.007 (α<0.05) while the value consuming cucumbers p=0.037 (α<0, 05). From the results of this study, pears were more effective at increasing salivary pH than cucumbers.

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