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**DIFFERENCES OF SALIVARY pH AFTER CONSUMING UHT MILK AND
PASTEURIZED MILK IN STUDENTS OF SMPN 2 KARANG INTAN**

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Abstract : The most common dental and oral health problem is dental caries. Risks can be detected by performing saliva analysis. Saliva is a liquid with a very volatile composition and can be analyzed its acidity (pH), electrolyte content and protein contained in it. These three things are influenced by several factors including, psychological state, stimulus, hormone levels, body movements, drugs and diet. One that can affect salivary pH is milk. There are several types of milk, including UHT milk and pasteurized milk. Milk contains many nutrients such as carbohydrates, proteins, fats, minerals and vitamins. This study aims to determine the differences in salivary pH after consuming UHT milk and pasteurized milk in students of SMPN 2 Karang Intan. This study uses quasi-experimental methods with One Group Pretest Posttest. The number of subjects in this study were 60 people consisting of two groups: the first group consumed 250 ml UHT milk and the second group consumed 250 ml pasteurized milk. Each group has 30 subjects. Saliva pH measurement using a digital pH meter. Data analysis used the Independent sample T-Test to find out the differences between the two independent data groups with a confidence level of 0.05. The results of the study were the average salivary pH after consuming UHT milk was 6.91 and after consuming pasteurized milk was 6.73. Based on the results of the analysis of the Independent Sample T-test, the Sig (2-tailed) value $p = 0,000 < \alpha 0.05$. It can be concluded that there is a difference in salivary pH after consuming UHT milk and pasteurized milk. UHT milk can be a better alternative to consume because it can further increase the pH of Saliva.

Keywords: Salivary pH, UHT milk, Pasteurized milk.

INTRODUCTION

Dental and oral health is a healthy state of being related in the oral cavity that allows individuals to eat, talk and interact socially without dysfunction, aesthetic disturbances and discomfort due to disease, occlusion deviations and tooth loss so that they are able to live socially and economically productive lives.¹ Based on Riskesdas In 2013 the proportion of the population with dental and oral problems in South Kalimantan Province was 36.1% and Banjar Regency, one of which had dental and oral problems, was 48.6%.²

Saliva is an oral fluid secreted by the salivary glands, there are major and minor glands.³ Saliva has several functions, including protecting the tissues in the oral cavity by means of mechanical cleaning to reduce plaque accumulation on the tooth surface, lubrication of dental elements, buffering effect, aids taste and digestive function, and aids tissue repair. The protective function of saliva is strongly influenced by changes related to composition and viscosity, composition of salivary ions and proteins, and salivary pH.⁴

pH (Potential of hydrogen Saliva) of Saliva is the degree of acidity of saliva which normally ranges from 5.6-7 with an average pH of 6.7. Several factors that cause changes in salivary pH include the average salivary flow rate, microorganisms in the oral cavity, the buffering capacity of saliva, as well as foods and beverages that are often consumed.⁵

One of the drinks that affect the pH of saliva is milk. **Milk** is a white liquid that contains nutritious substances and is an ideal nutrient during growth. Milk is a very popular nutrient that almost everyone likes, starting from children, teenagers and adults.⁶

Based on the research of Nozari et al (2014), there are differences in salivary pH after consuming several types of milk which are influenced by the fat content contained in each type of milk.⁷ Based on the study, within 6.5 minutes after drinking milk, the pH of saliva will return to normal pH as before the subject consumed milk.⁸

Milk contains so many nutrients that are needed by the body. Milk is divided into several types, one of which is UHT (Ultra High Temperature) milk and Pasteurized milk. **UHT milk** is a liquid milk product obtained from fresh milk which is sterilized at a temperature of not less than 135⁰ C for 2 seconds and packaged immediately in aseptic sterile packaging.⁹ Based on research by Nielsen (2012), UHT milk is one of the most often consumed and the consumption rate of UHT milk is 29%. Based on the research of Savira et al (2017), Saliva pH increased by an average of 0.1444 after the subject consumed UHT milk which caused the subject's oral condition to be more alkaline.¹⁰

Pasteurization is a heating process that uses low temperatures below 100⁰ C. Pasteurization aims to inactivate enzymes and extend shelf life. Pasteurization can be done in two ways, namely LTLT (Low Temperature Long Time) with a temperature of 63⁰ C for 30 minutes and HTST (High Temperature Short Time) with a temperature of 72⁰ C for 15 seconds. Pasteurization is followed by a cooling process at a temperature of 4⁰ C so as to increase the shelf life of milk.¹¹

This study aims to determine the difference in salivary pH after consuming UHT milk and pasteurized milk in students of SMPN 2 Karang Intan.

RESEARCH METHODS

The type of this research is **experimental research**, with the **research design** used is a quasi-experimental (quasi-experimental) using one group pretest posttest.¹² The population of this study was all students/I grades VII, VIII, and IX at SMPN 2 Karang Intan, totaling 146 people with the research sampling technique using the **Purposive Sampling technique**, namely based on certain considerations made by the researchers, based on the characteristics of the population

that had been determined.¹² Based on the characteristics of the population that has been determined by the researcher, 60 samples were obtained and then divided into 2 groups, namely the first group by consuming 250 ml of UHT milk and the second group by consuming 250 ml of pasteurized milk where each group consists of 30 person. Salivary pH measurement using a digital pH meter with a pH scale of 0-14.

The research data were then tested for Normality using the **Kolmogorov-Smimo test**, followed by the T test using Leven's test. Research data that are normally distributed can be continued with the Independent T-test.¹³

RESULTS AND DISCUSSION

From the research that has been done, the results of statistical tests are as follows:

Table 1 Data on Salivary pH Before and After Consuming UHT Milk

<i>pH Saliva</i>	<i>N</i>	<i>Mean</i>
Before	30	6,72
After	30	6,91

Sumber: Hasil Uji Statistik, (2020).

Table 1 shows that of the 30 people sampled before consuming UHT milk, the average salivary pH was 6.72 and after consuming UHT milk, the average salivary pH was 6.91.

Table 2 Salivary pH Data Before and After Consuming Pasteurized Milk

<i>pH Saliva</i>	<i>N</i>	<i>Mean</i>
Before	30	6,62
After	30	6,73

Sumber: Hasil Uji Statistik, (2020).

Table 2 shows that of the 30 people sampled before consuming pasteurized milk, the average salivary pH was 6.62 and after consuming pasteurized milk, the average salivary pH was 6.73.

Table 3 Test Results of Independent Sample T-Test Differences in Saliva pH After Consuming UHT Milk and Pasteurized Milk in Students of SMPN 2 Karang Intan.

<i>pH Saliva</i>	<i>N</i>	<i>Sig. (2 tailed)</i>
Consuming UHT milk and pasteurized milk	60	0,000

Sumber: Hasil Uji Statistik, (2020).

The results of the above test $p\text{-value} = 0.000 < 0.05$, it can be concluded that H_0 is rejected, meaning that there is a difference in salivary pH after consuming UHT milk and pasteurized milk in students of SMPN 2 Karang Intan.

The pH of the subject's saliva increased after consuming UHT milk and pasteurized milk. Salivary pH after consuming UHT milk increased by an average of 0.19 and after consuming pasteurized milk increased by an average of 0.11.

This study is in accordance with the results of research conducted by Savira et al. (2017)¹⁰ which states that the pH of the subject's saliva has increased after consuming UHT milk. The salivary pH of respondents after consuming UHT milk has increased. This is because UHT milk contains more antioxidants. It is a good composition for individual oral health. The high antioxidant content is anti-cariogenic and antibacterial which can reduce the accumulation of oral bacteria so as to reduce the breakdown of carbohydrates into lactic acid and aspartamic acid by bacteria, so that the pH value of the subject's saliva remains in a stable condition.¹⁴

250 ml UHT milk contains 25% Vitamin A and 15% Vitamin C. UHT milk also has a protein content of 8 g which allows the release of more ammonia base substances, so that the pH value of the subject's saliva increases.¹⁵

Meanwhile, pasteurized milk contains only a small amount of antioxidants, namely from vitamin A as much as 25% but does not contain vitamin C. The pasteurization process can damage the vitamin C content.¹⁶

Vitamin A and Vitamin C can act as anti-cariogenic and antibacterial. The low content of antioxidants in milk causes the number of bacteria in the oral cavity to increase.¹⁴

However, after consuming UHT milk, there was 1 respondent who experienced a decrease in salivary pH value and 1 respondent who did not experience a change in salivary pH value. And after consuming pasteurized milk, there were 2 respondents who experienced a decrease in the pH value of saliva and 3 respondents who did not experience a change in the pH value of the saliva. This can be influenced by the poor buffering capacity of saliva and the poor ability of saliva to clean food or drink residues in the oral cavity.¹⁷

Pasteurized milk contains 9 grams of protein which allows the production of more basic ammonia. This causes the salivary pH to increase.¹⁵

CONCLUSION

Based on the results of research that has been done, it can be concluded that there is a difference in salivary pH after consuming UHT milk and pasteurized milk in students of SMPN 2 Karang Intan.

SUGGESTION

1. Students at SMPN 2 Karang Intan are advised to consume UHT milk and pasteurized milk, especially at the age of the highest caries period. And UHT milk can be used as a

better alternative for consumption because consuming UHT milk can further increase the pH of saliva and restore normal salivary conditions when compared to pasteurized milk.

2. Can be used as a dental and oral health education material to the public that UHT and pasteurized milk are milk that is rich in benefits, especially UHT milk because it is better able to restore the pH of saliva to normal conditions so that the risk of dental caries due to a decrease in salivary pH can be prevented.
3. It is hoped that the next researcher will conduct further research.

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