

Research Article

Correlation of Tuak Manis and Tuak Pahit Drinks with Saliva pH as Beginning of Dental Caries in Semanding, Tuban District

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- Saliva pH
- Sweet tuak
- Bitter tuak

Abstract

Background: Caries is still the highest disease and most often complained by people in oral health problems. The results of oral examinations in Bekthiharjo, especially in RT 03 / RW 04 Semanding, Tuban District, the majority of the population aged 35-44 years found that the average DMF-T was 7.5 included in the high category. The problem in this study is the high average index of DMF-T in the community in Bekthiharjo RT 03 / RW 04 Semanding, Tuban District.

Objective: The aim of this study is to determine the correlation between tuak manis and tuak pahit with salivary pH in Bekthiharjo, Semanding, Tuban District.

Methods: This type of research is Pre-experimental design with pretest posttest methods. Respondents from this study are male population aged 35-44 years who consumed tuak manis and tuak pahit over 1. The data collection method used observation. The data analysis technique used the correlation test, Chi-Square test.

Result: The results of this study are that there is a significant correlation between drinking tuak manis and tuak pahit with salivary pH.

Discussion: Salivary glands can be stimulated by mechanical and chemical (stimulation of taste such as acid, sweet, salty, and bitter). The speed of salivary secretion can directly affect the degree of acidity in the oral cavity. The decrease in pH will repeatedly lead to the demineralization process and the beginning of the caries process.

Conclusion: Based on this study, it can be concluded that there is a correlation between drinking tuak and salivary pH.

INTRODUCTION

Oral hygiene is an important thing for individual, the condition of the oral cavity that is not clean and healthy can cause problems in daily life [1]. Caries caused by demineralization of hard tissue (enamel, dentine and cementum) and destruction of dental organic material by acid production by hydrolysis from the accumulation of food debris on the tooth surface. There are four main factors needed for caries formation, namely tooth surface (enamel or dentin), saliva, caries bacteria, fermented carbohydrates such as sucrose, and time. Caries left untreated can cause pain, tooth loss and infection [2]. Hard tissue of tooth damage consists of carious and non-carious lesions, namely attrition, abrasion and erosion. Those abnormalities of tooth are not caused by microorganisms or plaque. Eating foods or drinks that contain acids or chemicals can cause tooth erosion [1]. Saliva is one of the factor that can cause caries. Saliva is a complex and colorless oral fluid that consists of a mixture of secretions from the salivary glands. All salivary glands have a function to help digest food by removing a secretion called "saliva" (saliva or saliva) [3].

Saliva has a normal pH of 6.7. Saliva is usually alkaline (base), the lower the pH of saliva, the caries tends to be higher. Several factors that cause changes in salivary pH include the average salivary flow velocity, oral cavity microorganisms, and salivary buffer capacity [4].

Some drinks in Indonesia are known locally as alcoholic, such as brem, tuak and ciu. Tuak is a fermentation drinks from nira water that produces alcohol, sugar and vinegar [5]. There are 2 types of tuak; tuak manis (without fermentation) and tuak pahit (which undergoes fermentation). Tuak pahit is drinks from palm trees that have a bitter taste and has been fermented in the manufacturing process [1]. Tuak manis consist of water (88.8%), carbohydrates in the form of sucrose (11.8), protein (0.23%), fat (0.02), and minerals (0.03%). Tuak pahit wine consists of water (88.8%), carbohydrates in the form of sucrose (11.8), protein (0.23%), fat (0.02), and minerals (0.03%). contain alcohol (4-5%) [1]. Tuak is a kind of distinctive drink that has become a tradition of the Tuban community, especially in Bekthiharjo, Semanding, Tuban District. Based on empirical observations, tuak drinks are often consumed among the people of Bekthiharjo Village because

there are many palm trees there. One of the culture there is consuming tuak every afternoon at 3 o'clock and at traditional celebrations. The majority of people who consume tuak drinks are men with more than 30 years of age. They consume tuak at an average of 5 glasses a day.

The prevalence of dental caries in the age group of 35-44 years in East Java is 92.2%. 17.4% have DMF-T > 3. People in East Java > 50% experience dental health problems while those who receive services from dental medical clinic are only 9.5% [6]. Based on the examination conducted on September 21, 2019 in Bekthiharjo, the majority of the population aged 35-44 years as many as 40 people obtained D = 170, M = 96, and F = 37, the number of DMF-T total of 330 with an average of 7.5 and this is in the high category. WHO (World Health Organization) expects population aged 35-44 years to show an average value of DMF-T 6.8 to 7.1 in the low category [6]. The problem in this study is the high average of DMF-T in the community in Bekthiharjo, RT 03 / RW 04, Semanding, Tuban. The aim of this research is to know the correlation between drinking tuak manis and tuak pahit with salivary pH in RT 03 / RW 04 Bekthiharjo, Semanding, Tuban District.

RESEARCH METHODS

This research has been declared to be ethically appropriate by the health research ethics committee of poltekkes kemenkes Surabaya with the number EA/177/KEPK-Poltekkes_Sby/V/2020. The type of research conducted in this study is Pre-experimental with pretest posttest research design. The sample of this research is the male population with aged 35-44 years who consume palm wine regularly for more than 1 year in Bekthiharjo Village RT 03 / RW 04 Semanding, Tuban District with total samples were 36. The sample were divided into two groups. First group was group who drank tuak manis and the other drank tuak pahit. All samples were instructed to spit their saliva in a glass and the pH was examined and then the samples were allowed to eat before drank tuak. After that they drank tuak in a half of glass. And they were instructed to spit their saliva and examined pH saliva used pH meter. This research was conducted from September 2019-February 2020. Salivary pH data in this study was carried out by measuring using a pH meter and then written on the observation sheet.

RESULTS

Based on Table 1 it can be seen that the respondents before drinking tuak manis have acid salivary pH conditions with a total of 11 respondents (61%), neutral salivary pH criteria with a number of 3 respondents (17%), while the pH criteria of salivary alkaline with a total of 4 respondents (22%). After respondents drank tuak manis there was a decrease in acid pH by 7 respondents (39%), in neutral pH it decreased by 2 respondents (11%), while in alkaline pH an increase of 9 respondents (50%). The increase in salivary pH is influenced by how long the respondent has consumed tuak manis wine and the absence of alcohol content in the tuak manis and there is no fermentation in making tuak.

Based on Table 2 it can be seen that the respondents before drinking tuak pahit that the condition of salivary pH in acidic conditions with a total of 18 respondents (100%), the criteria for neutral saliva pH with the number of 0 respondents (0%),

Table 1: Correlation Salivary pH before and after Drinking Tuak Manis.

Salivary pH	Before		After	
	Total (n)	Percentage (%)	Total (n)	Percentage (%)
Acid	11	61	7	39
Neutral	3	17	2	11
Alkaline	4	22	9	50
Total	18	100	18	100

Table 2: Correlation of Salivary pH before and after Drinking Tuak Pahit.

Salivary pH	Before		After	
	Total (n)	Percentage (%)	Total (n)	Percentage (%)
Acid	18	100	18	100
Neutral	0	0	0	0
Alkaline	0	0	0	0
Total	18	100	18	100

while the pH criteria of salivary alkaline with the number of 0 respondents (0%). and after drinking the tuak pahit with the same results ie at neutral pH 0 respondents (0%), at basic pH also has the same results 0 respondents (0%), at acidic pH also has the same results 18 respondents (100%) but a decrease in pH between before drinking tuak pahit has an average value of 3.64 and after drinking tuak pahit has decreased has an average value of 2.62. Decrease in salivary pH is influenced by the alcohol content in tuak pahit and fermentation in the making of tuak.

Based on Table 3 the Asymp value is known. Sig. smaller than 0.05 (0.00 < 0.05), a two-variable hybrid test using the Chi-Square test on salivary pH after drinking tuak manis and tuak pahit with salivary pH. Based on the results of the data obtained a sig value of 0,000 which means the *p-Value* is smaller than the value of α (0,000 < 0.05). These results indicate that there is a significant correlation between drinking tuak manis and tuak pahit with salivary pH.

DISCUSSION

This increase in salivary pH can be caused by duration of respondent to consume tuak manis and the process of making tuak (not undergoing fermentation) and the chemical components it contains. This can be seen from the results of salivary pH before and after drinking tuak manis. This is in accordance with research Noviyanti Rizki in 2014 explained that the juice of freshly extracted sap from trees has a sweet taste with neutral pH, but due to the presence of neutral pH, environmental influences and fermentation cause the juice to become contaminated so that the pH drops to become acidic and sweet taste in nira water turns into bitter. This is in accordance with the opinion of Amerongen [7], the speed of secretion is influenced by the nature of stimulation, salivary glands can be stimulated by mechanical (such as chewing hard food / gum) and chemical (stimulation of taste such as acid, sweet, salty, and bitter). The speed of salivary secretion can directly affect the degree of acidity in the oral cavity. When there is an increase in the speed of salivary secretion will increase the pH of saliva, conversely a decrease in the speed of salivary secretion will reduce the pH of saliva. This situation will affect the process of demineralization of

Table 3: Correlation Test Results of Salivary pH before and after Drinking Tuak Manis and Tuak Pahit.

	N	Minimum	Maximum	Mean	p-Value
Type of tuak	72	1,00	4,00	2,50	0,000
Salivary pH	72	1,00	3,00	1,43	0,000
Uji Chisquare Test					

pH in acidic conditions and remineralisation of pH under normal conditions in teeth. A decrease in pH repeatedly will result in the demineralization process and the beginning of the caries process

The degree of acidity (pH) of the saliva and the buffering capacity of the saliva can be influenced by circadian rhythms, diet, and stimulation of the speed of secretion [7]. Tarigan's [8], when salivary pH falls below the normal limit, enamel loses calcium which can cause etching of the outer enamel which leads to decalcification of enamel by acids.

This is in accordance with the opinion of Amerongen [7], a decrease in pH will repeatedly lead to the demineralization process and the beginning of the caries process. This is supported by research conducted by Noviyanti Rizki [9], on the effect of consumption of tuak on tooth erosion in Maiwa Sub-district, Enrekang District. Bitter wine drink is a drink containing acid with a pH below normal. Based on the study of tuak measurement with a digital pH meter conducted by researchers, the results show that the pH of the tuak pahit drinks that is produced by Bangkala Village is acidic, the pH of tuak which is produced by Mangkawani Village is acid, and the pH of tuak which is produced by Puncak Village Hope is sour.

The higher degree of acidity in food and drinks that are routinely consumed, resulting in the more frequent teeth exposed to acid so as to create an acidic environment. Tooth demineralization occurs when enamel is in an environmental pH below 5.5 (acidic). Tuak pahit with a pH below 5.5 consumed by the community has a significant effect on demineralization in tooth enamel because a low pH will increase the concentration of hydrogen ions and these ions will damage the enamel hydroxyapatite. In accordance with Priyambodo Ardian and Daniar's research [1], which examined the effect of consuming tuak on tooth erosion in Mariorejo, Soppeng district. Tuak pahit is one of the habits in people who are often consumed in Marioriaja, Soppeng district. There are many factors can trigger tooth erosion due to the influence of Tuak consumption, such as age, sex, type of work, residence, duration of consumption, frequency, the number of tuak. This research can increase the knowledge of respondents that consuming tuak pahit and can increase the pH of saliva, if the pH of saliva has increased, the process of demineralization that causes dental caries can be prevented [10-18].

CONCLUSION

Based on this research, the salivary pH after drinking tuak manis is alkaline. The salivary pH after drinking tuak pahit is acidic. There is a significant correlation between salivary pH after drinking tuak manis and tuak pahit in the male population of RT 03 / RW 04 Bekthiharjo, Semanding, Tuban District.

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