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The Effect of Consuming Robusta Coffee (*Coffea Canephora*) on Salivary pH Based on Gender

Poetry Oktanauli[1], Pinka Taher[2], Margaretha Herawati[3], Ratih Widyastuti[4], Andy Hidayat[5], Susi R Puspitadewi[6], Esthuning Vidya Pramesty[7]

[1,2,3,5] Department of Oral Biology, Faculty of Dentistry, Prof. Dr. Moestopo (Beragama) University,Jakarta

[4]Department of Periodontics, Faculty of Dentistry, Prof. Dr. Moestopo (Beragama) University, Jakarta

[6]Department of Prosthodontics, Faculty of Dentistry, Prof. Dr. Moestopo (Beragama) University, Jakarta

[7]Faculty of Dentistry, Prof. Dr. Moestopo (Beragama) University, Jakarta

ABSTRACT

Backgrounds: The degree of acidity (pH) of saliva plays an important role in dental caries, periodontaldisease, and various other oral diseases. A low degree of accidity (4.5- 5.5) will supports acidogenic bacteria such as *Streptococcus mutans* and *Lactobacillus* to grow. Diet patterns influence the degree ofacidity (pH) of saliva. Coffee is a familiar drink to all ages and genders. The main content of robusta coffeeare caffeine, carbohydrates, protein, organic acids, trigonelline and chlorogenic acid can cause a decreasein the acidity (pH) levels of men's and women's saliva.

Objectives: Provide information regarding the effect of consuming robusta coffee on salivary pH based on gender.

Methods: This study used 32 samples divided into 2 groups, which are male and female groups aged 20-24 years with an experimental research type and pretest-posttest group design. The normality test used Shapiro- Wilk, and statistical tests used the Paired T-Test and Independent T-Test.

Results: Based on the results of the statistical testsshowed a decrease in salivary pH in each group (P = 0.01 for the male group and P = 0.029 for the femalegroup) after consuming robusta coffee. However, there was no significant difference in effect between the two groups (P = 0.217) after consuming robusta coffee.

Conclusion: Consuming robusta coffee candecrease men's and women's salivary pH, but there is no significant difference in effect between the twogroups. The decrease in men's salivary pH has a greater value compared to women's salivary pH.

KEYWORDS: Salivary pH, Diet Patterns, Robusta Coffee, Gender, Young Adults.

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INTRODUCTION

According to Law of the Republic of Indonesia Number 17 of 2023, health is healthy conditions of a person, both physically, mentally, and socially and not just being free from disease to enable him/her to live productively.[1] Dental and oral health is related to general health. Dental and oral conditions that are not maintained and cared for can cause various problems and discomfort for the individual.[2] A good diet patterns is very important in maintaining dental and oral health. A good diet is something that needs to be considered in order to maintain dental and oral health. Diet patterns will affect the acidity level (pH) of saliva and play a role in the formation of dental caries. If teeth are exposed to saliva pH with low acidity for a long duration, the possibility of the formation of dental caries will also increase.[3]

Saliva is one of the most important components in the mouth. Saliva is a thin aqueous solution containing organic and inorganic constituents. Saliva has several benefits for the oral environment, including buffering to neutralize acids or bases, cleaning from substances or food residues, remineralization, lubricating the oral cavity, having a role in chewing, swallowing, and speaking. Saliva plays a role in protecting oral tissues by keeping them moist with

their high calcium content, phosphate concentration, and buffering acid strength.[4]

Coffee is a familiar and very popular drink for all people around the world. Also in Indonesia, coffee is a drink that is commonly consumed every day by Indonesian people of all ages and genders. Coffee is the fruit seed of the Coffea genus tree. Coffee has components consisting of caffeine, nicotinic acid, monosaccharides, sucrose, trigonelline ($C_7H_7NO_2$), and chlorogenic acid. There are two types of coffee that are most famous throughout the world, which are arabica coffee and robusta coffee. Robusta coffee has a higher level of bitterness than arabica coffee. Robusta coffee has a caffeine component of 1.7% to 4.0%, while arabica coffee has a caffeine component of only 0.8% to 1.4%.[5] One of the factors that influences and plays a role in tooth demineralization, prevention of the process of tooth decay, and other oral cavity diseases is the acidity level (pH) of saliva. Acidity in the tooth and saliva areas is something that plays an important role in the process of dental caries.

The components contained in coffee can changes salivary pH in subjects who consume it. Research conducted by Herry Imran et al. in 2016 showed that there is a significant effect between consuming coffee and a decrease in salivary pH due to the content of coffee, namely acidic substances such as nicotinic acid and chlorogenic acid, and high content of simple carbohydrates, such as monosaccharides and sucrose.[6] Similiar research was conducted by Paroza et al. in 2021 showed that robusta coffee can affect changes in salivary pH in healthy subjects. This is shown by the results of the average value of salivary pH decreases after being given robusta coffee. The decrease in the acidity (pH) of saliva indicates a high risk of dental caries. Based on this, it can be seen that robusta coffee affects salivary pH in both men and women.[7]

MATERIALS AND METHODS

The type of research conducted is a clinical experimental study with a one group pre-post test design research design. This design is used to find out the salivary pH before and after treatment of the sample by conducting one measurement before treatment (pre-test) and after treatment (post-test), then the results of the pre-test measurements are compared with the results of the post-test measurements. The study was conducted using 32 saliva samples from 16 male subjects and 16 female subjects to comply the ideal data requirements. The data or research results obtained were evaluated using the SPSS (Statistical Package for the Social Sciences) program by first conducting a normality test using the Shapiro-Wilk Test. The data or research results were proven to be normally distributed with a significant value ($p>0.05$). Next, used a parametric statistical test method, namely the Paired Sample T-Test for paired data, then used an Independent T-Test to compare the average results of saliva pH before and after treatment between the two groups.

RESULTS AND DISCUSSION

The research results can be seen in the following table:

Table 1. Pretest-Posttest Frequency Distribution in Male and Female Gender Groups

Variabel	Mean	SD	Median (Minimum-Maksimum)
Pretest pH of men saliva	7.5244	.46695	7.4900 (6.92 – 8.51)
Posttest pH of men saliva	7.1213	.49714	7.0950 (6.03 – 8.10)
Pretest pH of women saliva	7.3488	.41724	7.1950 (6.80 – 8.11)
Posttest pH of women saliva	7.1213	.31536	7.0400 (6.61 – 7.70)

Table 2. Data Normality Test

Treatment Group	*Shapiro-Wilk*		
	Statistik	df	sig
Pretest pH of men saliva	.943	16	.385
Posttest pH of men saliva	.951	16	.511
Pretest pH of women saliva	.919	16	.163
Posttest pH of women saliva	.942	16	.379

Table 3. Results of Saliva pH Difference Test Before and After Treatment

	P - Value
Pretest – posttest men group	.001
Pretest – posttest women group	.029

*P<0.05, CI 95% (*Paired T-Test*)

Table 4. Results of the Test of Differences in the Effect of Consuming Robusta Coffee on Changes in Saliva pH Between Male and Female Groups.

	P - Value
Difference in saliva pH of men and women groups before and after consuming robusta coffee	0.217

*P<0.05, CI 95% (*Independent T-Test*)

Descriptive data analysis in table 1 shows that the pH of the saliva of men group before consuming robusta coffee had mean, median, minimum, and maximum values of 7.5244, 7.4900, 6.92, 8.51 respectively with a standard deviation of 0.46695. The pH value of the saliva of the men group after consuming robusta coffee had mean, median, minimum, and maximum values of 7.1213, 7.0950, 6.03, 8.10 respectively with a standard deviation smaller than the mean of 0.49714.

Table 1 shows that the pH value of the saliva of women group before consuming robusta coffee had mean, median, minimum, and maximum values of 7.3488, 7.1950, 6.80, 8.11 respectively with a standard deviation smaller than the mean of 0.41724. The pH value of the saliva of women group after consuming robusta coffee had a mean, median, minimum, and maximum value of 7.1213, 7.0400, 6.61, and 7.70, respectively, with a standard deviation of 0.31536. The standard deviation measures how widely the deviation or spread of the data value is from the average or mean value. Based on the descriptive data analysis in table 5.1, the standard deviation of the entire data is smaller than the mean, indicating that the mean value can be used as a representation of the entire data, or it can be interpreted that the data is homogeneous.

The results of the data normality test based on table 2, all data are considered normally distributed because they have a p value> 0.05, which are the p value in the men salivary pH pretest, men salivary pH posttest, women salivary pH pretest, and women salivary pH posttest on robusta coffee treatment are 0.385, 0.511, 0.163, and 0.379, respectively. Based on the results of the data normality test, the pretest and posttest data on the salivary pH of the men and women groups are normally distributed, so that the hypothesis testing uses parametric tests, namely the Paired T-Test for paired groups and the Independent T-Test for unpaired groups.

Table 3 shows the Asymp. Sig. (2-tailed) value for the men group on the robusta coffee treatment of 0.01, this value is smaller than 0.05, so it can be interpreted that there is a significant effect between the pH of men saliva before and after the robusta coffee treatment. Asymp. Sig. value. (2-tailed) for the women group on the robusta coffee treatment was found to be 0.029, the value is smaller than 0.05, so it can be interpreted that there is a significant effect between the pH of female saliva before and after the robusta coffee treatment.

Based on table 4, the results of the Independent T-Test statistical test were obtained with an Asymp. Sig. (2-tailed) value of 0.217, the value is greater than 0.05, so there is no significant difference in the effect between the robusta coffee treatment on changes in the pH of the saliva of the men and women groups.

This study used robusta coffee, showing a decrease in salivary pH in the men group (the average salivary pH became 7.1213 which was the average pH before consuming of 7.5244) and also in the women group (the average salivary pH became 7.1213 which was the average pH before consuming of 7.3488). The results of this study shows that there is an effect of consuming robusta coffee on salivary pH in both groups and show that the salivary pH of men has a lower value than women. This is similiar with research conducted by Arfatul M. et al. in 2023 regarding the difference in salivary pH between young adult men and young adult women aged 17-24 years, where the salivary pH of young adult men is lower than the salivary pH of young adult women. Many factors can influence changes and differences in salivary pH in men and women, including the types of food and drinks consumed, flow path, buffer capacity, and viscosity of saliva, as well as maintenance of dental and oral health.[8]

The results of statistical tests with Paired T-Test from this study showed that there was a significant difference between the pH of men and women saliva before and after consuming robusta coffee, meaning that there was an effect of consuming robusta coffee on salivary pH in each gender. There was a decrease in salivary pH in both men and women groups after being exposed to robusta coffee. The results of this study are similiar with research conducted by Herry Imran et al. in 2016 regarding the effect of coffee consumption on decreased salivary pH because coffee contains acidic substances such as nicotinic acid and chlorogenic acid, as well as simple carbohydrate content in high concentrations, such as monosaccharides and sucrose.[6]

This statement is supported by research conducted by Paroza et al. in 2021 regarding robusta coffee solution can affect changes in salivary pH in healthy subjects. This is shown by the results of the average value of salivary pH after consuming robusta coffee decrease, indicating a high risk of dental caries.[7] The results of this study are also in line with research conducted by Arfatul M. et al. in 2023 regarding the types of food and drinks consumed can affect changes and differences in salivary pH in men and women genders.[8] Foods containing carbohydrates will be metabolized quickly by oral bacteria and form acid so that salivary pH decreases within 1-3 minutes.[9,10] Coffee components, which are high simple

carbohydrates, such as sucrose, polysaccharides, and monosaccharides can potentially reduce salivary pH for those who consume them because these components will be fermented into acid by *Streptococcus mutans* bacteria so that they can reduce salivary pH and cause salivary pH to become acidic.[11] A decrease in salivary pH can cause rapid tooth demineralization and facilitate the growth of acidogenic bacteria such as *Streptococcus mutans* and *Lactobacillus*, resulting in a high risk of dental caries.[12,13]

The results of the statistical test with the Independent T-Test in this study showed no significant difference in the effect between the salivary pH of the men and women groups on the robusta coffee treatment. This is evidenced by the average change in saliva pH which is only slightly different between the two, which are the average change in saliva pH in the men group is 0.4031 and the average change in saliva pH in the women group is 0.2275, a difference of 0.1756 between the two average decreases in saliva pH.

The robusta coffee shows it has an effect on lowering the saliva pH of men and women because of the components it contains, so it can change the saliva pH to an acidic atmosphere in the oral cavity, and cause a high risk of dental caries and various oral diseases. The effect of robusta coffee in lowering saliva pH proves that the drink is not recommended to be consumed too often or consumed with high frequency.

CONCLUSION

In this study, it can be concluded that consuming robusta coffee is able to reduce thedegree of acidity (pH) of the saliva of men and women with a slight difference in average, where the decrease in salivary pH that occurs in men is greater than that of women.

REFERENCES

I. Undang-Undang Republik Indonesia Nomor 17 Tahun 2023 Tentang Kesehatan.

II. Pratiwi, D., Ariyani, A.P., Sari, A., Wirahadikusumah, A., Nofrizal, R., Tjandrawinata, R., Soulisa, A.G., Wijaya, H., Komariah, Sandra, F. Penyuluhan Peningkatan Kesadaran Dini Dalam Menjaga Kesehatan Gigi Dan Mulut Pada Masyarakat Tegal Alur, Jakarta. Jurnal Abdi Masyarakat Indonesia. 2020; 2(2): 120-8.

III. Hans, R., Thomas, S., Garla, B., Dagli, R.J., Hans, M.K. *Research Article: Effect of Various Sugary Beverages on Salivary pH, Flow Rate, and Oral Clearance Rate amongst Adults. Research Article Scientifica*. 2016; 1-7.

IV. Kumar, B., Kashyap, N., Avinash, A., Chevvuri, R., Sagar, M.K., Shrikant, K. *The Composition, Function and Role of Saliva In Maintaining Oral Health: A Review. International Journal of Contemporary Dental and Medical Review*. 2017; 1-6.

V. Harry Imran, Nurdin, Nasri. Pengaruh Konsumsi Kopi Terhadap Penurunan Ph Saliva Pada Usia Dewasa. Jurnal Penelitian Kesehatan Suara Forikes. 2016; 7(3): 161-5

VI. Karina Sa'diah, Maulida Hayati. Pengaruh Konsumsi Kopi (Coffea sp) terhadap Ph, Laju Alir dan Viskositas Saliva pada Pecandu Kopi (Coffee Holic). Jurnal B-Dent. 2018; 5(1): 72-82.

VII. Oktanauli, P., Zikir, A.P., Taher, P., Herawati, M., Sean, M. *Effect of Robusta Coffee (Coffea canephora) on the Degree of Acidity (pH) of Saliva. International Journal of Clinical Science and Medical Research*. 2023; 3(5): 97-101.

VIII. Makiyah, A., Ramadhani, FA. Perbedaan pH Saliva Berorientasi Gender Pada Mahasiswa Keperawatan Fakultas Kesehatan Universitas Muhammadiyah Sukabumi. Journal Health Society. 2023; 12(2): 69-76.

IX. Susi, S., Alioes, Y., Putri, C. J., Erawati, S. Meningkatkan pH saliva dengan Berkumur Infusum Daun Kemangi. Prima Journal of Oral and Dental Sciences. 2020; 3(1): 5-9.

X. Widia, R., Kasuma, N. *Comparison of Salivary pH Before and After Consuming a Solution of Sugar and Palm Sugar In Dentistry Faculty's Student of Andalas University. Andalas Dental Journal.* 2018; 6(2): 70-72.

XI. Mardiati, E., Wiradona, I. *Effect of Black Coffee and Black Tea Consumption on pH, Flow Rate, and Viscosity of Saliva*. International Journal of Applied Dental Sciences. 2023; 9(2): 38-42.

XII. Rahayu YC, Kurniawati A. Cairan Rongga Mulut. Yogyakarta: Innosain; 2018: 13-15, 39-42, 61-63.

XIII. Lely, MA. Pengaruh (pH) Saliva terhadap Terjadinya Karies Gigi pada Anak Usia Prasekolah. Indonesian Bulletin of Health Research. 2017; 45(4): 241 243.