The difference of sweet taste threshold before and after using mouthwash containing zinc sulfate

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ABSTRACT

Introduction: Mouthwash containing zinc sulfate could reduce the ability of tasting sweetness temporarily. Zinc sulfate is an example of a zinc compound which is the active ingredient in mouthwash. Zinc sulfate is added in mouthwash as an antiplaque and astringent material that gives a cleaning on the mouth. This study aimed is to analized differences of sweet taste threshold changes data before and after using mouthwash containing zinc sulfate. **Methods:** The study was using quasi experimental study. Study sample was collage students of Dentistry Faculty of Padjadjaran University totally 30 sample ages between 18-25 years old men and women took based on purposive sampling. Murphy method was applied to measure the threshold of sweet taste perception and identification before and after using mouthwash containing zinc sulfate. **Results:** The result of statistically shows the average value of sweet perception threshold before and after using mouthwash containing zinc sulfate are 0.0046 M and 0.0128 M with standard deviation 0.0047 and 0.0084. Sweet identification threshold before and after using mouthwash containing zinc sulfate are 0.0164 M and 0.0248 M with standard deviation 0.0089 and 0.0082. **Conclusion:** There is difference of sweet taste threshold before and after using mouthwash containing zinc sulfate.

Keywords: Mouthwash, zinc sulfate, taste, sweet taste.

INTRODUCTION

Mouthwash is widely used by the people as an effort to plaque control and prevention of bad breath. Various kinds of mouthwash in a community environment market with diverse content. Zinc compounds are mostly added in the mouthwash composition because they have antimicrobial that effects and reduce bad breath.[1,2]

Zinc sulfate is an example of a zinc compound which is the active ingredient in mouthwash. Zinc sulfate is added in mouthwash as an antiplaque and astringent material that gives a cleaning on the mouth.[2,3] Unconsciously, excessive use of mouthwash can cause side effects such as taste disorder.[4] Based on Keast et al's research in 2004, the use of liquid containing zinc sulfate in the mouth can disrupt the tasting, especially sweet taste tasting. The properties of astringencies in zinc sulfate can constrict and precipitate exposed tissue protein of the oral cavity so that it may cause taste disorders.[5]

Taste is an interesting sensation in human life. The tasting allows humans to choose food and drink according to taste.[6] The tasting also plays an important role as the body's defensive

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door that allows humans to recognize chemical substances in food and resist harmful substances to the body.[7,8] According to Winarno 1997, there are four basic flavors in foods that are sweet, salty, sour, and bitter. Generally humans love foods with sweet and salty taste because it is associated with high nutritional value. Foods with sour and bitter taste are recognized as foods that should be avoided because they are associated with harmful substances to the body.[9] In general, sweet taste is considered a pleasant sensation. Sweet taste can be caused by various compounds, one of them organic compounds such as sugar.[10] Reduced sensitivity of sweet taste caused by tasting disorder causes the individual to consume more sugar to get a sweet taste. This causes the risk of tooth decay becomes higher.

Disturbance tasting sweet taste can occur due to the use of mouthwash containing zinc sulfate.[11] Therefore, the authors are motivated to conduct research on the difference of sweet taste threshold before and after using mouthwash containing zinc sulfate.

The results of this research hope can add information about the difference of sweet taste threshold before and after using mouthwash containing zinc sulfate relate with plaque control and bad breath and the tasting function necessary to maintain human survival.his study aimed is to analized differences of sweet taste threshold changes data before and after using mouthwash containing zinc sulfate.

METHODS

This research is a quasi-experimental research which aims to derive information that is approximate for information that can be obtained with actual experiments in circumstances where it is not possible to control and manipulate all relevant variables. The population of this research is students of Faculty of Dentistry, Padjadjaran University. The sample of this research is 30 people with purposive sampling method. Purposive sampling method is a sampling method based on individual considerations or considerations of the researcher.[12]

The criteria of the population are as follows: Male or female young adult who age between 18-25 years old, general and oral health of the sample relatively good, no systemic disturbance, no use of drugs and alcohol, no smoking, no use of prosthesis or removable orthodontic appliance, willing to be a sample. This research was conducted in two stages, namely the preparation stage and the stage of implementation, which was done in two circumstances, namely before and after using a mouthwash containing zinc sulfate. Preparation stage undertaken to measure the tasting threshold is: Make a solution of sucrose with a concentration of 0.0006 M; 0.001M; 0.002 M; 0.004 M; 0.012 M; 0.02 M; 0.028 M; 0.036 M; 0.044 M; 0.052 M; 0.06, prepared a 20 ml zinc sulfate mouthwash, arranged a small slice with an intermittent arrangement between the sucrose and distilled water solutions, the slocks arranged into twelve rows and three columns, the first and the third columns containing distilled water, while the second column contained the solution sucrose starting from the lowest concentration to the highest concentration in sequence.

The implementation stage of the measurement threshold measurement of this study is carried out as follows: the sample is asked to rinse with distilled water in the first column of the first row, after which it is given distilled water and sucrose solution in a row according to column and row horizontally, the operator notes the concentration of sucrose solution as the perception threshold tasting when the sample has sensed a different sensation with water, but has not been able to recognize exactly the type of flavor, the operator continues to provide distilled water and a sucrose solution with a higher concentration on the next line until the sample can correctly identify and surely the type of taste of the solution drunk.

The result is recorded as the verification threshold of the tasting, then sample gargle with a mouthwash containing zinc sulfate for 30 seconds, sample repeating the grains one and two, the operator recorded the concentration of sucrose solution as the perception threshold of tasting after using a mouthwash containing zinc sulfate when the sample already sensed a different sensations with water but have not been able to accurately recognize the type of flavor, the operator continues to provide distilled water and a sucrose solution with a higher concentration on the next line until the sample can correctly

identify and surely the type of taste of the solution taken. The results are recorded as the verification threshold of the tasting after using a mouthwash containing zinc sulfate. The experiment is only done once on each sample to avoid the effects of adaptation. Data collection was obtained through experiments conducted on sample about the perception threshold and the threshold of sweet taste tasting identification. Data obtained in this research is shown in table, then calculated by using t test student.

RESULTS

This research of threshold differences of taste tasting before and after using a mouthwash containing zinc sulfate was performed on 30 sample. The study used a solution of sucrose with a concentration of 0.0006 M to 0.06 M as a solution to test the sweet taste tasting threshold value. Based on the results of the research, the values of the tasting threshold consisted of the value of the perception threshold and the threshold value of identification each measured before and after using a mouthwash containing zinc sulfate.

The perceptual threshold is obtained when the sample can distinguish the test solution from water but has not been able to confirm the taste type. The threshold of identification is obtained when the sample can recognize and specify the type of taste of the test solution with specific and precise. The data were analyzed by paired student t test statistic method to find out whether there was a difference of sweet taste threshold value before and after using mouthwash containing zinc sulfate. The statistical calculation yields data in the mean, mode, median, standard deviation and t arithmetic from the perception threshold and the sweet taste identification threshold before and after using a mouthwash containing zinc sulfate shown in Table 1 and Table 2.

Table 1. Perception Threshold of Sweet Savoring Before and After Using Mouthwash Contained Zinc Sulfate

	Perception Threshold				
	Before	**After**	**t count**	**t table**	**Examination**
Maximum	0,0200	0,0360			
Minimum	0,0006	0,0010			
Modus	0,0020	0,0120	-6,734	-2,045	H_0 rejected
Rata-rata	0,0046	0,0128			
Standard Deviation	**0,0047**	**0,0084**			

Ket: α = 0,05

Table 1 shows the maximum and minimum tasting taste perception threshold values before using a mouthwash containing zinc sulfate is 0.0200 and 0.0006 with mean and standard deviation values of 0.0046 and 0.0047. After using a mouthwash containing zinc sulfate obtained a maximum value of 0.0360 and the minimum value to 0.0010 with an average of 0.0128 and standard deviation of 0.0084. The result of statistical test with the criterion of starting test H0 if tcount ≥ t table or t count ≤ - ttable indicates that H0 rejected, then it is concluded that there is a significant difference between sweet taste perception threshold before and after using mouthwash containing zinc sulfate. Table 2 shows the maximum and minimum taste

	Perception Threshold				
	Before	**After**	**t count**	**t table**	**Examination**
Maximum	0,0360	0,0440			
Minimum	0,0010	0,0120			
Modus	0,0120	0,0200	-6,888	-2,045	H_0 rejected
Rata-rata	0,0164	**0,0248**			
Standard Deviation	**0,0089**	**0,0082**			

Ket: α = 0,05

taste sweetening taste verification threshold values before using a mouthwash containing zinc sulfate is 0.0360 and 0.0010 with mean and standard deviation values of 0.0164 and 0.0089. After using a mouthwash containing zinc sulfate obtained a maximum value of 0.0440 and the minimum value to 0.0120 with an average of 0.0248 and standard deviation of 0.0082. The result of statistical test with the criterion of starting test H0 if tcount ≥

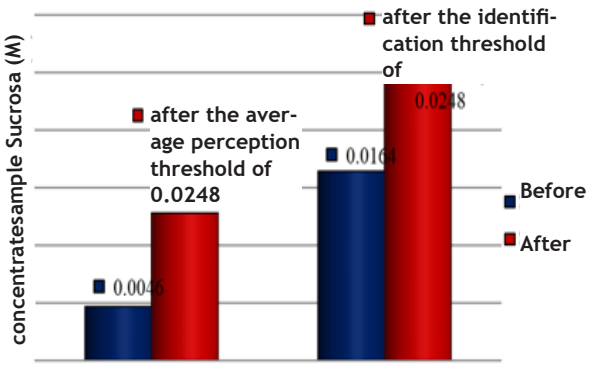

Figure 1 Average Perceptual Threshold and Threshold Identification of Soy Confection Before and After Using Zinc Sulfate Containing Mouthwash

ttable or tcount ≤ - ttable indicates that H0 is rejected, it is concluded that there is a significant difference between the threshold of sweet taste identification before and after using mouthwash containing zinc sulfate.

DISCUSSION

Based on the results of research that has been done on the threshold of taste sweet taste before and after using mouthwash containing zinc sulfate obtained t arithmetic = -6,734 for perception threshold and t count = -6,888 for threshold identification. This result is smaller than t table that is equal to -2,045. Table 1 shows the mean and standard deviations from measurement of perception threshold before using a mouthwash containing zinc sulfate is 0.0046 with standard deviation 0.0047 while the mean perception threshold and standard deviation after using a mouthwash containing zinc sulfate is 0 , 0128 and 0.0084.

Table 2 shows the mean and standard deviations of the measurement threshold of identification before using a mouthwash containing zinc sulfate is 0.0164 with standard deviation 0.0089 while the mean identification threshold and standard deviation after using a mouthwash containing zinc sulfate are 0 , 0248 and 0.0082.

Based on the result of paired student t test with α = 0,05, it is concluded that the null hypothesis is rejected and hypothesis one is accepted, it means that statistically there is difference of perception threshold and verification threshold of sweet taste before and after using mouthwash containing zinc sulfate. The result of research of taste threshold shows 23 data stated there is difference of perception threshold of sweet taste before and after using mouthwash containing zinc sulfate. There are 7 data that do not show any difference between sweet taste perception threshold before and after using mouthwash containing zinc sulfate.

The results showed 22 data stated there is difference threshold of sweet taste identification before and after using mouthwash containing zinc sulfate. There are 8 data that do not show any difference between the threshold of sweet taste identification before and after using a mouthwash containing zinc sulfate. There is no difference in the perception threshold in the research that has been done due to the existence of intruder factors that are difficult to be controlled by researchers such as food waste, psychological, hormonal and systemic conditions.

Based on paired student t test statistic for perception threshold data and threshold of identification, obtained significant result that there is difference of taste threshold both perception threshold and sweet taste identification threshold before and after using mouthwash containing zinc sulfate. An increase in the tasting threshold that includes the perception threshold and the identification threshold due to zinc sulfate is an astringent local drug.[11,13] The use of a mouthwash containing zinc sulfate will cause the precipitation of the protein at the taste receptor.

This situation occurs because the zinc ions can bind to proteins. A protein bond with zinc ions will change the three-dimensional structure of the taste receptor. In addition, the protein deposits form biofilms with little penetration, so the permeability of the taste bud membrane becomes altered. Changes in the permeability of the taste bud membrane cause a change in the normal functioning of the taste receptor and cause the

tasting disorder.[11]

The properties of astringent zinc sulfate also lead to a reduction in oral tissue extravasation. The shrinkage that accompanies the precipitation of the protein will lead to inhibition of salivary gland secretion, resulting in reduced salivary volume. Reduced salivary volume will cause tasting disorders because saliva is a chemical solvent of flavored stimuli.[5,14] Precipitation of protein and shrinkage of tissue that occurs will cause the sensation of astringensia, the metallic taste and the feeling of the mouth that is not lost despite rinsing with water. Metallic flavor that occurs will cause a masking effect is one taste taste that mask the taste of other tastes, so that taste taste threshold value to be increased.[11,15]

The use of a mouthwash containing zinc sulfate may affect the sensitivity of taste receptors, so the sweet taste-tasting threshold is increased. The effect is seen from the results of experiments that show the difference of sweet taste threshold before and after using mouthwash containing zinc sulfate.

CONCLUSION

There is difference of sweet taste threshold before and after using mouthwash containing zinc sulfate

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