


The Effect of Garlicing with Decorated Binahong Leaves (*Anredera Cordifolia*) on Saliva Ph

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Article Info	ABSTRACT
Keywords: Saliva pH, Binahong Leaves (<i>Anredera cordifolia</i>)	Saliva is formed from secretion gland saliva on the oral mucosa , with production daily around 700 ml. Normal saliva pH is around 6-7, with pH changes are influenced by taste stimulation . Binahong (<i>Anredera cordifolia</i>) is plants that are capable growing in the plains low and high , all part plant binahong Can utilized , but the most common used in herbal medicine is the leaves Because contain compound chemistry like saponins , flavonoids, polyphenols , and triterpenoids . Purpose from study This is For know influence gargle stew leaf binahong (<i>Anredera cordifolia</i>) on saliva pH student health tooth class of 2023. Method Study used is <i>quasi -experimental</i> with design <i>pre and post test group design</i> . Study This get sig . value of 0.00 so ($\alpha < 0.05$) then There is influence gargle stew leaf binahong (<i>Anredera cordifolia</i>) on saliva pH student health tooth class of 2023.
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INTRODUCTION

Dental and oral health is an important factor in overall body well-being, improving the welfare of human resources from a social and economic perspective, and playing a strategic role in national development. Thus, it is crucial for every individual to have the awareness, skills, and motivation to maintain dental and oral health. Unfortunately, many people often neglect this, even though the teeth and mouth are entry points for microbes that can attack other parts of the body (Susilawati & Damayanti, 2020) .

Oral and dental health can be measured through salivary function, and it is crucial for protecting teeth from external and environmental factors in the mouth (Damira et al., 2021). Saliva, also known as spittle or saliva, is a complex fluid produced by certain glands and distributed throughout the oral cavity (Anisa, 2021) . One of its main roles is to neutralize changes in acidity in the mouth. Salivary glands produce a continuous flow of saliva into the mouth to keep the oral mucosa moist, which helps protect it from abrasion, and to clean microorganisms, detached epithelial cells, leukocytes, and food debris through the swallowing process (Afdilla et al., 2023) .

Saliva is formed from secretions from the major and minor salivary glands and is located in the oral mucosa. Approximately 90% of saliva is produced by the submandibular and parotid glands in the mouth, while 5% comes from the major salivary glands located under the tongue, and the remaining 5% is produced by smaller salivary glands (Afdilla et

al., 2023) . Humans produce approximately 700 ml of saliva daily. Normal saliva secretion ranges from 1 to 2 millimeters per minute. A decrease in salivary pH (acid capacity) and low salivary secretion indicate a higher risk of dental caries. Conversely, an increase in salivary pH (alkaline) indicates a higher risk of tartar formation (Anisa, 2021) . Changes in the rate of saliva production directly affect the acidity level (pH) in the mouth. Stimulation of sweet, bitter, sour, and spicy tastes can affect the rate of salivary secretion (Rifiana et al., 2020) .

Salivary pH (acidity) is a key component of oral health. Normal salivary pH is around 7, but if it drops below 5.5, the condition is considered critical (Soeryani et al., 2020). Salivary pH indicates the inverse of the level of acidity or alkalinity in a solution: a lower pH indicates a higher acid content , while a higher pH indicates a higher base content. When the pH reaches 7, the solution is considered neutral, with no acidity or alkalinity (Sahdena et al., 2023) .

To overcome the acid incompatibility in the mouth, we must prevent plaque formation. Prevention can be done through various methods, such as mechanical tooth brushing and gargling with chemicals such as binahong leaves. Using mouthwash is an excellent method for maintaining a clean oral cavity. Mouthwashes used to treat cavities often contain risky chemicals that can dry out the mouth and cause negative side effects if used long-term (Eni, 2019) .

Indonesia boasts rich biodiversity, including a variety of medicinal plants that have long been used for medicinal purposes. In general, natural remedies can be consumed in various ways, such as by boiling, extracting them through squeezing, or even consuming them directly (Hidayat et al., 2019) . The ability to process beneficial plants into medicines is based on knowledge passed down from generation to generation. One of the 30 thousand to 950 types of plants used in traditional medicine in Indonesia is the binahong plant (Hardiana and Wulandari, 2019).

Binahong, known by the scientific name *Anredera cordifolia* , is a plant easily found in both lowlands and highlands. Binahong is believed to have originated in Australia before spreading to many islands in the Pacific. This plant is known as *heartleaf madeiravine* or *madeire vine* in England, and in China, it is called *teng san chi* . People have long known binahong leaves (*Anredera cordifolia*) as a traditional medicinal plant or home remedy. Binahong plants are easy to find and can be used as medicine, from the roots, stems, flowers, and leaves. Binahong leaves can be used as a traditional medicine to treat stomach aches, wounds, canker sores, ulcers, and dizziness (Damayanti et al., 2022) .

Binahong leaves (*Anredera cordifolia*) contain various chemical compounds that contribute to their bitter taste. Some of these compounds include saponins, alkaloids, polyphenols, and triterpenoids (Rifiana et al., 2020) . The bitter taste of binahong leaves can increase the rate of secretion, which has an impact on the level of oral acidity (pH), because the buffer system has the ability to neutralize the decrease in salivary pH (Damayanti et al., 2022) .

Based on an initial survey conducted by researchers, it was found that 30 dental health students from the class of 2023 experienced quite high caries. One of the causes of caries is acidic salivary pH, if the salivary pH is acidic, there is an increase in the growth of

Streptococcus mutans bacteria. *Streptococcus mutans* bacteria must be inhibited because this bacteria is the cause of acidic caries (Ismalayani et al., 2023) . In addition, the reason researchers took binahong leaves was because binahong leaves contain chemical compounds such as saponins, alkaloids, polyphenols, and triterpenoids which make binahong leaves taste bitter and cause an increase in salivary pH (Rifiana et al., 2020) . So researchers are interested in conducting research using traditional decoctions, namely using boiled binahong leaves (*Anredera cordifolia*) to increase saliva pH.

METHOD

Research used is *quasi experiment* . Study This used For know pH of saliva before And after gargle with stew leaf binahong (*Anredera cordifolia*) through analysis statistics correlation (testing relationship / influence) between factor because consequences . Research This use design *pre and post test group design*, namely measurement of saliva pH before And after gargle stew leaf binahong (*Anredera cordifolia*) . Variables free on study This is leaf binahong (*Anredera cordifolia*) and variables used as sample is the pH of saliva. Population in study This is all over student health tooth class of 2023, numbering 78 people. Technique taking sample that is *Simple Random Sampling*, where technique election sample done in a way random without consider social class or level population , so that every individual own chance For selected . In study This used sheet observation , Observation used For observe condition in the field during study . Data management in study This use application namely SPSS (Statistical Product and solution service) , for every analysis with do test normality , after obtained As a result , the data was analyzed through test correlation For determine There is or whether or not influence before And after gargle use leaf binahong (*Anredera cordifolia*). Procedure in study This covering giving *Informed consent* to respondents , then do *pre-test* And *post test* with measure the pH of saliva before gargle stew leaf binahong (*Anredera cordifolia*), Then do *pre and* saliva pH data collection *post test* as well as latest data analysis results And conclusion from results inspection served .

RESULTS AND DISCUSSION

Univariate Analysis

1. Respondent Characteristics Based on Gender

The gender characteristics of the respondents involved in this study can be seen in the table below :

Table 1. Respondent Characteristics Based on Gender

Gender	n	Percentage
Man	3	7%
Woman	41	93%
Amount	44	100%

Based on the table above, it can be seen that respondents based on gender consist of 3 men (7%) and 41 women (93%).

2. Characteristics Based on Age

Characteristics based on respondents involved in this study can be seen in the table below :

Table 2. Respondent Characteristics Based on Age

Age	n	Percentage
17	2	5%
18	21	48%
19	14	31%
20	1	2%
21	2	5%
22	1	2%
23	2	5%
24	1	2%
Amount	44	100%

Based on the table above, it can be seen that respondents based on age consist of 2 people (5%) aged 17, 21 and 23 years, 21 people (48%) aged 18 years, 14 people (31%) aged 19 years and 1 person (2%) aged 20, 22 and 24 years.

3. Salivary pH before gargling with boiled binahong leaves (*Anredera cordifolia*)

The difference in the pH of respondents' saliva before being given boiled binahong leaves (*Anredera cordifolia*) can be seen in table 3 below :

Table 3. Saliva pH Before Gargling with Boiled Binahong Leaves (*Anredera cordifolia*)

Saliva pH	n	Percentage
Sour	23	52%
Neutral	14	32%
Language	7	16%
Amount	44	100%

Based on the table above, it shows that the pH of saliva before gargling with boiled binahong leaves (*Anredera cordifolia*) was acidic for 23 respondents (52%), neutral for 14 respondents (32%), and alkaline for 7 respondents (16%).

4. Salivary pH after gargling with boiled binahong leaves (*Anredera cordifolia*)

The difference in the pH of respondents' saliva after being given boiled binahong leaves (*Anredera cordifolia*) can be seen in table 3 below :

Table 4. Saliva pH After Gargling with Boiled Binahong Leaves (*Anredera cordifolia*)

Saliva pH	n	Percentage
Sour	11	25%
Neutral	24	55%
Language	9	20%
Amount	44	100%

Based on the table above, it shows that the pH of saliva after gargling with boiled binahong leaves (*Anredera cordifolia*) was acidic for 11 respondents (25%), neutral for 24 respondents (55%), and basic for 9 respondents (20%).

5. Bivariate Analysis

a. Wilcoxon test

The results of the Wilcoxon test on the saliva pH variable in this study can be seen in table 5 below :

Table 5. Wilcoxon Test Analysis

Variables	Mean	Mean difference	p-Value
Before Gargling, Boil Binahong Leaves (<i>Anredera cordifolia</i>)	5.86		
After gargling with boiled binahong leaves (<i>Anredera cordifolia</i>)	6.53	0.66	,000

Based on the table above, it shows the average pH value of saliva. before gargling with boiled binahong leaves amounted to 5.86 and after gargling with boiled binahong leaves increased to 6.53 with a difference of 0.66. The results of *the Wilcoxon test* shows a significant value of 0.000 so ($p < 0.05$) which indicates a significant difference in changes in saliva pH before and after gargling with boiled binahong leaves (*Anredera cordifolia*).

Table 6. Mann-Whitney Test Analysis

Variables	p-Value
Before and After Gargling with Boiled Binahong Leaves (<i>Anredera cordifolia</i>)	,000

Based on table on results Mann-Whitney test shows mark significant of 0.000 so that ($p < 0.05$) which indicates that H_0 is rejected and H_a is accepted, which shows existence influence between the pH of saliva before And after gargle stew leaf binahong (*Anredera cordifolia*). This Possible happen because of taste bitter on leaf binahong (*Anredera cordifolia*), which can increase saliva flow and influence degrees acidity in mouth.

From the results study with title influence gargle stew leaf binahong (*Anredera cordifolia*) on salivary pH in student health tooth class of 2023 shows There is difference between the pH of saliva before And after gargle stew leaf binahong (*Anredera cordifolia*). Can seen from the pH of saliva before gargle stew leaf binahong (*Anredera cordifolia*) part big has an acidic pH And after gargle stew leaf binahong (*Anredera cordifolia*) partly large neutral pH. This is possible because of the bitter taste it contains on leaf binahong

(*Anredera cordifolia*), which can stimulate speed secretion, so that influence degrees acid (pH) in mouth.

Study This in line with study Eni (2019) which shows existence significant changes in salivary pH between the pH of saliva before And after gargle with solution leaf binahong (*Anredera cordifolia*). Study the find that bitter taste leaf binahong can increase saliva flow. Bitter taste This originate from compound chemistry in leaf including saponins, flavonoids, polyphenols, alkaloids, terpenoids, oils essential oils, as well as sour oleanic in leaf the. Bitter taste stimulation can cause abundant salivary secretion, which makes saliva become thinner and more runny. When saliva increases, the pH value also increase.

According to Rifiana et al. (2020), rinsing with solution leaf binahong (*Anredera cordifolia*) which has an acidic pH causes the pH of saliva to change approach neutral. Salivary pH changes Because various factor in cavity mouth, good before and after gargle with solution leaf binahong (*Anredera cordifolia*). Factors This including level acidity mouth (pH), which is influenced in a way direct by speed saliva secretion , as well as level stimulation sweet, bitter, sour And spicy. Condition sour potential increase risk caries tooth can reduced with increase saliva pH .

Caries or hole tooth caused by by various type bacteria that produce sour through decomposition carbohydrate like fructose, sucrose as well as glucose. Sour This damage minerals in tooth . If the pH is below 5.5 which is condition acid, remineralization process No can accompany the demineralization process, and minerals in tooth will more much is missing (Santoso et al., 2022) .

Bacteria *Streptococcus mutans* can using condition sour in cavity mouth For make colonies that can result in damage tooth. The pH of saliva is Wrong One aspects that influence degrees acidity in mouth. Saliva functions as balance that maintains degrees oral acidity (pH) remains optimal, namely nature base (Thioritz And Saleh, 2020).

Saliva is element important role in protect tooth from elements in and outside cavity mouth. Saliva has immunoglobulin And anti -bacterial substances that control development bacteria in plaque, good salivary flow can reduce adhesiveness food And clean mouth with dissolve sugar. Saliva too has dissolved minerals For stage prevention beginning damage teeth, and decline the amount of saliva can result in damage more teeth serious (Larosa, 2019).

Degrees acidity (pH) of saliva holds role important in balance cavity mouth . For guard function optimally, the arrangement And the nature of saliva is necessary still awake in balanced conditions, especially in matter pH. This is caused by by the pH of saliva is very relate with activity chewing in the cavity mouth (Sawitri & Maulina, 2021) .

CONCLUSION

Based on the results of research on the effect of gargling boiled binahong leaves (*Anredera cordifolia*) on salivary pH in dental health students of the 2023 intake, it was concluded that : There is an effect before and after gargling with boiled binahong leaves (*Anredera cordifolia*) on salivary pH in dental health students of the 2023 intake. The pH of saliva in dental health students of the 2023 class before gargling with boiled binahong leaves

(*Anredera cordifolia*) was in the acid criteria for 23 respondents (52%) and after gargling with boiled binahong leaves (*Anredera cordifolia*) was in the neutral criteria for 24 respondents (55%). It is recommended that universities organize promotional and preventive activities related to dental and oral health involving lecturers and students to promote positive habits among students and the surrounding community. These activities could include counseling or education about the benefits of boiled binahong leaves (*Anredera cordifolia*) for oral health. It is hoped that students will maintain their dental and oral health and regularly visit a dentist or dental nurse twice a year. It is recommended that future researchers conduct further studies to evaluate the long-term effects and potential additional benefits of gargling with boiled binahong leaves (*Anredera cordifolia*).

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