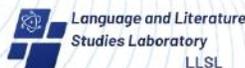




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Potential of Pineapple Peel (*Ananas Comosus*) as a Toothpaste Base Material for Mouth Refreshing

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Abstract

Almost 90% of Indonesians have cavities, swollen gums and abscesses, which is due to the fact that most Indonesians have their teeth flattened in the wrong way, while this will affect dental health. The purpose of this research is to study the potential of pineapple peel (*anas SUS*) for the basic composition of toothpaste to refresh the mouth. This research method is experimental research. Research on experiments is research that is held to determine the consequences of something that is done intentionally by researchers. In the organoleptic assessment of toothpaste color, taste, texture, and aroma are in accordance with the standard *sni 8861: 2020*. Data collection techniques and equipment with organic assessments will be presented in the appendix. Analysis of toothpaste is the color of toothpaste which has a percentage of $ss = 40\%$ and $s = 0\%$ as $ifts = 60\%$. Aroma on toothpaste which has a percentage as $ss = 100\%$, $s = 0\%$ and $ts = 0\%$. Texture on toothpaste which has a percentage as $ss = 80\%$ and $s = 0\%$ while $ts = 20\%$. The toothpaste has a percentage of $ss = 86.67\%$ and $s = 0\%$ while $ts = 1333\%$. Pineapple peel toothpaste is a toothpaste. The ingredients of this toothpaste include pineapple peel, salt, charcoal, mint leaves and green tea. This toothpaste is great for people whose teeth are sensitive, but for people whose teeth are normal, the toothpaste can also be used because the toothpaste is natural.

Keyword: Toothpaste; Tooth; Pineapple Peel; Experiment; Aroma Organic

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INTRODUCTION

Almost 90% of the majority of Indonesians experience cases of cavities, swollen gums, and abscesses. This happens because the average Indonesian brushes their teeth in the wrong way, and some are even too lazy to brush their teeth, even though this will affect dental health. Teeth are small white structures found in the human mouth and become one of the important organs in the body's digestive process (Suryanegara, 2000). Oral health is very important. One important microorganism that is often found in the human mouth is *Streptococcus mutans* (Triyani Sumiati, 2019).

The bromelain enzyme in pineapple peel has been proven to inhibit the growth of *Streptococcus mutans* bacteria. In addition to its bromelain content, flavonoid compounds in pineapple peel also play an antibacterial role. Flavonoids are compounds that are actually found in all parts of the plant. The flavonoid content, which is a phenol compound, can cause inhibition of cell wall synthesis. Therefore, flavonoids are potential antibacterial components.

In addition to bromelain and flavonoid compounds, pineapple peel also contains tannin compounds. The mechanism of action of tannins as anti-bacterial agents is by inactivating the adhesion of microbial cells to the cell surface. The mechanism by which steroids are antibacterial is related to lipid membranes and sensitivity to steroid components that cause leakage in formulating pineapple peel toothpaste.

Pineapple (*Ananas comosus* L) is a fruit that has a very complex content and is rich in minerals, both macro and micro, organic substances, water, and vitamins. The chlorine, iodine, phenol, and bromelain enzymes in pineapple have the effect of suppressing bacterial growth. Pineapple has a discarded part, such as the skin. Pineapple skin has an uneven texture (like eyes) and small spines. Pineapple skin contains vitamin C, carotenoids, fiber, anthocyanins, flavonoids, and liposomal enzymes. The mechanism of action of alkaloids as antibacterials is through inhibition of cell wall synthetics, which will cause lysis of the bacterial cell wall so that bacterial growth is inhibited.

In research (Anggreni, 2012), an ethanol extract of pineapple peel was able to inhibit the growth of *Streptococcus mutans* bacteria with a concentration of 6.25%. The direct use of pineapple peel is considered less effective because the extract cannot last long, so it is formed in a toothpaste formulation from pineapple peel extract. Toothpaste is a semi-solid preparation used to clean the surface of the teeth and refresh the mouth (Mason, 2000). Toothpaste serves to improve dental health by guarding against the formation of dental caries and gum disorders, as well as refreshing the mouth.

A toothpaste formula that can be made at home with easy-to-find ingredients such as pineapple peel, lemon extract, mint leaves, green tea, clove oil, and salt. This toothpaste is suitable for brushing our teeth every day because of its good natural ingredients, such as pineapple peel, which can help strengthen teeth. Not only that, but thanks to its vitamin C content, it is also effective in maintaining oral and gum health. Lemon extract, with its vitamin C content, can brighten teeth, and its citric acid content can fight bacteria in the mouth. Then there are mint leaves, which are believed to make the breath much fresher thanks to their distinctive aroma. Then there is green tea. The polyphenol content in green tea prevents dental plaque from sticking to the surface of the teeth, also reducing the risk of cavities. Clove oil, with its eugenol content, can relieve toothache because this compound has anti-inflammatory

properties. And finally, there is salt, which can help prevent gingivitis and cavities (Saputra, 2019; Seroja, 2019; Nugroho, 2020; Fuazi, 2020; Rudi, 2021).

Bacteria need moisture to thrive, so without enough water, they cannot grow properly. This natural toothpaste made from pineapple peel waste is better than toothpastes that contain many chemicals. Common chemicals in toothpaste that are harmful are carrageenan, diethanolamine (DEA), fluoride, formaldehyde-releasing agents, and parabens. Carrageenan is a compound derived from seaweed that is commonly used as a thickening agent. But unfortunately, carrageenan has been shown to cause intestinal inflammation and affect the growth of cancer cells in the body. Diethanolamine in toothpaste is a compound used to make toothpaste but risks causing irritation to the eyes and skin. It is even more dangerous if diethanolamine (DEA) reacts with other compounds that can produce liver cancer.

Fluoride is a mineral in toothpaste used to strengthen tooth enamel while helping prevent cavities. However, a study revealed that ingested fluoride can cause bone cancer in men and impair brain function. Formaldehyde-releasing is a chemical compound that releases formaldehyde, which can be absorbed through the oral membrane and cause irritation to the skin and mouth to trigger other allergies. The last is Paraben, a natural chemical compound used as a fragrance in toothpaste, is thought to disrupt the endocrine system and cause cancer and reproductive problems.

Pineapple peel toothpaste has several constituent components, such as pineapple peel extract, CMC-Na, calcium carbonate, glycerin, Na-lauryl sulfate, nipagin, nipasol, and distilled water. Brush your teeth at least three times a day, namely in the morning, at night, and before bed. Even though it is done regularly, three times a day, brushing your teeth is actually not enough because it cannot clean between the teeth and the corners of the mouth properly, especially if done in a hurry or the wrong way. Also, make sure that the toothbrush you use has soft bristles and a brush head that fits the size of your mouth. As much as possible, use toothpaste that contains fluoride to help prevent tooth decay and cavities. If the teeth are not cleaned properly, food debris that sticks in the mouth will form a layer of biofilm called dental plaque (Fatmawati, 2011). The accumulation of more and more dental plaque will reduce aesthetics; besides that, it will be pathological, including causing tartar and dental caries (Tahmourespour, 2010), which is why we must brush our teeth as often as possible (Paul, 2024; Rahmadani, 2024; Cristiana, 2024; Ibrahi, 2024).

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The purpose of this study was to determine the potential of pineapple skin (*Ananas comosus*) as a natural toothpaste base material to refresh the mouth. The benefits of this research can be input for all teachers of MTsN 1 Model Banda Aceh by making the habit of brushing teeth using natural toothpaste from pineapple skin (*Ananas comosus*) to refresh the mouth.

METHOD

The research method that will be used is experimental research. Experimental research is a study conducted to find the effect of something that is done intentionally by researchers. The population of this study will be tested on all 114 teachers of MTsN 1 Banda Aceh. The sample of this study will be tested on all teachers, teachers room A and teacher room B, MTsN 1 Banda Aceh, which amounted to 15 people.

The method used in this research is the experimental method with organoleptic assessment. According to Sugiono (2018), the experimental method is a research method used to look for the effect of something in systematically controlled conditions. In this organoleptic assessment of toothpaste, color, taste, texture, and aroma are in accordance with SNI 8861:2020 standards. Data collection techniques and tools for organoleptic assessment will be presented in tables.

After being given an organoleptic test questionnaire, the panelists will be given one toothbrush and one toothpaste to test. After that, the panelists will fill out the questionnaire on a Likert scale. Which consists of positive statements SS = 3, S = 2, and TS = 1, and consists of negative statements SS = 1, S = 2, and TS = 3. Then, the researcher will conduct an open interview by asking the panelists' responses to taste, aroma, color, texture, and comfort when using pineapple peel toothpaste (*Ananas comosus*) to refresh the mouth.

The data processing method is to give 1 toothbrush and 1 pineapple peel toothpaste to try, and then after trying them, the researcher will give a questionnaire to all panelists and interview them about their thoughts about the color, aroma, texture, taste, and comfort of using the pineapple peel toothpaste. Then, the researcher will immediately process the data as shown in the research results. Data analysis in this study uses the percentage formula with the following equation:

$$P = \frac{f}{N} \times 100 \%$$

Description:

P = Percentage number

f = Frequency of questionnaire scores of pineapple peel toothpaste (*Ananas comosus*)

N = Number of panelists

The analysis carried out in this study is a percentage calculation with an organoleptic test with a hedonic scale on pineapple skin toothpaste with the parameters of color, aroma, texture, taste, and comfort when worn.

FINDING AND DISCUSSION

This pineapple peel toothpaste serves to refresh the mouth. Like charcoal, which can whiten teeth, and mint leaves, which can refresh the mouth. In this study, there are several elements that will be tested, such as color, aroma, texture, taste, and comfort when used. There are 15 people who will be tested, and the following color percentage results on pineapple skin toothpaste are presented in Table 1 below.

Table 1. Percentage of color in pineapple peel toothpaste

COLOR			
Answer	Number of answers	Answer score	Percentage
SS	6	18	40%
S	0	0	0
TS	9	27	60%

Based on Table 1 above, it can be explained that the color of pineapple skin toothpaste is not much liked and has a percentage of SS = 40%, S = 0%, and TS = 60%. Furthermore, the percentage results of the aroma in pineapple skin toothpaste are presented in Table 2 below.

Table 2. Percentage of aroma in pineapple peel toothpaste

AROMA			
Answer	Number of answers	Answer score	Percentage
SS	15	45	100%
S	0	0	0
TS	0	0	0

Based on table 2 above, it can be explained that the aroma of pineapple skin toothpaste is much liked and has a percentage of SS = 100%, S = 0%, and TS = 0%. Furthermore, the percentage results of texture in pineapple skin toothpaste are presented in Table 3 below.

Table 3. Percentage of texture in pineapple peel toothpaste

TEXTURE			
Answer	Number of answers	Answer score	Percentage
SS	12	36	80%
S	0	0	0
TS	3	9	20%

Based on table 3 above, it can be explained that the texture of pineapple skin toothpaste is much liked and has a percentage of SS = 80%, S = 0%, and TS = 20%. Furthermore, the percentage results of taste in pineapple skin toothpaste are presented in Table 4.4 below.

Table 4. Percentage of flavor in pineapple peel toothpaste

TASTE			
Answer	Number of answers	Answer score	Percentage

SS	13	39	86,67%
S	0	0	0
TS	2	6	13,33%

Based on table 4 above, it can be explained that the taste of pineapple skin toothpaste is much liked and has a percentage of SS = 86.67%, S = 0%, and TS = 13.33%. Finally, the percentage results of comfort when used in pineapple skin toothpaste are presented in Table 5 below.

Table 5. Percentage of comfortable feel when used on pineapple peel toothpaste

COMFORTABLE FEEL WHEN WORN			
Answer	Number of answers	Answer score	Percentage
SS	12	36	80%
S	0	0	0
TS	3	9	20%

Based on table 5 above, it can be explained that the feeling of comfort when used in pineapple skin toothpaste is much liked and has a percentage of SS = 80%, S = 0%, and TS = 20%.

From the research that has been done, there are many positive and negative comments. Apart from having a color that is not good because of the color produced by charcoal, the taste and aroma are still fragrant and good because they contain mint leaves, green tea, and have a clove aroma produced by pepsodent cloves. The results of the analysis of toothpaste are the color of the toothpaste, which has a percentage of SS = 40%, S = 0%, and TS = 60%. The aroma of toothpaste has a percentage of SS = 100%, S = 0%, and TS = 0%. The texture of toothpaste has a percentage of SS = 80%, S = 0%, and TS = 20%. The taste of toothpaste has a percentage of SS = 86.67%, S = 0%, and TS = 13.33%. And the feeling of comfort when used in toothpaste has a percentage of SS = 80%, S = 0%, and TS = 20%. Many panelists did not like the color of the toothpaste because it had a black color caused by charcoal and had a slightly rough texture like a scrub because it contained pineapple skin, and there was one panelist whose teeth were injured because it had a rough texture. However, the panelists still liked the toothpaste because it had an aroma and taste and was comfortable to use. Mint leaves and green tea make the aroma of the toothpaste fragrant and fresh; it tastes and is comfortable to wear because it contains Himalayan salt, and after washing, the teeth become clean and fresh. This is what makes the panelists like the pineapple skin toothpaste.

This research is in line with research (Raisha, 2017), which makes toothpaste using pineapple skin, and he stated that pineapple skin is suitable for making toothpaste to refresh the mouth. Research (Harmely, 2009), which makes toothpaste as a mouth freshener, also states that dried pineapple skin or juice from pineapple skin is suitable for cleaning teeth. Research conducted by Yuliasri (2019) also states that pineapple peel is a natural alternative material to be used as a toothpaste preparation.

CONCLUSION

Pineapple peel toothpaste is a toothpaste made from pineapple peel. The ingredients contained in this toothpaste include pineapple peel, Himalayan salt, charcoal, mint leaves, and green tea. This toothpaste is great for people who have sensitive teeth, but for people with normal teeth, it can also be used because this toothpaste is natural. If you often use this toothpaste, your mouth

and teeth will look fresh, white, clean, and fragrant, and it can make your gums healthy.

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