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HAND SANITIZER GEL MADE FROM SEAWEED, SOPI AND NATURAL FRAGRANCE

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ABSTRACT

Research "Gel hand sanitizers without rinse made from seaweed, *sopi* and natural fragrances", was purpose to find out the physical characteristics and antiseptic power of the products produced. The research method used is an experimental method. The ingredients used are seaweed as a gel preparation, 65% *sopi* as an antiseptic material and cajuput oil and cinnamon as a natural fragrance. The treatment includes A = immersion of seaweed for 24 hours, consist of A1 = immersion in clean water and A2 = immersion in 3% NaOH solution. B = Natural fragrances, consist of B0 = No Fragrance, B1 = Cajuput Oil, B2 = Cinnamon extract.

The results of the research show that physical characteristics include: the color of the product is influenced by the type of fragrance used, especially the fragrance that comes from natural ingredients that have a distinctive color. The product texture depends on the alkali treatment of seaweed that is used as a gel preparation. Seaweed without alkali treatment produces products in the form of thick liquids. Whereas seaweed with 3% NaOH solution produced semi-solid (gel) shaped products. The product gel is homogeneous with a pH value of 5.5 - 6.0. Antiseptic power includes inhibitory power for gram-positive bacteria (*Clostridium perfringens* and *Staphylococcus aureus*) generally weak, whereas gram-negative bacteria (*Escherichia coli*, *Pseudomonas* and *Salmonella*) are generally weak to moderate. The trial of product use in 10 volunteers showed no side effects from the products produced. The positive result of using the product is that the skin feels smooth.

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INTRODUCTION

Eucheuma cottonii seaweed is one of the superior commodities of Maluku Region. This type of seaweed grows in various regions in Maluku, and has even been cultivated. The problem faced, the success of seaweed cultivation is not comparable to marketing because the price is unstable, too low even difficult in marketing. This made the seaweed farmers disappointed with their efforts.

Besides seaweed, the problem faced in this area is *sopi*. *Sopi* is a traditional Moluccan drink, usually used in traditional ceremonies or parties. As part of the culturally tool, *sopi* is used as a tool to unite, giving to a sense of security and peace in people's lives. *Sopi* alcohol content is quite high at around 30%, so this drink is included in class C liquor which is harmful to the body. The problem faced, this drink has been consumed freely does not know the time and place, thus disrupting the comfort of the community. This drink is often the trigger for violence and disputes between youth, which then spread into clashes between villages. Its presence is illegal and police officers often confiscate it. But the production has never stopped because of the many requests. Its existence is still needed to turn the wheels of the people's economy. This drink is a source of income for the people of Maluku to fulfill their daily needs.

Another alternative to use seaweed and *sopi* is its use in producing gel hand sanitizer without rinsing. The selection of this product to become a research topic is based on people's awareness of a healthy lifestyle. Where the use of hand sanitizer today has become a lifestyle among people because of its practical and easy to carry everywhere. One of the antiseptic ingredients used is from alcohol groups with concentrations of 50% - 70%, (Retnosari, 2007 in Siti, 2011).

From the explanation above, it is felt necessary to conduct research on the use of *sopi* and seaweed in making gel hand sanitizer without rinse. This can provide other alternatives for the community in utilizing *sopi* and seaweed as a source of income. The uniqueness of this research is the use of *sopi* as a natural antiseptic, seaweed as a natural gel preparation material, eucalyptus oil and cinnamon as a natural fragrance. The use of cajuput oil and cinnamon as a natural fragrance is based on its considerable potential in the Maluku region. With the use of natural ingredients, it is hoped that this product is safe to use for all age groups.

The purpose of this study was to determine the physical characteristics and antiseptic power of the gel hand sanitizer without rinse produced.

METHODS

Place And Time Of Research

This research was carried out at the Ambon Industrial Research and Standardization Center in December 2017 - March 2018.

Materials and tools

Eucheuma cottonii Seaweed, *sopi*, cajuput oil, cinnamon extract, stove, stirrer, filter, packaging, etc.

Work procedures

- *Eucheuma cottonii* seaweed is washed and soaked according to treatment:
A = Soaking seaweed for 24 hours
A1 = Soaking in clean water
A2 = Soaking in 3% NaOH solution
- Seaweed is extracted in water (1: 20), until boiling and breaking into seaweed porridge.
- Seaweed slurry is filtered and extracted as a gel preparation
- The volume of seaweed gel preparations were measured and mixed with *sopi* (liquid alcohol) with 65% content as much as 15% by volume of the gel preparation while stirring until evenly mixed
- Then added 2% natural fragrance, with treatment:
B = natural fragrance
B0 = No Fragrance
B1 = Cajuput Oil
B2 = Cinnamon extract
- Hand sanitizer gel products produced, packed in bottles.

Observation

Observations made on products include:

- The shape, color, smell and homogeneity are done visually
- Homogeneity. The gel preparation is applied to a piece of glass, the gel preparation must show a homogeneous arrangement and no coarse grain is seen (Manus et al., 2016).
- PH. Handsanitizer gel solution poured into a small bottle and measured PH using PH paper. Measurement results matched the color with the existing PH standard.
- Antiseptic Power Tests include: Total Plate Count (TPC) and bacterial inhibitory power (*Clostridium perfringens*, *Staphylococcus aureus*, *Escherichia coli*, *Pseudomonas* and *Salmonella*).

- Test the user. This test is conducted to determine the effect caused after the use of this product. The trial was conducted on 10 volunteers, by applying handsanitizer gel to the hand, left for a few minutes while observing the reaction. Positive reactions are characterized by redness, itching, swelling, roughness or smoothness that is felt on the skin.

RESULTS AND DISCUSSION

In this study 20 grams of dried seaweed were used. After passing the washing and soaking process

according to treatment (A), the seaweed is cooked to a boil and becomes seaweed porridge. Furthermore, seaweed slurry is filtered to obtain filtrate. The filtrate obtained was ± 200 ml and the color was clear. The filtrate is mixed with ± 30 ml of *sopi*, ± 30 ml, while stirring until it is completely mixed and the liquid becomes thick. Then added natural fragrance according to treatment (B). The product obtained is packaged in bottles. Be gel handsanitizer.

1. Characteristics of Gel Handsanitizer Without Rinse

Characteristics of gel hand sanitizer without rinse include organoleptic observation (texture, color, odor), homogeneity and pH, can be seen in table 1.

Table 1. Characteristics of gel hand sanitizer without rinse.

No	Treatment	Color	Odor	Texture	Homogeneity	pH
1	A1B0	Cloudy	Typical <i>sopi</i> (alcohol)	Viscous liquid	Homogeneous	5,5
2	A1B1	Broken white	Eucalyptus oil	Viscous liquid	Homogeneous	5,5
3	A1B2	Bright chocolate	Cinnamon	Viscous liquid	Homogeneous	6,0
4	A1B1B2	Light brown	Eucalyptus oil	Viscous liquid	Homogeneous	5,5
5	A2B0	Cloudy	Typical <i>sopi</i> (alcohol)	Semi solid / gel	Homogeneous	6,0
6	A2B1	Broken white	Eucalyptus oil	Semi solid / gel	Homogeneous	6,0
7	A2B2	Bright chocolate	Cinnamon	Semi solid / gel	Homogeneous	6,0
8	A2B1B2	Light brown	Eucalyptus oil	Semi padat/gel	Homogeneous	5,5

Based on observations made visually on gel hand sanitizer products without rinse it appears that color is strongly influenced by the type of fragrance used, especially the odor that comes from natural ingredients that have a distinctive color. In the perfumed treatment (B0) the color is clear cloudy with a distinctive odor of *sopi* (alcohol). Treatment with cajuput oil (B1), ivory white with a distinctive odor of cajuput oil. Treatment with cinnamon fragrance (B2), the color is bright brown with the odor of cinnamon. While the combination of cajuput oil and cinnamon extract (B1B2), the color is light brown (cloudy) with the odor of cajuput oil. This product is in the form of thick liquid for immersion treatment in clean water (A1) while for soaking treatment in 3% (A2) semi solid (gel) NaOH solution. Homogeneous product gel (no coarse grain). If

you want to use it should be shaken first so that the liquid becomes thick and easy to use.

PH measurement aims to look at product safety so as not to irritate the skin when the product is used. The resulting PH value is 5.5 - 6.0. This PH value can be said to be safe because it is still in accordance with the PH skin interval of 4.5 to 6.5 (Tranggono and Latifah, 2007).

2. Antiseptic power

The results of the antiseptic test on gel handsanitizer products without rinse can be seen in table 2. The antiseptic properties tested were bacterial inhibitory power against gram-positive bacteria (*Clostridium perfringes*, *Salmonella aureus*) and gram-negative bacteria (*Escherichia coli*, *Pseudomonas*, *Salmonella*) and TPC (Total Plate Count).

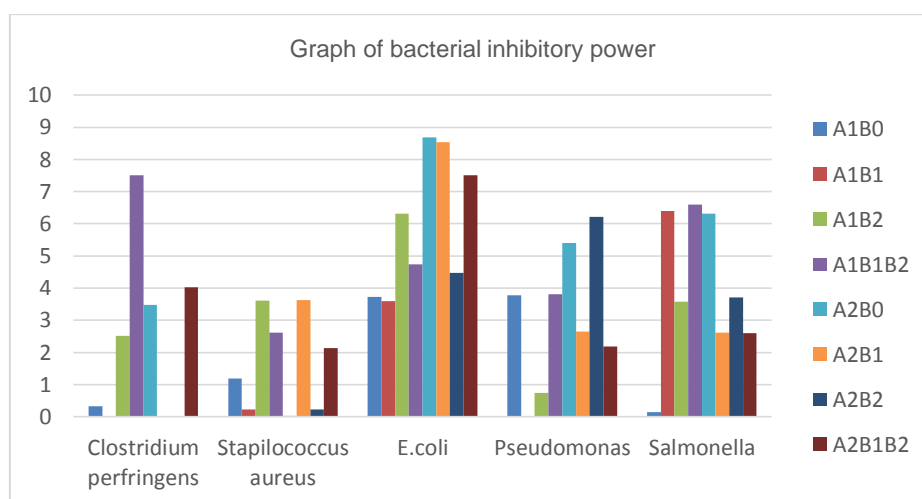
Table 2. Results of antiseptic power tests.

No	Treatment	C.perfringens (mm)	S.aureus (mm)	E.coli (mm)	Pseudomonas (mm)	Salmonella (mm)	TPC (coloni)
1	A1B0	0,32	1,18	3,72	3,78	0,14	19
2	A1B1	0,01	0,22	3,60	0,01	6,40	25
3	A1B2	2,52	3,61	6,32	0,74	3,58	17
4	A1B1B2	7,50	2,62	4,74	3,80	6,60	2
5	A2B0	3,48	0,02	8,68	5,40	6,32	23
6	A2B1	0,01	3,62	8,54	2,64	2,62	23
7	A2B2	0,01	0,22	4,48	6,22	3,71	11
8	A2B1B2	4,02	2,14	7,50	2,18	2,60	1

Antiseptic power of gel hand sanitizer products without rinse as in the table above, shows the inhibitory power of gram-positive bacteria (*Clostridium perfringens* and *Staphylococcus aureus*) generally weak compared to gram-negative bacteria (*Escherichia coli*, *Pseudomonas* and *Salmonella*) weak to moderate inhibition. In Susanto et al. (2012), the diameter of the inhibitory zone ≤ 5 mm

was categorized as weak; inhibition zone of 6-10 mm is categorized as moderate; 11-20 mm inhibition zone is categorized as strong and the inhibitory zone ≥ 21 mm is categorized as very strong.

The effect of each treatment on bacterial inhibitory power can be seen in Figure 1.

**Figure 1.** Effect of each treatment on bacterial inhibitory power.

Gram-negative bacteria are pathogens that are more dangerous than Gram-positive bacteria, because the outer membrane of the cell wall protects bacteria from the host's defense system and blocks the entry of antibiotic drugs. Lipopolysaccharide compounds against the outer membrane of gram-negative bacteria can also be toxic to the host (Artikelsiana, 2015).

Alcohol has the ability of bacteriocides to be good against gram positive and gram negative including viruses and some fungi. However, alcohol does not have antimicrobial effects on bacterial berspora (Ramadhan, 2013). Martindale (2002) in Wahyu (2006) states that the benefits of using alcohol are volatile so that they do

not have long contact with the skin, are not corrosive, are not penetrated into the skin pores and are cheap.

The main components of eucalyptus oil are terpenoids. The biggest component is 1,8-sineol which is a monoterpene compound. 1,8-sineol compounds act as antimicrobial, antioxidant, immune, analgesic and spasmolytic (Angela & Davis 2010). Nahak (2016) research results, the antibacterial activity test of eucalyptus alba oil at a concentration of 30% (b / v) has a inhibition of 30mm against *E.coli* and 21mm bacteria against *S.aureus* bacteria in the concentration of wood leaf oil white 20% (b / v). In this study the use of eucalyptus oil (B1) was aimed at its function as a

fragrance with a concentration of its use of only 2%, so that it had no effect on its function as an antibacterial.

Another fragrance used in this study is cinnamon extract (B2). Cinnamon extract contains tannins, triterpenoids, saponins and flavonoids (Azima, 2004). Tannins and flavonoids are phenol groups. One of the functions of tannin and flavonoids is as an antimicrobial. Phenol compounds known as antiseptic substances can kill a number of bacteria. the biggest component of cinnamon, and the most dominant role as a bacteriotoxic agent is sinamat aldehyde and eugenol. The results of research conducted by Sujatmiko (2014) showed that the inhibitory effect of cinnamon extract on *E. coli* bacteria ranged from 7 to 9 mm. While the results

of research from Rahmah (2016) showed the concentration of cinnamon extract with levels of 2-8% were not able to form an inhibitory zone against *E.coli* bacteria, *Salmonella typhi*. That means the cinnamon extract with 2% levels used in this study is less likely to have an antibacterial effect and only serves as a fragrance.

Furthermore, the Total Plate Count (TPC) in table 2 above shows the smallest total plate number, namely 1-2 colonies, obtained from the treatment of a combination of eucalyptus oil and cinnamon extract (A2B1B2), followed by eucalyptus oil (B1) with a total plate count amounting to 11-17 colonies.

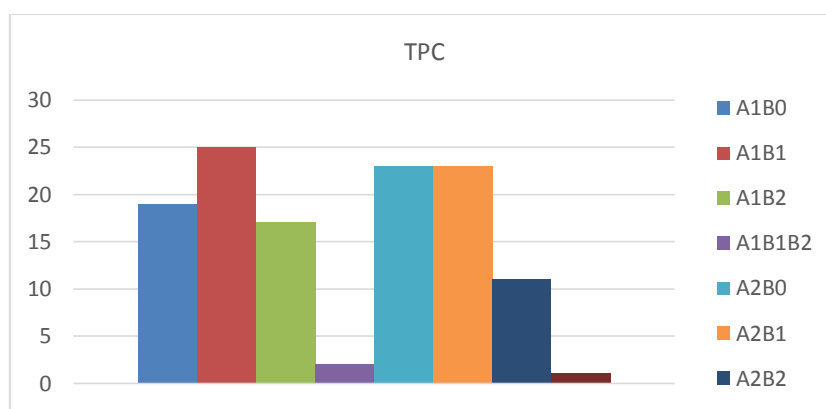


Figure 2. The Total Plate Count (TPC)

3. Trials on Users

Table 3. Trials on Users.

No	Description	1	2	3	4	5	6	7	8	9	10
1	Reddish skin	-	-	-	-	-	-	-	-	-	-
2	Skin itch	-	-	-	-	-	-	-	-	-	-
3	Skin puffy	-	-	-	-	-	-	-	-	-	-
4	Skin feels crude	-	-	-	-	-	-	-	-	-	-
5	Skin feels smooth	+	+	+	+	+	+	+	+	+	+

Note. Give a sign: (+) if appropriate description and (-) if not appropriate

This test was carried out on 10 volunteers, by applying hand sanitizer gel without rinsing on the hands and leaving it for a few minutes (\pm 15 minutes) while observing the reaction. The results of the trial can be seen in the table above. The table shows no side effects from the products produced. The positive result of using the product is that the skin feels smooth. This is because the gel preparation used is derived from seaweed. In Anggadiredja et al. (2006) and Winarno (1990) states, the results of extraction of seaweed in the form of carrageenan which is a hydrocolloid which functions as a stabilizer (balance regulator), thichener (thickener),

gelling agent (gelling agent), emulsifying agent (emulsifier). This function that makes seaweed as a gel preparation in gel hand sanitizer products without rinses is superior *Eucheuma cottonii* and more natural. The resulting gel product remains stable, meaning it remains moist and not dry and makes the skin feel smooth.

CONCLUSION

1. Physical characteristics of the product show that the color of the product is influenced by the type of aroma used, especially the aroma that comes

from natural ingredients that have a distinctive color. Product texture in the form of thick and semi-solid liquid (gel). The product gel is homogeneous with a pH value of 5.5 - 6.0

2. Antiseptic power of gel hand sanitizer products without rinsing, shows antiseptic power against gram-positive bacteria (*Clostridium perfringens* and (*Staphylococcus aureus*) generally weak compared to gram-negative bacteria (*Escherichia coli*, *Pseudomonas* and *Salmonella*) weak to moderate antiseptic power.
3. The trial of product use in 10 volunteers showed no side effects from the products produced. The positive result of using the product is that the skin feels smooth.

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