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FORMULATION OF HAND SANITIZER GEL PREPARATION COMBINATION OF NEMBA LEAF (*AZADIRACHTAINDICAA.JUSS*) ETHANOL EXTRACT OF AND EXTRACT OF ALOE VERA (*ALOE VERA)*AGAINS STAPYLOCOCCUCAUREUS BACTERIA

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ABSTRACT

The use of hand antiseptics in the form of gel preparations which are more popular with the namepreparations *hand sanitizer* usually contain antiseptics in the form of synthetic chemicals which are relatively expensive and often cause skin health problems, such as dry skin. The leaves of the neem plant and aloe vera gel have been shown to be able to treat several diseases, one of which is being able to be a companion drug for antibacterial treatment. The method used in this research is experimental method because it is intended to determine the effect or relationship between the independent variables called treatment factors, namely thegel formulation *Hand Sanitizer* from a combination of neem leaves and aloe vera gel with concentrations of 5%, 10%, and 15%, with the dependent variable called the observation factor, namely the test. Organoleptic, pH, homogeneity, dispersion test, irritation test and antibacterial activity tes. The results obtained from this study are that neem leaf ethanol extract and aloe vera gel can be formulated intopreparations *hand sanitizer* gelwith concentrations of 5%, 10% and 15%, with homogeneous preparations, pH around 6.68-7.03, with dispersion ranges from 4.4cm - 5.5 cm, and stable at 4 weeks of storage.. Results preparations *hand sanitizers* containing ethanol extract of neem leaves 15% provides a strong barrier against *Staphylococcus aureus* was 13.80 ± 0.29 mm.

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1. INTRODUCTION

Humans often forget to washtheir hands when they want to eat after their activities, therefore many people use hand sanitizers. Hand sanitizers is a hand sanitizer product that is pratical and easy to carry everywhere. Hand sanitizer is an antiseptic that can prevent bacterial comtamination. One of the natural ingredients that are widely used as an anti-bacterial is aloe vera and neem (Astuti, 2020). Research has been carried out on the antibacterial activity of aloe vera on S.aureus and E.coli bacteria, the results show that at a concentration of 75 % can inhibit S. aureus bacteria with an average inhibition zone of 10.5 mm and 6.92 mm on E.coli mm this is because aloe vera contains anthraquinone which acts as an antibacteria (A' Lana 2017). While the antibacterial activity of neem leaves using the TLC method in previos studies showed the results could inhibit bacteria as seen from the formation of a clear zone with an rf value of 0,4 on S. aureus bacteria this is because neem leaves contain terpenoids, flavonoids, alkaloids, saponins, tannins (Eko, 2019). Based on the description

above, researchers are interested in combining the two extracts as a better antibacterial (Usman, 2019) it is hoped that the two combinations of natural ingredients can inhibit bacteria more widely and have low side effects (A'Lana, 2017).

2. METHOD

Tools and Materials

The equipment used in this research are autoclave, rod stirrer, beaker glass, erlenmeyer, measuring glass, caliper, needle loop, incubator, petri dish, porcelain crucible, round bottom flask, micro pipette, analytical balance, oven, water bath and rotary vacuum evaporator. In this study, various materials were used, namely, natural ingredients used were aloe vera and neem leaves, additional materials used were aquadest, amyl alcohol, h2so4, ch3cooh, hcl, fecl3, bi(no3)3, ethanol 96% and 70 %, ether, i, ki, chloral hydrate, chloroform, methanol, naoh, nacl, isopropanol, na2so4, nutrient agar, nutrient broth, hgcl2, mg and zn powder, pb(c2h3o2)2, and the bacteria used was s. Aureus.

Making Neem Leaf Extract and Aloe Vera

Making neem leaf extract and aloe vera, Neem and aloe verasimplicia were cleaned of impurities by washing the samples, draining them. Then dried at room temperature, mashed the sample with a blender to obtain simplicia powder, stored simplicia in tightly closed container and protected from sunlight. Weighed 500g of each sample was put in a container, added 3 liters of 96 % ethanol, macerated for 3 days, stirring occasionally, filtered and the results obtained were put in another container, then the remaining residue was added to 2 liters of 96 % ethanol, squeezed for 2 days, stirring occasionally, filtered to obtain remaset results combined, the results of the maserate were evaporated on a rotary evaporator to obtain aloe vera extracts.

Gel Formulation

Modified Gel Basic Formula

The basic formula for the modified gel can be seen in table 1.

Table 1. Basic Gel Formula

Bahan	Bobot
CMC-Na	2 g
Alkohol 70%	10 ml
Propilenglikol	2 g
Nipagin 0,01%	0,150 g
Air ad	150 ml

1. How to Make Gel Base

Put hot water into the mortar, add 2 g of Na-CMC, grind vigorously until a transparent mass is obtained, add nipagin which has been dissolved in hot water before grinding homogeneously, add 2 g of propylene glycol, add the remaining aquadest and alcohol.

2. How to make hand sanitizer gel

The study was made with concentrations of 5, 10, and 15% containing nemm leaf extract. The formula for the preparation of hand sanitizers can be seen in table 2.

Tabel 2. Formula Sediaan *Hand Sanitizer* dengan Berbagai Konsentrasi

Formulation	Bobot Ekstrak (g)		Bobot Dasar Gel (g)
	Mimba leaf	Lidah Buaya	
Formulation 1	2,5	2,5	95
Formulation 2	7	3	90
Formulation 3	10	5	85

3. How To Make Hand Sanitizer

The gel base was weighed according to the formula and partly put into the mortar and then the two extracts were added and then ground homogeneously and the remaining homogeneous ground gel base was added to obtain a hand sanitizer gel preparation.

Evaluation Of Gel Hand Sanitizer

a) Organoleptic testing
The organoleptic test was carried out with 20 respondents and observations were made visually which included color, aroma, shape, and texture.

b) Homogeneity test
The homogeneity test was carried out by placing part of the preparation on a glass slide and observing the presence or absence of coarse grains (Directorate General of POM, 1985).

c) Determination of the pH of the preparation
The pH test was carried out with a pH meter. Dissolve 1 g of the preparation with 0.1 l of aquadest then insert the electrode and the number obtained shows the pH of the preparation (Rawlins, 2003).

d) Determination of stock spread
Place 500 mg of the preparation on a watch glass and then cover it with another watch glass, leave it for 60 seconds and then measure the dispersion using a ruler (Naibaho et al, 2013).

e) Observation of the stability of the preparation
All preparations were stored at room temperature for 4 weeks, seen what happened during the storage period, namely changes in consistency, color, odor and spreadability of the preparation (Ansel, 1989).

f) Irritation Test
The irritation test was carried out by applying the preparation behind the ear and allowed to stand for 24 hours, observing the presence or absence of irritation. Irritation occurs characterized by a change in skin color to red, itchy and rough. The irritation test was carried out on 6 respondents (Wasitaatmadja, 1997).

g) Antibacterial Activity Testing
Entered 0.1 ml of bacterial inoculum, added 15 ml of nutrient agar medium with a temperature of 45-50ºC. Shake and allow to harden, put a paper backing on the media then 25 l of neem leaf extract test solution combined with aloe vera extract, allowed to stand for 15 minutes and incubated at 37ºC for 20 hours. The diameter of the inhibition of bacterial growth around the backing paper was measured (Yulinar, et al., 2011).

Dropped each disc with a single test solution for 15 minutes and then placed both at the same distance. The solidified paper backing was left for 15 minutes and incubated for 18 hours. The inhibition was measured, tested 3 times (Directorate General of POM, 1995).

3. RESULTS AND DISCUSSION

Results of the Homogeneity of Preparations

Based on the results of the study, the results of the homogeneity test can be seen in table 3.

Table 3. The results of the homogeneity test of neem and aloe vera hand sanitizer gel

Gel Type	Homogeneity
Basis *Hand sanitizer*	Homogeneous, no coarse grains
Hand sanitizerCombination 5%	Homogeneous, no coarse grains
*Hand sanitizer*Combination 10%	Homogeneous, no coarse grains
*Hand sanitizer*Combination15%	Homogeneous, no coarse grains

Based on the data above, it was obtained that all homogeneous hand sanitizer preparations did not contain coarse grains when tested.

4. CONCLUSION

Ethanol extract of neemleaves and aloe vera gel can be formulated into hand sanitizer in the form of gel concentrations of 5, 10, and 15%, with homogeneous preparations, pH aroud 6.68-7.03, with spreadability ranging from 4.4 cm-5.5 cm, does not cause irritation to the skin and is stable at 4 weeks of storage. The preparation of hand sanitizer containing neem leaf extract and aloe vera gel has antibacterial activity at a concentration of 15% having a strong category against staphylococcus aureus. The result of the hand sanitizer preparation containing 15 % neem and aloe vera extract provided a strong inhibition against staphylococcus aureus, namely 13.80 ± 0.29 mm and at a concentration of the growth of staphylococcus aureus, but it was less strong, namely 9.50 ± 0.50 mm.

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