

Effectiveness Test Antimicrobial Infusion Gotu Kola Leaf Extract (*Centella Asiatica*) On The Growth *Staphylococcus Aureus*

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Abstract- *Infection is a disease that causes tissue damage. One cause of skin infections is bacteria Staphylococcus aureus. Utilization of natural materials as traditional medicine in Indonesia is now increasing. Centella Asiatica is one of the nutritious plants for medicine, contains active antibacterial components such as saponin or asiaticosida, alkaloid, flavonoids, and tannins. Saponins or asiaticocides are lipophilic which can form complex compounds with cell membranes through hydrogen bonds, then destroy the permeability of bacterial cell walls. This research is to test the effectivity of antimicrobial substances contained in the extract of Leaf kola leaf infusion as a traditional medicine to the growth of Staphylococcus aureus, with the descriptive survey design method to find out the effectiveness of Inca leaf infusion extract zone (Centella Asiatica L) to bacteria Staphylococcus aureus. Result: The concentration formed inhibition zone of bacterial growth Staphylococcus aureus is 25% concentration average 7.25 mm, 50% average 11.3 mm, 75% average 12,75 mm, and 100% average 17 , 6 mm. Conclusion: Leaf kola infusion extract (Centella Asiatica L) on the growth of Staphylococcus aureus forming inhibit zone at concentrations 25%, 50%, 75%, and 100%.*

Keywords: *Effectiveness, Pegagan leaf, Staphylococcus aureus.*

I. INTRODUCTION

Infection is a disease that causes damage to the body or tissues caused by organisms such as bacteria, viruses, and fungi. Infection occurs because the environment is too susceptible to bacteria. Based on data from the Provincial Health Office of Bengkulu in 2015 cases of skin infections that occurred as much as 5.611 in the city of

Bengkulu.^[1] One of the causes of skin infections are bacteria *Staphylococcus aureus*, *Enterococci*, and *Escherichia coli*.^[2] *Staphylococcus aureus* is generally found to be more than 20-30% in the nose and skin of adults. Bacteria *Staphylococcus aureus* can infect skin such as bile, acne and wound infections.^[3]

Treatment for infectious skin diseases by administration of antibiotics is a material produced by microorganisms that can kill or inhibit the the growth of other microorganisms. One of the antibiotics used is tetracycline. Increased use of antibiotics, spur the increased resistance of bacteria to the antibiotic. To prevent the occurrence of bacterial resistance to antibiotics should be developed research in the discovery of new drugs derived from nature.^[4]

Utilization of natural materials as traditional medicine in Indonesia has recently increased, even some natural materials have been manufactured in fabrication or on a large scale. The use of traditional medicine is considered to have fewer side effects compared with chemicals, besides that the price is more affordable. A large number of studies on traditional medicines is expected to promote traditional medicine.^[5] Indonesia is known as the second largest natural resource country after Brazil. The natural resources are spread from Sabangsampai Merauke. Indonesia has about 30,000 plant species from 40,000 plant species in the world940 of which can be used for medicine (this amount represents 90% of the number of medicinal plants in Asia). A large number of medicinal plants, only about 20-22% are cultivated, while the other 78% is obtained through direct harvesting from the forest.^[6]

Centella Asiatica is one of the nutritious crops for medicine and is often used for traditional medicine, such as anti-diarrheal drugs. Plants that have the Latin name *Centella Asiatica* often found in open places, *Centella Asiatica* contains chemicals such as asiaticosida (including parts of saponins), which has benefits for wound healing

and also anti lepra. Another benefit of this plant is for the treatment of diarrhea, dysentery, epilepsy and also for memory improvement.^[6]

Centella Asiatica contains antibacterial active components such as saponins or asiaticosida, alkaloids, flavonoids, and tannins. Asiaticosida can inhibit skin cells that can be seen in wound healing by increasing the rate of migration of skin cells, reaching the adhesion of early skin cells, promoting an increase in the average amount of human dermal fibroblasts. Saponins or asiaticocides are lipophilic which can form complex compounds with cell membranes through hydrogen bonds, then destroy the permeability of bacterial cell walls.^[6]

According to a study by NS Jagtap et al. in 2005, Pegagan plant extract also had an antibacterial effect against *Escherichia coli*, *Bacillus subtilis*, and *Propionibacterium vulgaris*. In addition to antibacterial, Gotu kola can also be used as an antifungal against *Aspergillus niger*, *Aspergillus flavus*, and *Candida albicans*. Seeing the above problem, the researcher is interested in researching antimicrobial effectivity test of Leaf Penagan leaf extract (*Centella Asiatica L*) at various concentrations of 12.5%, 25%, 50%, 75% and 100% to inhibit the growth of bacteria *Staphylococcus aureus*.

II. METHODS

The research used descriptive laboratory method. Laboratory representative survey is conducted on a set of objects that usually aims to see the picture of the phenomenon that occurs within a particular population.^[7] This study looked at the effectiveness of antimicrobial inhibition zone of leaf infusion *Centella Asiatica L* on the growth of *Staphylococcus aureus*.

III. RESULTS

Regarding the study of the inhibition zone of *Centella* leaf infusion extract on growth of *Staphylococcus aureus*, it was found that the concentration of infused extract was directly proportional to the growth zone of growth *Staphylococcus aureus*. At concentration 12,5% did not get inhibition zone, while concentration 100% got the average of inhibiting zone of 17,6 mm, from the statement above can be seen table below the following:

TABLE 4 1 RESULT OF ZONE DIAMETER OF UNIVARIATE TEST

Concentration of	Inhibition zone diameter (mm)				Average (mm)	Classification Davis Stout	Effectiveness (%)
	Replay 1	Replay 2	Replay 3	Replay 4			
12,5%	0	0	0	0	0	No	0%
25%	7,5	8	13,5	0	7,25	Medium	28,7%
50%	13,75	10,25	13	8,5	11,3	Strong	44,7%
75%	11	14	14,25	5	12,75	Strong	50,4%
100%	17,25	17,25	22,5	5	17,6	Strong	69,7%
Positive Control	26,5	23	24,5	27	25,25	Very Strong	100%
Negative Control	0	0	0	0	0	No	0%

IV. DISCUSSION

This study was successfully performed with the result of the research is the formation of a clear zone in the bacterial growth medium of *Staphylococcus aureus*. At the concentration of 12.5% of the infusion of 12.5% beta leaf of the pegagan leaf, there is no inhibition zone to inhibit the growth of bacteria *Staphylococcus aureus*. However, at the treated concentration of 25% of the inhibiting zone obtained at each repeatability were 7.5 mm, 8 mm, 13.5 mm, 0 mm, averaging 7.25 in the medium category. Moreover, at the concentration treatment of 50% pagan leaf infusion extract, the clear zone diameter obtained at each repetition is 13,75 mm, 10,25 mm, 13 mm, 8,5 mm, mean 11,3 mm, with strong category, on the treatment of extract concentration of 75% pagan leaf, the clear zone diameter obtained at each repeating is 11 mm, 14 mm, 14,25 mm, 11,75 mm, mean 12,75 mm, with strong category, at concentration treatment 100% Pegagan leaf info li extract, clear zone diameter obtained at each repetition was 17,25 mm, 17,25 mm, 22,5 mm, 13,75 mm, and average 17,6 mm, with strong category.

This study used a negative control (-) that is aquadest with 0 mm clear zone or no inhibition zone formed on medium *Muller Hilton Agar*, and a positive control (+) tetracycline 500 mg used as a comparison with 26.5 mm repetition, 23 mm, 24.5 mm, 27 mm, the average inhibition zone formed is 25.25 mm with the extreme category which is used as a comparison of drag zone formed on media *Muller Hilton agar*.

From the research result, it can be seen that Leaf Penagan leaf extract (*Centella Asiatica L*) can inhibit the growth of bacteria *Staphylococcus aureus* and the result of inhibition zone obtained with moderate category at 25%

concentration, and active at concentrations of 50%, 75%, 100%, and positive control of tetracycline.

The formation of the drag zone or clear zone around the disc paper shows the occurrence of inhibition of bacterial colony growth due to the influence of compounds contained in leaf extract of pegagan (*Centella Asiatica L*). Flavonoid compounds, saponins, and terpenoids contained in leaf extract of pegagan (*Centella Asiatica L*) is a class of bioactive compounds that can inhibit bacterial growth. Based on the results of previous research it is known that the compound flavonoids, saponins, and terpenoids are an active compound inhibits bacterial growth.

The ability of an antimicrobial agent in inhibiting the growth of microorganisms depends on the concentration of the antimicrobial. This means that the amount of antimicrobial ingredients in a medium of bacterial growth greatly determines the life of exposed bacteria. In addition to the concentration factor, the antimicrobial type also determines the ability to inhibit bacterial growth. In this study suspected bacterial susceptibility *Staphylococcus aureus* because of the chemical content in leaf extract of *Centella Asiatica L* (*Centella Asiatica L*) in the form of *saponins*, *flavonoids*, and *terpenoids* that are as antibacterial.

The occurrence of inhibition of bacterial colony growth is due to the damage that occurs in the structural components of bacterial cell membranes. The terpenoid group compound may bind to proteins and lipids present in the cell membrane and may even induce lysis of the cell. Bacterial cell membranes composed of proteins and lipids are particularly susceptible to chemicals that can reduce surface tension. Damage to cell membranes can lead to disruption of nutrient transport through cell membranes so that bacterial cells experience nutritional deficiencies necessary for their growth.

The ability of leaf of gotu kola as antibacterial is also supported by research^[8] where the results obtained from research that the higher the concentration of pegagan leaf extract, the greater the inhibitory zone diameter formed bacteria *Staphylococcus aureus*, showed that the antibacterial inhibition ability of ethanol extract 96% pegagan inhibit the growth *Staphylococcus aureus* concentration of 12.5% by 7 mm, 25% concentration of 9.20 mm concentration of 50% by 13.20 mm and 75% concentration of 14.50 mm, it shows that ethanol extract of pegagan leaf is effective against *Staphylococcus aureus*, whereas in *K. pneumonia* is not categorized as an inhibitor.

In this study it can be stated that the leaf of Gotu kola has an excellent antibacterial effect seen at concentrations of 50%, 75%, and 100%, in inhibiting the growth of *Staphylococcus aureus*, the concentration of extract is antibacterial strongly categorized to cause a

considerable obstacle zone when compared with the concentration others.

This research is in line with previous research using 96% ethanol extract where the result of the research is the area of drag zone which is directly proportional to the level of extract concentration used, and in my research using infuse extract also obtained results that are directly proportional to the concentration level where the higher the concentration, the larger the drag zone is formed.

V. CONCLUSION

The concentration of 12.5% of leaf extract of Pegagan leaf (*Centella Asiatica L*) on growth of *Staphylococcus aureus* has an inhibitory zone of 0 mm, 25% concentration has an inhibit zone of 7.25 mm, a concentration of 50% has an average zone 11.3 mm inhibitory, 75% concentration has an inhibit zone of 12.75 mm, and 100% concentration has an average of 17.6 mm inhibition zone.

The concentration of Pegagan leaf infusion (*Centella Asiatica L*) which effectively inhibited the growth of *Staphylococcus aureus* was at leaf concentration of Reagan 50% with an average of 11.3 mm, 75% with a mean of 12.75 mm and 100% with the average of 17.6 mm.

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