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STUDY OF CATECHIN CONCENTRATION FROM GAMBIER AND GREEN TEA ON THE EFFECT OF SUPPRESSING THE PROGRESS OF GROWTH OF Pseudomonas sp BACTERIA IN TILAPIA (Oreochromis niloticus)

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ABSTRACT

Gambir and green tea contain functional polyphenolic compounds, one of which is catechins. Catechins possess antimicrobial properties due to their ability to break down microbial cell chambers or precipitate proteins. The microbe *Pseudomanas* sp is often found in tilapia with a high level of pathogenicity. This study aimed to examine the effect of Gambir Catechin and Green Tea concentrations on the suppression of the growth of *Pseudomonas s*p in tilapia. The research method applied is tabulation and descriptive methods. The concentrations of catechin compounds were modified by 4%, 6%, 8%, and 10%. The results showed that the antimicrobial effect increased with an increase in the concentration of catechin compounds from gambier and green tea. This shows that there is a strong positive relationship between concentration and zone of inhibition and the catechin compounds of gambier and green tea have antimicrobial effects against *Pseudomonas* sp. The results of this study can be applied to the future development of tilapia aquaculture.

Keywords: *Catechins, Gambier, Green Tea, Pseudomonas*

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INTRODUCTION

Gambir contains functional elements that belong to the category of polyphenolic elements, including catechins. Catechins have antibacterial properties owing to their ability to destroy microbial tissues and organ membranes or through protein precipitation. The antimicrobial activity of gambier catechin concentrate triggers constant organ damage. Extra 4% catechin concentrate was less likely to stem the development of experimental microbes, while extra 6% and 8% catechin in the

medium triggered the development of Streptococcus mutans and Staphylocccus aureus to be reduced after one hour. However, besides gambir

(Uncaria gambir) other plants also contain catechins, namely Green Tea (Camellia sinensis). An important component of green tea is flavonoids, where the main content of these flavonoids is catechins which make up 30-40% of water-soluble solids (Annisa Ibifadillah, 2016). The purpose of this study was to assess the inhibition zone of Gambir and Green Tea catechins on Pseudomonas sp.

METHOD

2.1 Location and Time of Research,

This study was conducted from May to December 2022. Healthy tilapia samples were treated with *Pseudomonas* sp bacteria, and tilapia that showed behavioral abnormalities were sampled

. Tilapia will be obtained from the Fish Cultivation Group (Pokdakan) under the auspices of the Padang City Fisheries and Food Service. The Bungus Fish Seed Center (BBI) has the TUPOKSI (Tasks, Principles, and Functions) of inland fisheries preservation starting from cultivation, seeding, feed processing, and catechin samples were then purchased online. The catechins purchased were extracted with gambier and green tea at 40% each according to the concentration used in the study. [SW1.1][H2.1]Meanwhile, the analysis of the test results will be carried out at the BKIPM Laboratory (now BPPMHKP).

2.2 Methods

2.2.1Working method

2.2.1.1 Antibacterial Activity Test

1. The NA medium was then sterilized and lowered to a temperature of ± 450C, and the volume of the medium used was 10 ml.
2. The medium was filled into a Petri dish and left to harden. Experimental microbes were filled towards the NA medium field, and the experimental microbes that functioned were microbes with a dilution of 10-5 cfu/mL. The experimental microbes were equalized first using a vortex mixer to ensure intact
3. colony growth.
4. The medium was incubated for 24 hours in a sterile room.
5. Antiseptic filter paper with a diameter of ± 0.5 cm was placed in clindamycin phosphate, gambier catechins green tea and antiseptic distilled water for 2 h.
6. Aseptically, 4 paper disks containing clindamycin phosphate, 4 disks containing gambier catechin, 4 paper disks containing green tea catechin and 4 disks containing antiseptic distilled water were placed in a petri dish containing NA medium and microbial suspension. Each category of the experimental element was placed in a Petri dish.
7. Each paper disk was inoculated at a specific time so that there was no overlap of the built-up restraint sectors.

8. Put a sticker on the bottom of the petri with a tight fit.
9. The medium was incubated for 24 hours in a sterile room.
10. Cloudy and clear zones in each petri were observed.

2.3 Testing Stage

The results of this antimicrobial activity test will appear in the inhibition zone which looks clearer than the level zone. The clear zone was measured using a vernier calier. The measuring power used puts the caliber on the outer edge of the filter paper up to the longest and shortest edges of the clear zone that is built. The standard for assessing the usefulness of catechins is the following formula:

$$R = \frac{P + Q}{2}$$

Where,
R: Level of zone of inhibition (mm)
P: Longest zone of inhibition (mm)
Q: Shortest zone of inhibition (mm)

2.4. Data Analysis

The data review technique used in this experiment was descriptive and tabulate review.

RESULTS AND DISCUSSION

3.1 Test Results of Gambir and Green Tea Catechin Solutions Against Pseudomonas sp. Bacteria

The results of testing the gambier catechin solution and green tea on the growth activity of Pseudomonas sp. bacteria on vision after 24 h of incubation at three repetitions. The experimental results of gambier catechin solution and green tea on the growth activity of Pseudomonas sp. bacteria were positive . This was evidenced by the presence of a clean zone around the growth pit of Pseudomonas sp. An inhibition zone was also observed. There were also different types of antibiotics. The zone of inhibition of distilled water was negative.

Figure 1: Inhibition zone graph of gambier and green tea catechin solution

The antimicrobial effect increased with an increase in the concentration of the test solution from 4%, 6%, 8%, and 10% of 4%, 6%, 8%, and 10%, respectively. This shows that there is a positive relationship between concentration and zone of inhibition. This relationship can be seen in the catechins and green tea antimicrobial effect against Pseudomonas sp. The observation results in the appendix show that, the antimicrobial effect of gambier catechins and green tea on Pseudomonas sp. appendix shows, the antimicrobial effect was found to increase with an increase in the concentration of the test solution from 4%, 6%, 8%, and 10% respectively. This shows that there is a strong positive relationship between the concentration and the zone of inhibition. This indicates that gambier and green tea catechin solutions have an antimicrobial effect

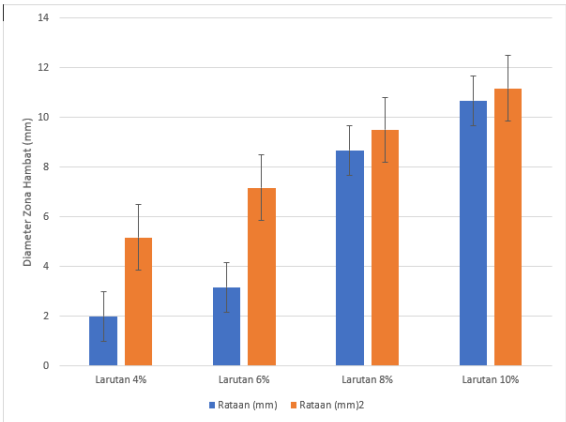

Figure 1: Inhibition zone graph of gambier and green tea catechin solution

against Pseudomonas sp. The data in all the tables above,show that the order of strength of the antimicrobial activity of the test solution concentrations of 4%, 6%, 8%, and 10%.

Based on the results of thise study, gambier catechin solution exhibited

better antimicrobial activity than green tea catechin. The average value of the inhibition zone of gambier catechin obtained consecutively where the 4% solution is 5.17 ± 1.25, 6% is 7.17 ± 0.76, 8% is 9.5 ± 0.5, and 10% is 11.17 ± 1.15. nThe average value of the inhibition zone of green tea catechins obtained consecutively where the 4% solution was 2 ± 0.5, 6% was 3.17 ± 0.76, 8% was 8.67 ± 1.15, and 10% was 10.67 ± 1.04. This is due to the presence of active elements in the solution. The active elements in the gambier catechin solution that may withstand microbial development are: tannins, flavonoids, and eugenol.

Catechin is the main bioactive element in gambier, accounting for 55 97% of its compesition. The different values obtainet from each experiment were due to differences in the solutions used for extraction. Catechins are essential flavonoids in gambier and green tea,whereas epicatechins and caffeic acid are flavonoids present in low concentration in gambier and green tea. (Patrick Muljono *et al*., 2016)

CONCLUSION

In this study, the use of several concentrations of gambier and green tea catechin solutions,4%, 6%, 8%, and 10%, is intended to prove whether or not there is not only antimicrobial activity against the test bacteria.antimicrobial activity against the test bacteria. Based on the experimental results, the inhibition zone of the gambier catechin solution was higher than that of green tea.

This is due to the active substances in the solution. Active substances contained in the catechin solution of gambier extract and green tea that may inhibit bacterial growth are: tannins, flavonoids, and green tea that may inhibit bacterial growth are: tannins, flavonoids, and eugenol. Tannins are topically used as an astringent for the treatment of burns, ulcers, and chronic inflammation of the mucous membrane as a remedy for persistent diarrhea. This substance is soluble in water, alcohol, and glycerol, and is insoluble in ether and chloroform. Flavonoids can enhance mitogenesis, cell

interaction, promote vascularization, prevent cell necrosis, and healwound tissue. Eugenol is a pale yellow liquid that is insoluble in water but soluble in alcohol, chloroform, and ether. Eugenol is used as an antiseptic indentistry.

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