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Anti-Bacterial Activity Testing Of Batak (Allium Chinense G. Don.) Leaf Ethanol Extract Against The Bacteria Propionibacterium Acnes, Staphylococcus Aureus, Escherichia Coli And Salmonella Thyphi

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ABSTRACT

Batak onion (Allium chinense G.Don) of the Amarylidaceae family is one of the traditional medicinal plants that has antibacterial properties, containing flavonoids, terpenoids, tannins and saponins. EEDBB extract against Propionibacterium acne (Pa), Staphylococcus aureus (Sa), Eschericia coli (Ec), Salmonella typhi (St). Batak shallot powder was extracted by maceration method using 80% ethanol as solvent. disc diffusion method of advertising concentration (EEDBB) 40%, 60%, 80% with a comparison of positive control and negative control. Measurement of antibacterial activity showed that all concentrations had antibacterial activity. The highest antibacterial activity of EEDBB at a concentration of 80% had a maximum antibacterial with an average inhibition zone of 11.5 mm for bacteria (Pa), 10 mm for bacteria (Sa), 15,5 mm for bacteria (Ec) and 16.1 mm for bacteria. bacteria (St). The lowest antibacterial activity ethanol extract at a concentration of 40% had the lowest inhibitory power with an average inhibition zone diameter of 7.8 mm for bacteria (Pa), 6.6 mm for bacteria (Sa), 12.9 mm for bacteria (Pa). . bacteria (Ec) and 13.2 mm in bacteria (St). EEDBB has the highest antibacterial activity on bacteria (St) with an average inhibition zone of 16mm. Data analysis was carried out using the One way ANOVA test, namely Ho was accepted and H1 was rejected where the value of sig < 0.05.

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1. Introduction

One of the diseases that often occurs in Indonesia is infectious disease. Infection is a disease caused by the entry and reproduction of microorganisms, a broad group of microscopic organisms. Microorganisms that cause disease in humans are referred to as pathogenic microorganisms, one of which is pathogenic bacteria according to (Fahmi & Sitompul, 2019).

Batak onion (Al¬lium chinense G.Don.) is an onion plant. Batak onion (Al¬lium chinense G.Don.) is a food plant that is consumed by the people of North Sumatra as a cooking spice, vegetable and medicine. Allium plants can inhibit the growth of microorganisms such as bacteria, fungi, viruses and parasites. Antibacterial compounds studied by (Naibaho et al., 2017) that Allium extract is believed to be able to help solve the problem of resistance to pathogenic bacteria that arise due to the use of antibiotics.

Propionibacterium acnes (Pa) is a bacterium that secretes hydrolytic enzymes that play an important role in the inflammatory process of acne (Hafsari et al., 2015).

Staphylococcus aureus (Sa) is a microorganism that is commonly found on the skin, mucous membranes of the nose, throat and digestive tract of humans and hair follicles according to (Rollando S., 2019).

Escherichia coli (Ec) is a gram-negative bacterium that is commonly found in the human large intestine and functions in the decomposition of food waste (Rollando S., 2019).

Salmonella typhi (H) is a bacterium that enters the human body through contaminated food and drink which can cause liquid diarrhea to dysentery (Gurning et al., 2020)

2. RESEARCH METHOD

a. Sample Collection

The sampling location was carried out at the Deli Tua market, Kec. Deli Tua, Kab. Deli Serdang, North Sumatra Province.

b. Extract Making

Simplicia was weighed 500 g and then extracted using 80% ethanol as solvent.

c. Antibacterial Activity Testing

Antibacterial activity testing was carried out on (EEDBB) using the agar disc diffusion method, by measuring the minimum inhibitory concentration (MIC).

d. Data analysis

Analysis of the data used in this study is the ANOVA test.

3. RESEARCH RESULTS AND DISCUSSION

3.1 Simplicity Characterization

The results of the simplicia characterization of Batak leek can be seen in Tables 1 and 2.

TABLE 1
ORGANOLEPTIC EXAMINATION OF BATAK LEEKS SIMPLICIA

Characterization Type	Results
Color	Green
Smell	Typical
Flavor	Spicy
Form	Small Long

Organoleptic examination aims to provide objectivity and plant specifications as well as initial identification by describing shape, color, smell and taste using the five senses.

TABLE 2.
EXAMINATION OF THE SIMPLICIA CHARACTERIZATION OF BATAK SCALLION

Characterization Type	Results	MMI Terms
Water content	2,45%	< 5%
Water soluble juice content	17,698%	≥18%
Ethanol soluble extract content	17,690%	≥18%
Total ash content	7,495%	≤6%

Total ash content is not acid soluble	0,7856%	≤1,5%

Based on the data above, it was obtained that all the characterization parameters tested on Batak leek had results that were in accordance with the MMI requirements because there was nothing less or more than the MMI requirements (WHO, 1993).

3.2 Phytochemical Screening Results

The results of phytochemical screening can be seen in table 3.

TABLE 3
PHYTOCHEMICAL SCREENING RESULTS OF BATAK LEEKS SIMPLICIA

Compound Group	Results	Conclusion
Flavonoid	Formation of yellowish red color	(+) Flavonoid
Saponin	Foam formed	(+) Saponin
Terpenoid	A reddish brown ring is formed	(+) Terpenoid
Tanin	Formation of brownish green	(+)Tanin

Based on the above results and the tests that have been carried out, the Batak leek shows positive results containing flavonoid compounds, saponins, terpenoids, and tannins (Naibaho et al., 2017).

3.3 Antibacterial Activity Test

Data on the results of EEDBB activity against bacteria Pa, Sa, Ec, St with extract concentrations of 40%, 60%, 80% can be seen in table 4 and graph 1.

TABLE 4
MINIMUM INHIBITORY CONCENTRATION TEST RESULTS

Concentration	*Propionibacterium acnes*	*Stphylococcus aureus*	*Escherichia coli*	*Salmonella thypi*
EEDBB 40%	7,8	6,6	12,9	13,2
EEDBB 60%	8,8	7,9	14,1	14,6
EEDBB 80%	11,5	10	15,5	16,1
Gentamicin	14,3	12,6	17,2	17,1
Aquadest	-	-	-	-

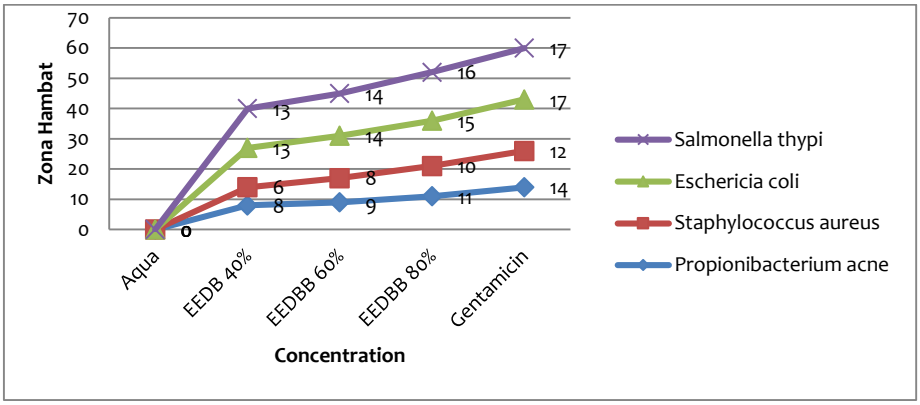

Image 1. Graph of the results of the minimum inhibitory concentration

Based on the antibacterial activity test of EEDBB with concentrations of 40%, 60%, and 80%, it was found that the 80% concentration had the greatest antibacterial activity with an average diameter of the inhibition zone of 11.5 mm on Pa bacteria, 10 mm on Sa bacteria, 15, 5 mm on Ec bacteria and 16.1 mm on St. bacteria.

The concentration of 60% had inhibitory power with an average diameter of the inhibition zone of 8.8 mm on Pa bacteria, 7.9 mm on Sa bacteria, 14.1 mm on Ec bacteria and 14.6 mm on St. bacteria. This shows that at that concentration, EEDBB still shows antibacterial activity. Concentration of 40% had the lowest inhibitory power with an average diameter of the inhibition zone of 7.8 mm for Pa bacteria, 6.6 mm for Sa bacteria, 12.9 mm for Ec bacteria and 13.2 mm for St. bacteria. This shows that at that concentration, EEDBB still shows antibacterial activity.

Gentamicin as a positive control had high antibacterial inhibition with an average diameter of the inhibition zone of 17 mm (Rikomah et al., 2019).

Meanwhile, distilled water as a negative control did not show any antibacterial activity where there was no inhibition zone on the surface.

In the graph of the minimum inhibitory concentration, it is known that EEDBB is the most efficient for the growth of salmonella thypi bacteria with the inhibition zone diameter of 40%, which is 13.2 mm, 60% concentration is 14.6 mm, and 80% concentration is 16.1 mm.

According to (Harahap et al., 2018), medicinal plants are an important source for the development of chemotherapeutic agents, the content of flavonoid compounds and tannins are phenolic compounds which are known to have bactericidal antimicrobial activity. Where phenol compounds act as plasma membrane denaturing agents of microorganisms, which causes leakage and cell death. This antibacterial activity can inhibit growth and even kill bacteria depending on the concentration and type of antimicrobial material. The higher the concentration of the extract, the larger the diameter of the inhibition area obtained, this is because the more active substances contained in the extract.

4. CONCLUSION

After conducting research on the antibacterial activity of EEDBB against bacteria Pa, Sa, Ec, St, it can be concluded that EEDBB has the highest antibacterial activity against bacteria St where the average MIC is 16.1 mm so that it can be used as an alternative for diseases caused by the bacterium Salmonella typhi.

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