

Testing the Anti-Bacterial Activity of Star Gooseberry Leaves (*Souropus Androgynus L*) Using the Disc Diffusion Method Using the n-Hexane Fraction Against Propionic Bacterium Acnes

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ABSTRACT

Acne vulgaris or acne, is a common inflammatory condition in the polysebaceous unit that occurs in teenagers and young adults and is characterized by comedones, papules, pustules, and nodules. One of the factors that causes acne is the Propionic bacterium acnes bacteria. One type of plant with antibacterial properties for acne is the Star Gooseberry Leaf plant (*Souropus Androgynus L*), which contains alkaloids, saponins, tannins, and flavonoids that act as antibacterials. Susanti (2012). This research aimed to obtain data on the antibacterial activity of the compound components contained in the n-hexane fraction of Star Gooseberry Leaves (*Souropus Androgynus L*) against the Propionic bacterium acnes bacteria, which can be seen from the inhibition zone. The method used was disc diffusion with three groups of control, namely (K(S), K(+), and K(-)). The test bacteria Propionic bacterium acnes, where the Control Sample consists of 4 test concentrations, namely 30 mg, 60 mg, 120 mg, and 240 mg. The positive control used two µg/disc Clindamycin, while the negative control was 2% DMSO. The results of the disc diffusion test of the ethanol fraction of Star Gooseberry Leaves (*Souropus Androgynus L*) using the disc diffusion method with concentrations of 30 mg/ml and 60 mg/ml did not provide an inhibition zone, the concentration of 120 mg/ml was 11.1 ± 0.10 mm, the concentration was 240 mg/ml was 14.63 ± 0.25 mm. The negative control DMSO 2% did not provide an inhibitory zone diameter, whereas the positive control Clindamycin 2 µg/disk provided an inhibition zone of 25.47 ± 0.70 mm.

Keywords: Disc diffusion, Fraction, Star Gooseberry Leaf (*Souropus Androgynus L*), Antibacterial.

INTRODUCTION

Infectious diseases are one of the main causes of high morbidity rates caused by various microorganisms such as protozoa, fungi and bacteria. One of the pathogenic microbes that causes infection is Propionic bacterium acnes. In modern medicine, Clindamycin can be used to inhibit bacterial protein synthesis by binding to the 50S ribosome, which results in inhibition of peptide bond formation. (Sugiarto, 2009) however, use that is too high can cause resistance. The increasing presence of antibiotic resistance requires alternatives, one of which is using medicinal plants. One of them is Katuk Leaf.

Based on research by Susanti (2012), it is proven that katuk leaf extract contains alkaloids, triterpenoids, saponins, tannins, polyphenols, glycosides and flavonoids. The aim of this research was to determine the anti-bacterial activity of the N-Hexane fraction of katuk leaves on Propionic bacterium acnes bacteria using the disc diffusion method. From the data obtained, it is hoped that it can provide scientific information about the importance of the benefits of katuk leaves as an alternative to antibiotics and can be developed to overcome antibiotic resistance

METHODS

A. Tools

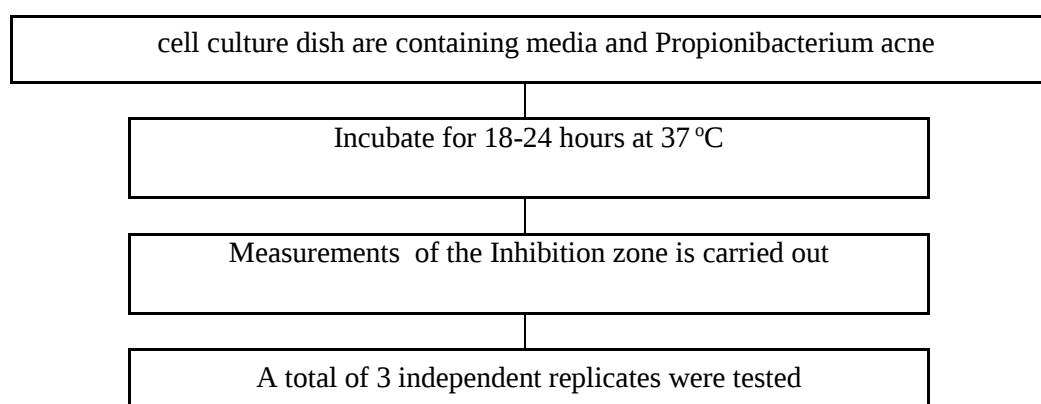
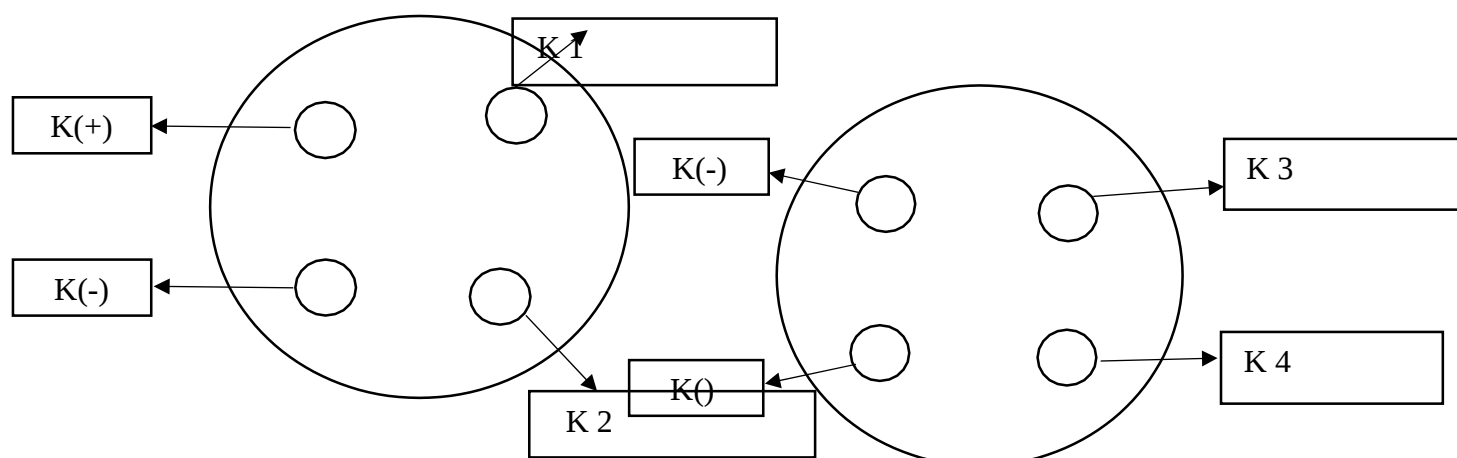
Following are the tools involved in this research: Oven (Memert), Refrigerator, Eppendorf, Stirring rod, Beaker glass, Micropipette (Socorex), Erlenmeyer, Test tube (10 ml), Anaerobic Jar. Incubator (Binder), Autoclave, Laminar Air Flow, Tongs/tweezers, Petri dish (15 ml), Blank disk (6 mm), Sterile cotton swabs, Sterile Ose, Blue tip (100 µl), Ruler, Sterile tube diameter (0.5 mm) length (150 mm) Eppendorf, Yellow tip.

B. Materials:

The microbes used for research are *Propionic bacterium acnes* bacteria. Antibacterial Test Materials namely, Mueller Hinton Broth (MHB), Mueller Hinton Agar (MHA), n-hexane fraction of Star gooseberry Leaves (*Souropus Androgynus L*) 3%, 6%, 12%, 24%, Clindamycin 2µg/disk as the positive control, DMSO 2%, sterile Aquadest.

C. Evaluation

Determine the minimum inhibition of compounds from the n-hexane fraction by observing the diameter of the inhibition zone obtained from the test compound indicated by a clear zone around the test compound on the agar medium.



Explanation:

K(-) : Negatif Control (DMSO 2%)

K(+): Positive Control (*Clindamycin* 2 µg)

K1 (3%): Material with a concentration of 30mg/ml

K2 (6%): Material with a concentration of 60 mg/ml

K3 (12%): Material with a concentration of 120 mg/ml

K4 (24%): Material with a concentration of 240 mg/ml

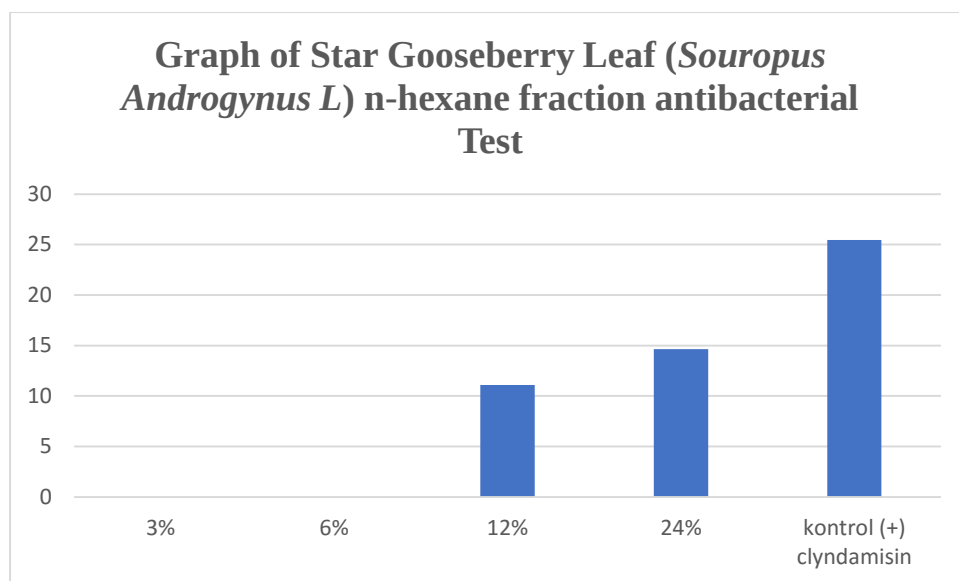
RESULTS AND DISCUSSION

The results of the Antibacterial Activity Test of the n-Hexane Fraction of Star Gooseberry (*Souropus Androgynus L*) Leaves using the Caram Diffusion Method Against *Propionic bacterium acnes* bacteria showed that there was an inhibitory zone with Test 1 Concentration 30 mg/ml, Test 2 Concentration 60 mg/ml, Test 3 Concentration 120 mg/ml, Test 4 Concentration 240 mg/ml, positive control *Clindamycin* 2µg/disk and negative control DMSO 2% (replicated 3x).

Average Results –Average Diameter of Inhibition Zone Test of Antibacterial Activity of n-Hexane Fraction of Star gooseberry Leaves (*Souropus Androgynus L*) using Disc Diffusion Method against *Propionic bacterium acnes*

Test Material	Inhibition Zone Diameter (mm)			Average ± Standard Deviation (mm)
	Replicatio n	Replicatio n	Replicatio n	
	1	2	3	
Concentration 30 mg/ml (1800 µg)	0 mm	0 mm	0 mm	0 mm
Concentration 60 mg/ml (3600 µg)	0 mm	0 mm	0 mm	0 mm
Concentration 120 mg/ml (7200 µg)	11.1 mm	11.2 mm	11.0 mm	11.1 ± 0.10
Concentration 240 mg/ml (14400 µg)	14.5 mm	14.7 mm	14.4 mm	14.63 ± 0.25
Positive Control	25.0 mm	25.3 mm	26.1 mm	25.47 ± 0.70
Negative control	0 mm	0 mm	0 mm	0 mm

From the data obtained, a bar diagram can be made as shown in the figure which shows that the positive control *Clindamycin* 2 µg has the highest average zone of inhibition compared to the concentration of the test solution used.



CONCLUSION

The research aims to determine the antibacterial activity of *Propionic bacterium acne* from the n-Hexane fraction of Star Gooseberry leaves (*Souropus Androgynus L*) by comparing the test material 30 mg/ml, 60 mg/ml, 120 mg/ml, and 240 mg/ml, positive control, using clindamycin two µg/disc, negative control DMSO 2%. Antibacterial testing in this study used the disc diffusion method. The principle of the disc diffusion method is that the drug is saturated into filter paper or paper discs (Dzen et al. 2003). In the diffusion method procedure, a filter paper disc (diameter of about 6 mm) is placed on the surface of the agar (solid media), which has been inoculated with the test microorganism. The petri dish was incubated after that, and the zone of inhibition was measured (Choma & Grzelak, 2010).

At concentration 1 (30 mg/ml) and concentration 2 (60 mg/ml), there was no inhibition zone, but an inhibition zone began to appear at concentration 3 (120 mg/ml) with an inhibition zone of 11.1 mm. Meanwhile, at concentration 4 (240 mg/ml), the inhibition zone was 14.63 mm. In testing antibacterial activity, this time using the positive control *clindamycin* with a concentration of 2 µg/disc showed effectiveness as an antibacterial against *Propionic bacterium acne* bacteria. The average diameter of the resulting inhibition zone was 25.47 mm. From these results, it can be said that *Clindamycin* has an extreme inhibitory power because it is >20mm.

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