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Antibacterial Test Of Telang Flower Extract (Clitorea Ternatea L.) Against *Pseudomonas Aeruginosa*

Luluk Aniqoh Meliana Putri[1] Chinthia Devientasari[1]
Institut Ilmu Kesehatan STRADA Indonesia
***Corresponding author:** lulukaniqohmelianaputri@iik-strada.ac.id

ABSTRACT

The butterfly pea flower is a shrub that can grow and live for years (perennial), can reach a height of 5 meters, has fine hair, and is woody at the base, the flower color is bright blue with a yellowish white color in the middle. Butterfly pea flower (Clitoria ternatea L.) is a plant that has long been used in medicine and has been proven to contain alkaloid and flavonoid secondary metabolite compounds which have antibacterial potential. Antibacterials are substances that can interfere with the growth or even kill bacteria by interfering with the metabolism of harmful microbes. The aim of this research was to determine the inhibitory power of telang flower simplicia extract (Clitoria ternatea L.) on the growth of Pseudomonas aeruginosa bacteria. This research aims to test the activity of butterfly pea flowers, namely by maceration using 70% ethanol solvent. For antibacterial testing using the disk diffusion method. Extracts are made in various concentrations of 10%, 20%, 30%. The positive control used was Chloramphenicol. The results of this research were that the average zone of inhibition of butterfly pea flower extract against Pseudomonas aeruginosa bacteria was 1.48 mm at 10% concentration, 2.41 mm at 20% concentration, and 5.70 mm at 30% concentration. These results show that butterfly pea flower extract has antibacterial activity against Pseudomonas aeruginosa bacteria, although the resulting inhibitory power is not strong. At a concentration of 30% butterfly pea flower extract, it has the greatest inhibitory effect on the growth of Pseudomonas aeruginosa bacteria than concentrations of 10% and 20%.

Keywords: Antibacterial, Butterfly Flower, Extract, Pseudomonas aeruginosa

INTRODUCTION

The butterfly pea flower is a shrub that can grow and live for years (perennial), can reach a height of 5 meters, has fine hair, and a woody base. The leaves are compound pinnately trifoliate (like legume leaves in general), the flowers are single like a butterfly emerging from the leaf axils, the color of the flowers is bright blue with a yellowish white color in the middle, but there are also white flowers. The telang flower also has pods with seeds that are shaped like flat kidneys. The telang flower (Clitoria ternatea L.) is a plant that has long been used in medicine and has been proven to have alkaloid and flavonoid secondary metabolite compounds which have antibacterial potential (Anto, 2020) . Antibacterials are substances that can interfere with the growth or even kill bacteria by interfering with the metabolism of harmful microbes. The mechanism of action of anti-bacterial compounds includes inhibiting cell wall synthesis, inhibiting the integrity of bacterial cell wall permeability, inhibiting the work of enzymes and inhibiting the synthesis of nucleic acids and proteins (Dwidjoseputro, 1978).

Pseudomonas aeruginosa is an opportunistic pathogen, namely a bacterium that initiates infection by exploiting damage to the host's defense mechanisms. This bacteria can cause urinary tract infections, respiratory tract infections, dermatitis, soft tissue infections, bone and joint infections, digestive tract infections and various systemic infections. *Pseudomonas aeruginosa* can form biofilms in body tissues which cause many infectious diseases. The

biofilm protects it against penetration of antibiotics, antibodies, complement and phagocytic cells. These characteristics cause resistance to antibiotics (Mansouri et al., 2013).

METHODS

Tool

Incubators, blenders, analytical balances, rotary evaporation, autoclaves, aseptic cabinets, laboratory glassware, hot plates, eppendrop tubes, sterile bottles, calipers, tripods, methylated spirits, Petri dishes, cotton buds, micropipette tips, micropipettes, tube needles, sterile gauze, steel cotton, handscoon, and label paper.

Material

The materials used in this research were ethanol extract of butterfly pea flower (Clitoria ternatea L.), Pseudomonas aeruginosa bacteria, 70% ethanol, distilled water, DMSO (dimethylsulfoxide), Chloramphenicol, Nutrient agar (NA), Muller Hiton Agar (MHA), aluminum foil.

This type of research is experimental research carried out in vitro. This research was carried out in several stages of activities, namely:

1. Process of determining Clitorea ternatea L flowers.

The aim is to match the morphological characteristics of the plants to be studied so that errors do not occur in taking plants for research

2. Collection and preparation of Clitorea ternatea L flowers.

Making simplicia is done through several preparation stages including taking fresh telang flowers, wet sorting, washing, drying, dry sorting and grinding simplicia. Fresh butterfly pea flowers are dried in an oven at 50ºC for 10 hours. Next, grind it with a simplicia grinder and sift it with a 60 mesh sieve, so that a fine powder is produced.

3. Preparation of ethanol extract of Clitorea ternatea L flowers.

Butterfly flower powder was extracted using the maceration method for 3x24 hours. The solvent used in making this extract is 70% ethanol. Then the solvent was evaporated using a rotary vacuum evaporator with a temperature of 60ºC at 70 rpm. Next, place it in a water bath until a thick extract is formed

4. Phytochemical Test

a. Alkaloids

0.05 gram of extract was put into a test tube, 5 ml of chloroform and 5 drops of concentrated ammonia were added. The chloroform fraction was taken and 3 drops of 2M H2SO4 were added. The acid fraction was taken with a dropper pipette and divided into three on the spot test to add Dragendorf, Mayer and Wagner reagents. A red precipitate was formed by Dragendorf's reagent, a white precipitate by Mayer's reagent, and a brown precipitate by Wagner's reagent indicating the presence of alkaloids.

b. Flavonoids

0.05 gram of extract was put into a test tube, 5ml of ethanol was added then homogenized. The mixture in the test tube was heated at 50°C for 5 minutes then filtered. The filtrate was added with concentrated H2SO4. Positive results are shown in red.

c. Saponin

0.05 gram of extract was put into a test tube. Add 5 ml of distilled water and homogenize. After homogenization, heated at 70ºC for 5 minutes. Then shake for 5 minutes. If there is foam and it lasts for 10 minutes, it indicates the presence of saponin

d. d. Tannin

0.05 gram of extract was put into a test tube, added with 5 ml of distilled water and homogenized. After homogenization, heated at 100ºC for 5 minutes, then filtered. The filtrate

was added with 5 drops of 1% FeCl3. If it produces a dark red, brown or black color, it indicates the presence of tannin

e. e. Steroids/Triterpenoids

0.05 gram of extract was put into a test tube. Add 5 ml of 30% ethanol and heat at 50ºC for 5 minutes, then filter. The filtrate formed is evaporated until dry. The residue formed was added to 2 ml of ether and transferred to a test tube, then Lieberman Burchard's reagent was added. If a green or blue color forms, it indicates the presence of steroids, but if a red or purple color forms, it indicates the presence of triterpenoids.

5. Antibacterial Test The antibacterial test of the ethanol extract of Clitorea ternatea L. flowers was carried out using the disc diffusion method. This is to determine whether or not there is an effect of the ethanol extract of Clitorea ternatea L. flowers in inhibiting the growth of Pseudomonas aeruginosa bacteria.

RESULT AND DISCUSSION

1. Determination results showed that the sample used was the Butterfly Flower (Clitorea ternatea L.) of the Fabaceae tribe

2. Sampling of butterfly pea flowers

Fresh Flowers (g)	**Dried Flowers (g)**	**Powder (g)**
6000	750	520

A total of 6,000 grams of fresh butterfly pea flowers were dried in an oven at 50ºC for 10 hours, then 750 grams of butterfly pea flower simplicia were obtained, characterized by being easily broken if broken. The simplicia was ground with a simplicia grinder, and sieved using a 60 mesh sieve. 520 grams of dry powder was obtained. Powder that did not pass when sifted was not used for maceration.**3.** . Pembuatan ekstrak etanol bunga telang Hasil ekstrak kental ekstrak bunga telang

Powder (g)	Ethanol 70% (ml)	Liquid extract (ml)	Condensed Extract (g)	Rendemen t (%)
520	5000	550	57,8	10,5

The maceration method is carried out for 3x24 hours. The solvent used in making this extract is 70% ethanol. The choice of 70% ethanol is because it has good penetration ability on the hydrophilic and lipophilic side, so that it can penetrate the cell membrane and then enter the cell and interact with the metabolites contained in the cell. 70% ethanol is also able to extract necessary compounds such as flavonoids, alkaloids, terpenoids and steroids (Malanggi, 2012). Then the solvent was evaporated using a rotary vacuum evaporator with a temperature of 60ºC at 70 rpm. Next, place it in a water bath for 7 days until a thick extract forms. The thick extract obtained was 57.8 grams.

4. Phytochemical Test of Butterfly Flower Extract

Senyawa Metabolit	Result
Alkaloid	+
Flavonoid	+
Saponin	+
Tannin	+
Steroid/ Triterpenoid	-

Butterfly flower extract contains secondary metabolite compounds of alkaloids, flavonoids, saponins and tannins. Does not contain steroids or triterpenoids.

5. Hasil Uji Antibakteri

Inhibition Zone Diameter (mm)

No.	Concentration	Replication I	Replication II	Replication III	Average
1	Control (-) DMSO	0	0	0	0
2	Control (+) Chloramfenichol	8,66	8,78	8,34	8,59
3	Extract 10%	1,45	1,35	1,65	1,48
4	Extract 20%	2,3	2,41	2,53	2,41
5	Extract 30%	5,7	5,65	5,76	5,70

Testing the results of the bacterial ethanol extract of Clitoria ternatea L. flowers, the inhibition zone at a concentration of 10% was 1.48 mm, at a concentration of 20% was 2.41 mm, and at a concentration of 30% was 5.70 mm, where concentrations were 10% and 20 % has an inhibition zone in the weak category and for a concentration of 30% has an inhibition zone in the medium category. The diameter results for the positive control (chloramphenicol) gave an average diameter of the inhibition zone of 8.49 mm, while for the negative control (DMSO).

CONCLUSION

Based on the research results, it was found that the ethanol extract of Clitorea ternatea L. flowers has the ability to inhibit the growth of Staphylococcus aureus bacteria at concentrations of 10%, 20% and 30%. Clitorea ternatea L. at concentrations of 10% and 20% is in the weak category because it produces an average inhibitory zone diameter of 1.48 mm and 2.41 mm, while the 30% concentration is in the medium category with an average inhibitory zone diameter of 5.70 mm.

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