

# Antibacterial Bioactivity Assay of Ulin (*Eusideroxylon zwageri* Teijsm. & Binn) Plant Bark Extract Against *Staphylococcus aureus* Bacteria

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**Abstract:-** The ulin plant is a typical plant that can be found in Indonesia. This plant is used traditionally, one of which is mouthwash. In this study, antibacterial biocativity testing was carried out on the ulin plant bark in each extract. Preparation of ulin plant bark extracts using the multistage maceration method and antibacterial testing using the disc diffusion method and measured based on the diameter of the inhibition zone. There were three extracts produced, hexane, ethyl acetate and methanol extracts. Each extract was tested for antibacterial using *Staphylococcus aureus* bacteria. The results showed that hexane and ethyl acetate extracts were included in the category of moderate antibacterial compounds while methanol extracts were included in the strong antibacterial category. So it can be concluded that methanol extract is the most potential extract as antibacterial.

**Keywords:-** Extract, Ulin, Antibacterial, *Staphylococcus aureus*.

## I. INTRODUCTION

The ulin plant is a large plant that has a height of about 30-35 m with a diameter of about 60-120 cm. The ulin plant is characterized by a straight trunk with a round, tight and wide tree crown. The leaves of the ulin plant have an alternating arrangement, young leaves are reddish in color which after old are green. In addition, ulin plants have fruits that resemble eggs with an average length of 10-18 cm with a diameter of 7-10 cm [1].

The use of ulin plants as furniture and bridge foundations by the Indonesian people so that ulin plants are often referred to as ironwood. The wood fibers of ulin plants are denser than other wood fibers so that these plants can survive termite attacks, borer insects, resistant to changes in temperature, humidity and the influence of sea water [2].

Ulin plants are typical plants that can only be found in several places in Indonesia, namely Kalimantan and Sumatra, especially Jambi. The utilization of Ulin Plants for the community is very diverse ranging from being the basic material for household appliances, bridges, road markers to being used as traditional medicine.

The ulin plant is widely used by the community in treating various diseases. The ulin plant has various benefits, one of which can be used as an anti-bacterial mouthwash. In addition, ulin plants are used by the community in treating diabetes, inflammation and mouth ulcers, so it is suspected that ulin plants have the potential to have antioxidant active compounds. The compounds contained in ulin plants that have been reported are secondary metabolite compounds including flavonoids, tannins, phenolics, saponins, alkaloids, steroids and terpenoids, all of which are compounds that can act as antioxidants and have potential as drugs [3,4].

## II. PLANT AND BACTRIA

### A. Characterization of ulin

- Kingdom: Plantae
- Division: Spermatophyta
- Sub Division: Angiospermae
- Class: Dicotyledoneae
- Ordo: Laurales
- Family: Lauraceae
- Genus: *Eusideroxylon*
- Species: *Eusideroxylon zwageri* Teijsm. & Binn

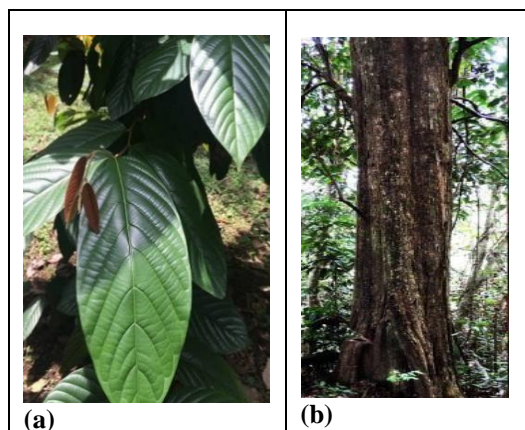


Fig. 1. Ulin plant (a) Leaf; (b) Bark

### B. *Staphylococcus aureus*

*S. aureus* bacteria used in this study are bacteria taken from the biomedical laboratory of Andalas University.

### III. MATERIAL AND METHODS

#### A. Material

Hexan, ethyl acetat, mtheanol, aquades, Ulin plant from Selat village, Jambi, Indonesia. *Staphylococcus aureus* bacteria.

#### B. Methods

- Preparation of ulin plant stem bark extract using multistage maceration method because this method is a simple method, without using heat so as not to damage the organic compounds contained and can separate compounds based on their level of solubility.
- Antibacterial testing is used by disc diffusion method which is a simple method in antibacterial testing. The media used were Nutrient agar (NA) for bacterial rejuvenation and Mueller-Hinton Agar (MHA) media for antibacterial testing. Antibacterial work was done in laminar air flow. A total of 2 grams of Nutrient Agar (NA) media was dissolved in 100 mL of distilled water and as much as 9.5 grams of Mueller-Hinton Agar (MHA) media was dissolved in 250 mL of distilled water. All media and equipment that will be

used are sterilized with an autoclave at a temperature of 121°C for 15 minutes. In antibacterial testing, a control solution was used using chloramphenicol with a concentration of 80%. Test solutions were made with concentrations of 250, 500, 1000 and 2000 mg/mL of each extract.

### IV. RESULT AND DISSCUSSION

Extracts using the multistage maceration method obtained three extracts, hexanes, ethyl acetate and methanol. Each extract was tested for antibacterial properties with concentrations of 250, 500, 1000, and 2000 mg/mL.

*S. Aureus* is a bacterium that causes several simple diseases experienced by humans. Antibacterial testing is measured based on the diameter of the inhibition zone. The greater the concentration of extract used, the greater the diameter of the inhibition zone, because the diameter of the inhibition zone is directly proportional to the concentration of the extract [5]The antibacterial criteria based on the diameter of the inhibition zone are as follows [6].

TABLE I. ANTIBACTERIAL CRITERIA

No.	Diameter of inhibition zone	Criteria
1.	≤5 mm	Weak
2.	5-10 mm	Middle
3.	10-20 mm	Strong
4.	≥20 mm	Very strong

TABLE II. RESULT OF ANTIBACTERIAL

Bacteria Name	Ekstrak	Kontrol	Konsentrasi Ekstrak (mg/mL) Diameter Zona Hambat (mm)			
			250	500	1000	2000
<i>S. aureus</i> (ATTC : 29213)	Heksana	33.9	6.60	7.57	8.75	9.1
	Etil Asetat	32.0	7.7	9.7	10.2	11.9
	Metanol	33.00	10.6	12.5	14.4	17.9

Traditional uses of ulin plants such as antibacterial drugs are still little reported, especially antibacterial against *Staphylococcus aureus* bacteria. *Staphylococcus aureus* bacteria are bacteria that cause diseases of the skin, nose, and cause the formation of mucous membranes in healthy people [7].

Tests of antibacterial and antifungal activity of ulin bark have been carried out on methanol extracts. The ulin bark showed antibacterial activity against *Enterococcus faecalis*, *Staphylococcus aureus*, *Salmonellatyphi* and *Escherichia Coli* bacteria and methanol extract of ulin bark has potential antifungal activity against *Trichophyton mentagrophytes* while DCM extract of ulin bark has potential antifungal activity against *Trametes versicolor*, *Gloeophyllum trabeum*, and *Chaetomium globosum* [8,9].

Based on the criteria for the diameter of the bacterial growth inhibition zone, hexane extract of ulin plant stem bark has moderate antibacterial ability because the bacterial growth inhibition zone is 5-10 mm. Ethyl acetate extract has moderate antibacterial ability and methanol extract has strong

antibacterial ability because it produces a growth inhibition zone of 10-20 mm.

The ulin plant is commonly used by Indonesians as a mouthwash by boiling the leaves or bark of the ulin plant with water. This proves that compounds that have potential as antibacterial have polar properties. Based on the test results, methanol extract has more potential as an antibacterial compound.

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