

# Phytochemical Screening and Antifungal Activity of Pelongor Plant (*Rhodamnia cinerea*) against *Candida albicans*

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**Abstract:-** *Rhodamnia cinerea* is a traditional Indonesian plant known as "Pelongor" a famous for its natural resources from the Riau Archipelago of Indonesia. This study's purpose is to investigate the antifungal activity of methanol extract *Rhodamnia cinerea* against *Candida albicans* (ATCC 10231). *Candida albicans* is one of the pathogenic fungi in humans. Known as candidiasis, it can affect the mouth, vagina, skin, nails, lungs, and digestive tract. The maceration method uses methanol as a solvent. Extraction results were tested for antifungal activity using extract concentrations of 50%, 75%, and 100% and using a positive control, namely ketoconazole, and a negative control, DMSO 10%, performed three times. The extracts were screened for antifungal activity using the disc diffusion method. The results showed that the sample methanol extract could inhibit the growth of the fungus *Candida albicans* in concentration 100% (9,4mm). The phytochemical analysis detected the presence of alkaloids, saponins, tannins, and terpenoids.

**Keywords:-** *Rhodamnia Cinerea*, Phytochemical Screening, Antifungal Activity.

## I. INTRODUCTION

*Rhodamnia cinerea* (Pelongor) is a medicinal plant found in Panjang Timur Island, Riau archipelago, Indonesia, where people still use the plant as an alternative medicine.

Indonesia is a country that has a high level of biodiversity, is one of the identified potential medicinal plants, such as *Rhodamnia cinerea* has not been found widely, especially in tropical forests (Astria et al., 2011).

Health problems in Indonesia are infectious diseases caused by viruses, fungi, parasites, and bacteria. One of the pathogenic fungi that often causes infection in humans is *Candida albicans* (Pieroni et.al, 2002).

Medicinal plants are better than conventional drugs because they can increase biomolecular activity in the body. Medicinal plants can improve the entire system because they work within the scope of the molecular cell (Nasution et al., 2018).

*Candida albicans* fungus is one of the pathogenic fungi in humans. The disease caused by the fungus *Candida albicans* is candidiasis, an acute and subacute fungal disease that can attack the mouth, vagina, skin, nails, lungs, and digestive tract. Research on natural antifungals to treat diseases caused by *C. albicans* fungus has not been done. Therefore, seeing the abundance of medicinal plants on Panjang Timur Island and the content of their bioactive compounds, researchers are interested in studying some of the plants on Panjang Timur Island, Riau archipelago.

## II. MATERIAL AND METHODS

### A. Sample Collection, Authentication, and Preparation

Samples were collected randomly from Panjang Timur Island, Riau Archipelago, Indonesia, and the samples were identified by the Department of Biology at Andalas University Padang Indonesia.

The plants were cleansed using running water. After the plants are dry, they are wrapped in newspaper, put in a plastic bag, and doused with alcohol until evenly distributed. The plastic bag was vacuumed to avoid living microbes during the trip. After arriving at the destination, the plant is open and air-dried until it dries. Then the plant is made into herbarium for shipping.

The processing method for each type of medicinal plant is different, such as consumed direct, and some the processed by boiling or drying, according to the disease they are suffering from. Based on its use, all community processes medicinal plants by boiling, while others do by pressing. Processing medicinal plants by boiling means that the nutritious substances contained in the plants can dissolve into the water. Large medicinal plants must be cut before boiling with water until it boils, while the water used for boiling must be clear, odorless, tasteless, and colorless (Ramandhani et al., 2020).

Samples were chopped or mashed for maceration using methanol, stirring every day, filtered once every 3 days, and replaced with new methanol, repeated up to 3 times.

The yield of the methanol extracts of all plants was determined. The percentage yield was calculated by dividing the weight of crude obtained after extraction by the weight of plant powder weighed before extraction and multiplied it by 100.

### B. Phytochemical Screening

Qualitative phytochemical screening of the extract was determined by the methods of screening tests of tannins, flavonoids, alkaloids, and saponin as described by Harborne (1987). Test for alkaloids, saponins, tannins, phenols, flavonoids, terpenoids, and steroids.

### C. Antifungal Activity

The extracted sample was tested for their antifungal activity using Kirby-Bauer (KB) method against *Candida albicans* ATCC 10231. In this test, fungi culture solutions

contain a turbidity standard of  $0.5 \times 10^6$  CFU/ml prepared in normal saline and spread on sterile Potato Dextrose Agar plates using the spread plate technique. Then discs containing different concentrations of extracts (50, 75, and 100 mg/mL), DMSO as a negative control, and ketoconazole as a positive control were put on an agar plate where the *Candida albicans* were grown, the plates incubated at 27°C for three days, and zone of inhibition recorded after incubation, and the experiment repeated three times.

## III. RESULT AND DISCUSSION

### A. Phytochemical Screening

The percentage yield of crude extract methanol was determined is 1,55% Alkaloids, phenols, tannins, saponins, and steroid/terpenoids, were the secondary metabolites found in the methanolic extract and have antimicrobial activity.

Table 1. Qualitative phytochemical analysis of methanolic plant extract

Name of plant	Secondary metabolite					
	Alkaloids	Phenols	Tannins	Saponins	Flavonoids	Steroid/Terpenoid
<i>Rhodammia cinerea</i>	+	+	+	+	-	+

Alkaloids are chemical compounds with a wide range of structures that are reported to have antimicrobial properties by blocking enzyme activity and can interfere with the integrity of the peptidoglycan component of microbial cells.

Phenols are a group of secondary metabolites distributed in plants that use as antimicrobial agents due to their potential to damage membrane structural integrity and inhibit certain electron transport enzymes.

Tannins are widely known for their ability to bind to different membrane structures and for their antifungal activity, and tannins have the affinity to binding ergosterol, thus reducing the amount of ergosterol in fungal cells.

The role of saponins as antimicrobials in these plants is likely because they can cause cell wall malfunction so that

cell membrane activity will be limited, and this will cause damage to membrane permeability which causes the cell wall to not function.

Terpenoids are the largest and the most diverse class of plant compounds, and have numerous functional roles in metabolism and ecology.

### B. Antifungal Activity

The in vitro antifungal activities of methanol extracts of *Rhodammia cinerea* concentrations of 50mg/mL, 75 mg/mL, and 100 mg/mL were tested against *Candida albicans* in the present study. The details of the results are shown in Table 2. At a higher concentration (100 mg/mL), the extracts of showed a higher antifungal activities against *C. albicans* with inhibition zones of 9,4 mm, respectively.

Table 2. Zone inhibition of Extract *Rhodammia cinerea*

Microbes	Extract <i>Rhodammia cinerea</i> (mm)			Control	
	50	75	100	Ketoconazole	DMSO
<i>Candida albicans</i>	5,6	7,7	9,4	30,3	0

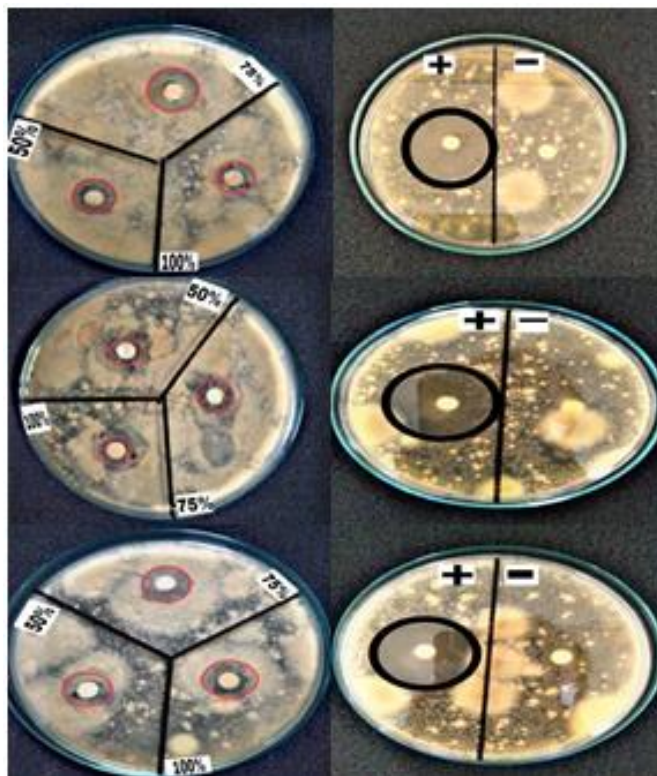


Fig 1. Antifungal activities

#### IV. CONCLUSION

Methanol extract of Pelongor (*Rhodamnia cinerea*) has antifungal activity against *Candida albicans* at a concentration of 100% with a strong inhibitory response.

#### V. ACKNOWLEDGMENT

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