Antifungal Activity of Buni Fruit (*Antidesma Bunius L.*) Against *Malassezia Furfur*: In Vitro Study with Disc Diffusion Method

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Abstract. Pityriasis versicolor, also known as tinea versicolor, is the most common fungal skin disease found in Indonesia and is mostly caused by the *Malassezia furfur*. In herbal medicine, one of the natural products is Buni fruit which has active compounds such as tannins, saponins, flavonoids, phenols, and alkaloids that can be used as antifungals. Using the Disc Diffusion method, this study will investigate the effectiveness of the inhibitory power of buni fruit extract (*Antidesma bunius L.*) against *Malassezia furfur* in vitro. This is an experimental investigation employing the Disc Diffusion method in vitro with concentrations of *buni* fruit extracts of 20%, 40%, and 80% with Dimethyl Sulfoxide (DMSO) 10% as the solvent. The buni fruit used was extracted with 70% ethanol and came from Hasanuddin University's Laboratory of Microbiology, Faculty of Medicine. Twenty samples of *Malassezia furfur* were grown in Sabouraud Dextrose Agar (SDA), which were divided into four groups: Ketoconazole 200mg as a positive control group, a concentration group of 20%, 40%, and 80%, and a negative control group. A caliper was used to measure the diameter of the inhibition zone generated around the paper disc of buni fruit extract (*Antidesma bunius L.)* after 24 h. The average diameter of the extract inhibition zone was 7.7 ± 0.22 mm at 20% concentration, 8.2 ± 0.51 mm at 40% concentration, and 8.98 ± 0.64 mm at 80% concentration. It can be stated that the extract of Buni fruit has an antifungal impact on the growth of *Malassezia furfur*.

Keywords: *Antidesma bunius* · antifungal · ketoconazole · Disc Diffusion Method

1 Introduction

Pityriasis versicolor (PV) is a fungal infection that can be found practically anywhere in the world but is most common in tropical countries with considerable rainfall, such as Indonesia. This is a fungal skin infection that is most prevalent in Indonesia. Pityriasis versicolor, commonly known as tinea versicolor, is a fungal infection of the stratum corneum that causes a chronic mild infection. Fine scaly macules with hyperpigmentation or hypopigmentation appear on the chest, belly, upper back, or arms. Malassezia

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globosa, Malassezia obtusa, Malassezia slooffiae, Malassezia sympodialis, Malassezia pachydermatis, Malassezia restricta, and Malassezia furfur are the seven Malassezia species that cause this disease [1–4].

In severe, recurrent, or widespread cases of pityriasis versicolor, topical treatments such as ointments and shampoos can be used, or systemic treatment with oral medications can be used. Topical treatments such as ketoconazole, selenium sulfide, and zinc pyrithione shampoo are commonly used. In addition to chemical drug treatment, numerous researchers are presently working on the creation of herbal medicine. Tannins, saponins, flavonoids, phenols, and alkaloids are antifungal substances commonly found in plants used in herbal therapy. It has also been demonstrated to work as an antimicrobe against a wide range of microorganisms [5–9].

2 Method

This study used experimental research, which tries to investigate how alternative treatments impact things under carefully monitored circumstances. Since there was no pretest administered to the sample before treatment in this study, the post-test-only control group design was adopted.

The effectiveness of buni fruit extract (Antidesma bunius L.) to inhibit Malassezia furfur was examined in this study using the disk diffusion method in vitro. The concentrations of buni fruit extract tested were 20%, 40%, and 80%, with sterile distilled water serving as the negative control group and 200 mg Ketoconazole tablets serving as the positive control group. Using Freeder's formula, the sample size for this study was determined to be 25 samples, with five sample groups and five treatment repeats.

On Sabouroud Dextrose Agar (SDA) medium, the antifungal activity was tested. 10 mL of SDA-containing medium was put into 5 Petri dishes and allowed to harden. Meanwhile, the *Malassezia furfur* culture was immersed in a 0.9 percent NaCl solution until it reached the 0.5 Mc Farland turbidity criterion. The fungus was injected into SDA agar after the SDA had solidified. The discs were then placed in 5 Petri dishes with diluted buni fruit extract (*Antidesma bunius L.*), ketoconazole as a positive control, and aquadest as a negative control. It was then incubated for a while [11].

The diameter of the inhibition zone created is used to classify antifungal inhibitory responses, using the following classification: A diameter of > 20 mm has a very strong inhibitory strength, while a diameter of 16–20 mm has strong inhibitory strength, 10–15 mm has moderate inhibition, and less than 10 mm has weak inhibition [11].

3 Result

The clear zone formed around the paper disk was an indicator that the extract of Buni fruit (*Antidesma bunius L.*) had antifungal properties against the fungus Malassezia furfur, according to the activity test of buni fruit extract (*Antidesma bunius L.*) with various concentrations of 20%, 40%, and 80%, as shown in Fig. 1.

The average caliper measurement results in a concentration of 20% achieving a diameter of 7.7 mm, a concentration of 40% obtaining a diameter of 8.2 mm, and a

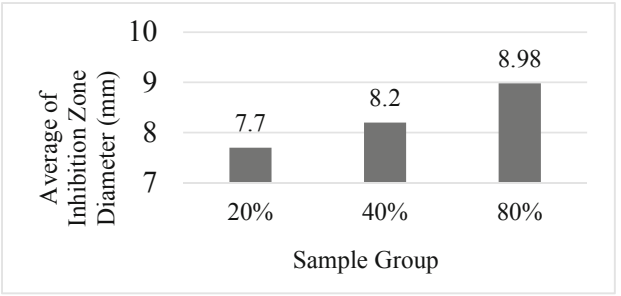

Fig. 1. Average of Inhibition Zone Diameter (mm) in each sample group

concentration of 80% obtaining a diameter of 8.98 mm, indicating that each concentration is classed by has limited sensitivity. As shown in the figure, the higher the concentration of buni fruit, the wider the inhibitory diameter.

According to Firdausi, A. et al., the higher the concentration of the extract, the higher the content of active chemicals in it, resulting in stronger antifungal activity. Even though the plant contains secondary metabolites that should be able to inhibit fungal growth, other factors that affect the formation of inhibition zones in antifungal assays include the sensitivity of antibacterial growth, the reaction between the active ingredients and the medium, incubation temperature, extraction method, fruit maturity used, and the type of solvent.

The review found that *Malassezia furfur* can be controlled by secondary metabolite compounds found in Buni fruit extract (*Antidesma bunius L.*). This is consistent with research by Munoz (2021) and Bakhup (2008) on the number of secondary metabolites, including flavonoids, tannins, alkaloids, saponins, and phenols, that can be used as antifungals in Buni fruit (*Antidesma bunius L.*) extracts.

Based on the findings of this study, it can be stated that the extract of Buni fruit (*Antidesma bunius L.*) has an antifungal impact on the growth *of Malassezia furfur* in vitro at extract concentrations of 20%, 40%, and 80%, with each having a modest inhibitory power.

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