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Antibacterial Activity of Endophytic Fungi Isolated from *Plectranthus Amboinicus* against Common Bacterial Skin Pathogens

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Structured Abstract

Background: The increasing concern of diseases caused by skin pathogens may be due to the development of beauty and wellness trends that have led to the excessive use of beauty products without careful consideration. This research aimed to investigate the endophytic fungi, microorganisms that inhabit the tissues of various plant parts without causing harm to its host, isolated from *Plectranthus amboinicus*, a herb plant known for its beneficial biological properties, and its antibacterial activities against common bacterial skin pathogens such as *Staphylococcus aureus*, *Propionibacterium acnes* and methicillin-resistant *Staphylococcus aureus* (MRSA).

Methods: Both surface imprint test and surface sterilization, utilizing 70% ethanol and 1% sodium hypochlorite, before the isolation processes were conducted to differentiate between epiphytic microorganisms and true fungal endophytes. In this study, agar plug diffusion assay (primary screening) was first implemented to identify the most prominent endophytic fungi, which would be further fermented and underwent solvent-solvent extraction, utilizing ethyl acetate, to obtain its crude extract. Disc diffusion assay (secondary screening) was then conducted to determine its antibacterial activities.

Results: This study resulted in 12 endophytic fungi successfully isolated from *Plectranthus amboinicus*, with 11 of them capable of exhibiting antibacterial activities. The results of the primary screening determined Strain M2.1 being the most prominent endophytic fungi, with inhibition zones being between 9.33 ± 1.15 mm and 24.00 ± 1.00 mm. Meanwhile, the secondary screening revealed that Strain M2.1 showed moderate activity against all selected bacterial strains, ranging from 10 to 100 mg/mL concentrations, forming inhibition zones between 12.67 ± 1.15 mm and 15.67 ± 0.58 mm at the highest concentration. Strain M2.1 was still capable of exhibiting sufficient activity even at such low concentrations, but a higher concentration might be needed for it to be as efficient as Chloramphenicol, a commercial antibiotic.

Conclusion: In conclusion, this study provided important insights that can influence the potential of producing naturally derived antibacterial extracted from *Plectranthus amboinicus*, through its endophytic fungi alternatives. Therefore, implementation of this alternative may offer benefits, especially for future pharmaceutical and commercialization purposes in relation to skin-related issues.

Keywords: *Plectranthus amboinicus*, Endophytic fungi, Skin pathogens, Agar plug diffusion assay, Disc diffusion assay

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