ISOLATION OF SOIL FUNGI FROM LAEM PHAK BIA SALT PANS AND EVALUATION OF THEIR ANTIMICROBIAL AND ENZYMATIC ACTIVITIES

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Bogor, June 2025

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ABSTRAK

RAIHAN RAMADHANI. Isolation of Soil Fungi from Laem Phak Bia Salt Pans and Evaluation of Their Antimicrobial and Enzymatic Activities. Dibimbing oleh IVAN PERMANA PUTRA and YAOVAPA ARAMSIRIRUJIWET.

Laem Phak Bia terletak di muara pesisir yang mana tambak garamnya dianggap sebagai lingkungan ekstrem. Cendawan yang tumbuh di lingkungan ekstrem dapat menghasilkan *extremolyte* dan ekstremozim karena kondisinya yang keras. Penelitian tentang cendawan tanah perlu diperbarui secara berkala, karena komunitas cendawan tanah mungkin rentan terhadap perubahan global. Studi ini bertujuan untuk mengisolasi dan mengidentifikasi keragaman cendawan tanah pada tambak garam di Laem Phak Bia serta melihat sifat antagonisnya terhadap cendawan patogen tumbuhan, serta aktivitas antibakteri dan enzimatiknya. Sembilan isolat cendawan dikumpulkan dari tanah yang berasa, dari tambak garam Laem Phak Bia, diklasifikasikan ke dalam 5 genus yakni *Aspergillus*, *Aureobasidium*, *Stachybotrys*, *Curvularia*, dan *Acremonium*. Semua isolat diuji untuk sifat antagonisnya terhadap tiga cendawan patogen tanaman seperti *Phytophthora palmivora*, *Colletotrichum* sp., dan *Curvularia* sp. Isolat 1A, yang termasuk ke dalam genus *Aspergillus*, menunjukkan aktivitas inhibisi pertumbuhan terbaik. Selain itu, supernatan kultur cair dari semua isolat dipakai untuk uji awal sifat antibakterinya terhadap beberapa bakteri, termasuk *Staphylococcus aureus*, *S. epidermidis*, *Escherichia coli*, dan *Bacillus subtilis*, dengan isolat 1A menunjukkan penghambatan terbaik. Pengujian aktivitas enzimatik pada semua isolat juga dilakukan, dan beberapa di antaranya menunjukkan hasil positif dalam produksi amilase serta lignin peroksidase.

Kata kunci: antimikroba, *Aspergillus*, cendawan tanah, enzim ekstraseluler, keanekaragaman cendawan

ABSTRACT

RAIHAN RAMADHANI. Isolation of Soil Fungi from Laem Phak Bia Salt Pans and Evaluation of Their Antimicrobial and Enzymatic Activities. Supervised by IVAN PERMANA PUTRA and YAOVAPA ARAMSIRIRUJIWET.

Laem Phak Bia is located at the coastal estuary where the salt pans are considered as an extreme environment. Fungi that thrive in extreme environments could produce extremolytes and extremozymes due to the harsh conditions. Research on soil fungi needs to be updated regularly, as soil fungal communities may be vulnerable to global changes. This study aims to isolate and identify the diversity of Laem Phak Bia salt pans soil fungi and assess their antagonistic properties against phytopathogenic fungi, as well as their antibacterial and enzymatic activities. Nine fungal isolates were collected from Laem Phak Bia salt pan soil, classified into 5 genera such as *Aspergillus*, *Aureobasidium*, *Stachybotrys*, *Curvularia*, and *Acremonium*. All isolates were tested for antagonistic properties against three plant pathogens such as *Phytophthora palmivora*, *Colletotrichum* sp., and *Curvularia* sp. Isolate 1A, belonging to the genus *Aspergillus*, exhibited the best growth inhibitory activity. Additionally, the culture broth supernatant of all isolates underwent preliminary antibacterial testing against several bacteria, including *Staphylococcus aureus*, *S. epidermidis*, *Escherichia coli*, and *Bacillus subtilis*, with isolate 1A showing the broader inhibition. The isolates were also screened for enzymatic activity, showing some are positive on producing amylase and lignin peroxidase.

Keyword: Antimicrobial, *Aspergillus*, extracellular enzyme, fungal diversity, soil fungi

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Hopefully this research will contribute to the progress of science and prove beneficial to those in need especially about soil fungal diversity.

Bogor, 2025

Raihan Ramadhani

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