Karakterisasi Molekuler dan Profil Metabolit Sekunder Fungi Endofit Tanaman Gaharu (*Aquilaria malaccensis* Lam.)

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Intisari

Eksploitasi *Aquilaria. malaccensis* sebagai tanaman obat dan gaharu berkualitas tinggi mengurangi ketersediaannya di alam. Topik penelitian tentang jamur endofit menjadi perhatian peneliti karena dapat menghasilkan metabolit sekunder yang mirip dengan tanaman inangnya. Produksi metabolit sekunder menggunakan mikroba dinilai lebih sederhana dan cepat dibandingkan ekstraksi dari tanaman inang yang dapat mempengaruhi habitat aslinya. Penelitian ini bertujuan untuk mengisolasi fungi endofit dari batang *A. malaccensis*, menentukan dan mengidentifikasi isolat fungi endofit yang menghasilkan metabolit sekunder paling beragam dan mengkarakterisasi karakter fitokimia metabolit sekunder yang dihasilkan menggunakan GC-MS. Fungi endofit dari batang *A. malaccensis* dipilih berdasarkan kemampuannya menghasilkan metabolit sekunder. Isolat terpilih diidentifikasi secara morfologi dan molekuler. Selanjutnya isolat terpilih dikultur pada media PDB selama 14 hari. Media diekstraksi menggunakan metode liquid-liquid extraction. Ekstrak yang diperoleh kemudian diuapkan menggunakan rotary evaporator dan dilakukan profiling metabolit menggunakan GC-MS. Hasil penelitian menunjukkan bahwa terdapat 26 isolat jamur endofit. Isolat EF5, EF8, EF9, EF11 dan EF20 dipilih untuk penyelidikan lebih lanjut. Hasil identifikasi morfologi dan molekuler menunjukkan bahwa EF5, EF8, EF9, EF11 dan EF20 memiliki kemiripan tertinggi dengan *Xylaria bamboosicola, Diaporthe litchiicola, Lasiodiplodia brasiliensis, Neopestalotiopsis eucalypticola* dan *Pestalotiopsis papuana*. Hasil GC-MS mendeteksi metabolit sekunder dari kelompok senyawa monoterpenoid, alkana, asam lemak, turunan benzoil, benzena dan turunan tersubstitusi serta alkaloid.

Kata kunci: Fungi endofit, *Aquilaria malaccensis*, metabolit sekunder, GC-MS

Molecular Characterization and Secondary Metabolite Profile of Endophytic Fungi of Agarwood (Aquilaria malaccensis Lam.) Plant

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Abstract

The overuse of *Aquilaria malaccensis* as a medicinal plant and high-quality agarwood reduces its availability in nature. Research topics on endophytic fungi have become of interest to researchers since they can produce secondary metabolites similar to their host plant. Production of secondary metabolites using microbes is considered simpler and faster than extracting from the host plant which may affect their natural habitat. The aim of this research is to isolat endophytic fungi from the stems of A. malaccensis, determine and identify isolats of endophytic fungi that produce the most diverse secondary metabolites and characterize the phytochemical characters of the secondary metabolites produced using GC-MS. Endophytic fungi from the stems of *A. malaccensis* were screened for their ability to produce secondary metabolites. The selected isolats were identified morphologically and molecularly. Furthermore, the chosen isolats were cultivated on PDB medium for 14 days. The medium was extracted by liquid-liquid extraction methode. The extracts obtained were then evaporated using rotary evaporator and subjected to metabolite profiling using GC-MS. The results showed that there were 26 isolats of endophytic fungi. Isolat EF5, EF8, EF9, EF11 and EF20 were selected for further investigation. The results of morphological and molecular identification showed that EF5, EF8, EF9, EF11 and EF20 had the highest similarity with *Xylaria bamboosicola, Diaporthe litchiicola, Lasiodiplodia brasiliensis, Neopestalotiopsis eucalypticola* and *Pestalotiopsis papuana*. GC-MS results detected secondary metabolite from group of compounds monoterpenoids, alkanes, fatty acids, benzoyl derivatives, benzene and substituted derivatives and alkaloids.

Key words: endophytic fungi, *Aquilaria malaccensis*, secondary metabolites, GC-MS