

ABSTRAK

INVESTIGASI SENYAWA BIOAKTIF FUNGI ENDOFIT MANGROVE 22PLP1-F1 PADA MEDIA LIMBAH SERABUT KELAPA SAWIT SEBAGAI ANTIBAKTERI TERHADAP PATOGEN RESISTEN

Oleh

A. Whisnu Shakthi Al Ghozali

Metabolit sekunder fungi endofit mangrove memiliki potensi sebagai sumber bioaktif antibakteri. Penelitian ini bertujuan mendapatkan kultur fungi endofit mangrove pada media limbah serabut kelapa sawit, mengetahui aktivitasnya sebagai antibakteri, dan mengetahui profil senyawanya. Isolat 22PLP1-F1 dikultur pada tiga media berbeda lalu diamati morfologinya. Isolat tunggal selanjutnya dikultivasi secara *One Strain Many Compound* (OSMAC) menggunakan serabut kelapa sawit dan bakteri patogen selama 14 hari. Biomassa hasil kultivasi diekstraksi menggunakan pelarut diklorometana : MeOH (1:1) dan dipartisi menggunakan diklorometana : akuades (1:3). Ekstrak diskriming aktivitas antibakterinya menggunakan metode *microtiter 96-well plate*. Komponen ekstrak kemudian dievaluasi menggunakan uji Kromatografi Lapis Tipis (KLT). Ekstrak aktif selanjutnya dimurnikan dengan kromatografi kolom terbuka kemudian diuji *Minimum Inhibitory Concentration* (MIC) dan dianalisis KLT untuk mengonfirmasi komponen bioaktif. Fraksi aktif kemudian dikarakterisasi dengan LC-MS/MS menggunakan aplikasi Masslynx 4.1 dan SIRIUS 6.2.2 untuk mengidentifikasi profil senyawa bioaktif. Dalam penelitian ini, isolat 22PLP1-F1 telah berhasil dikultur dalam media serabut kelapa sawit dan melalui pengamatan morfologi diketahui termasuk spesies *Aspergillus sydowii*. Hasil skrining aktivitas antibakteri menunjukkan aktivitas terhadap *P. aeruginosa* dari ekstrak fraksi diklorometana hasil kultivasi *axenic*. Visualisasi KLT awal menunjukkan keberadaan komponen alkaloid pada fraksi diklorometana dan komponen peptida pada fraksi air. Uji MIC menunjukkan aktivitas antibakteri terhadap *P. aeruginosa* pada fraksi metanol dengan nilai 0,5 mg/mL. Analisis data LC-MS/MS menunjukkan profil senyawa antibakteri yaitu golongan notoamida yang termasuk alkaloid indol terprenilasi dan aspergilon A yang memiliki aktivitas antifouling dan antikanker.

Kata kunci: Endofit mangrove, serabut sawit, *Aspergillus*, antibakteri.

ABSTRACT

INVESTIGATION OF MANGROVE ENDOPHYTE FUNGI 22PLP1-F1'S BIOACTIVE COMPOUND ON PALM FIBER WASTE AS ANTIBACTERIA AGAINST RESISTANT PATHOGEN

By

A. Whisnu Shakthi Al Ghozali

The secondary metabolites of mangrove endophytic fungi have the potential to be a source of antibacterial bioactives. The objective of this study is to cultivate mangrove endophytic fungi on palm fiber waste media, assess their antibacterial activity, and analyze their compound profile. Isolate 22PLP1-F1 was cultured on three different media, after which its morphology was observed. Single isolates were cultivated in the One Strain Many Compounds (OSMAC) method using palm fiber and pathogenic bacteria for 14 days. The cultivated biomass was extracted with dichloromethane: methanol (1:1) and partitioned with dichloromethane : aquadest (1:3). The extracts were screened for antibacterial activity using the 96-well plate microtiter method. Then, the extract components were evaluated using a thin-layer chromatography (TLC) assay. The active extract was further purified by open column chromatography, tested for minimum inhibitory concentration (MIC), and analyzed by TLC to confirm the bioactive components. The active fraction was characterized using LC-MS/MS with Masslynx 4.1 and SIRIUS 6.2.2 to identify the profile of bioactive compounds. In this study, isolate 22PLP1-F1 was successfully cultured in palm fiber media, and morphological observations revealed that it belongs to the *Aspergillus sydowii* species. Screening results for antibacterial activity showed activity against *P. aeruginosa* in the dichloromethane fraction of extracts from axenic cultivation. Preliminary TLC visualization revealed alkaloid components in the dichloromethane fraction and peptide components in the water fraction. The MIC test revealed antibacterial activity against *P. aeruginosa* in the methanol fraction, with an MIC value of 0.5 mg/mL. LC-MS/MS analysis revealed the antibacterial compound profile were from notoamide group, which belongs to prenylated indole alkaloids, and aspergilon A, which exhibits antifouling and anticancer properties.

Keywords: Endophytic mangrove, palm fiber, *Aspergillus*, antibacterial.