



Aktivitas Antimikroba Fungi Endofit Dari Biji Pala (*Myristica fragrans* Houtt.)

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INTI SARI

Fungi endofit adalah relung ekologi baru sebagai agen antimikroba. Penelitian fungi endofit dari biji pala masih terbatas pada pengamatan morfologi dan potensi antimikroba masih terbatas, sehingga pada berbagai jenis patogen perlu dilakukan. Tujuan dari penelitian ini adalah untuk mengetahui jenis spesies fungi endofit berdasarkan identifikasi penanda molekuler, aktifitas antimikroba fungi endofit unggul pada biji pala (*Myristica fragrans* Houtt.) berdasarkan nilai Konsentrasi Hambat Minimal (KHM) dan Konsentrasi Bunuh Minimal (KBM), dan identifikasi metabolit sekunder. Metode penelitian ini adalah; isolasi dan karakterisasi fungi endofit berdasarkan karakter morfologis, identifikasi berdasarkan penanda molekuler rDNA Internal Transcribed Spacer (ITS), uji antimikroba (antagonistik) *in vitro*, penentuan nilai KHM menggunakan pendekatan mikrodilusi, KBM menggunakan pendekatan metode sebar, deteksi profil kimia senyawa bioaktif berdasarkan analisis *Gas Chromatography Mass Spectrometry* (GC-MS). Hasil dari penelitian ini adalah jenis spesies fungi endofit berdasarkan identifikasi molekuler; *Neofusicoccum parvum*, *Neofusicoccum ribis*, *Aspergillus chevalieri*, *Gliocephalotrichum bulbilium*, *Fusarium solani*, *Aspergillus flavus*, dan *Aspergillus fumigatus*. Nilai KHM dan KBM pada bakteri *Staphylococcus aureus* adalah 250 ug/mL dan 1000 ug/mL, pada bakteri *Escherichia coli* adalah 250 ug/mL dan 1000 ug/mL, pada *Candida albicans* 125 ug/mL dan 250 ug/mL, pada fitopatogen *Rhizoctonia solani* 62.5 ug/mL dan 500 ug/mL. Profil kimia senyawa bioaktif yang paling melimpah pada fungi endofit unggul dari biji pala (*Myristica fragrans* Houtt.) adalah isolat *Aspergillus chevalieri*; Chanoclavine (43,73%), Methyl 7,9-octadecadiynoate (14,53%), dan Linalool (14,38%). Isolat *Aspergillus flavus*; Kojic acid (77,22%), Linalool (4,13%), Octadecanoic acid, 2-propenyl ester (2,70%). Isolat *Aspergillus fumigatus*; 17-Pentatriacontene (38,34%), Octasiloxane, 1,1,3,3,5,5,7,7,9,9,11,11,13,13,15,15-hexadecamethyl- (10,44%), dan Octadecane, 1,1'-[1,3-propanediylbis(oxy)]bis-(9,65%). Isolat *Gliocephalotrichum bulbilium*; Linalool (22,2%), Ribitol (18,5%), 17-Pentatriacontene (11,97%).

Kata Kunci: Fungi Endofit, Pala, *Internal Transcribed Spacer*, *Aktivitas Antimikroba*, *Gas Chromatography Mass Spectrometry*



Antimicrobial Activity of Endophytic Fungi from Seed of Nutmeg (*Myristica fragrans* Houtt.)

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ABSTRACT

Endophytic fungi represent a new ecological niche as antimicrobial agents. Research on endophytic fungi from nutmeg seeds has been limited to morphological observations, with the antimicrobial potential still needing to be explored across various pathogens. This study aimed to identify species of endophytic fungi based on molecular marker identification, evaluate the superior antimicrobial activity of endophytic fungi from nutmeg seed (*Myristica fragrans* Houtt.) using Minimum Inhibitory Concentration (MIC) and Minimum Bactericidal Concentration (MBC), and identify secondary metabolites. The research methods included isolation and characterization of endophytic fungi based on morphological characteristics, molecular identification using rDNA Internal Transcribed Spacer (ITS) markers, in vitro antimicrobial assays (antagonism), MIC determination using microdilution methods, MBC using spread plate methods, and detection of bioactive compound profiles via Gas Chromatography-Mass Spectrometry (GC-MS). Results identified the species of endophytic fungi through molecular identification as *Neofusicoccum parvum*, *Neofusicoccum ribis*, *Aspergillus chevalieri*, *Gliocephalotrichum bulbilium*, *Fusarium solani*, *Aspergillus flavus*, and *Aspergillus fumigatus*. MIC and MBC values against *Staphylococcus aureus* were 250 µg/mL and 1000 µg/mL, respectively; *Escherichia coli* were 250 µg/mL and 1000 µg/mL, *Candida albicans* were 125 µg/mL and 250 µg/mL, and the phytopathogen *Rhizoctonia solani* were 62.5 µg/mL and 500 µg/mL. The bioactive compound profile most abundant in superior nutmeg seed endophytic fungi, *A. chevalieri*, included Chanoclavine (43.73%), Methyl 7,9-octadecadiynoate (14.53%), and Linalool (14.38%). *A. flavus* isolate contained Kojic acid (77.22%), Linalool (4.13%), and Octadecanoic acid, 2-propenyl ester (2.70%). *A. fumigatus* isolate contained 17-Pentatriacontene (38.34%), Octasiloxane, 1,1,3,3,5,5,7,7,9,9,11,11,13,13,15,15-hexadecamethyl- (10.44%), and Octadecane, 1,1'-[1,3-propanediylbis(oxy)]bis- (9.65%). The *G. bulbilium* isolate contained Linalool (22.2%), Ribitol (18.5%), and 17-Pentatriacontene (11.97%).

Keywords: Endophytic Fungi, Nutmeg, Internal Transcribed Spacer, Antimicrobial Activity, Gas Chromatography-Mass Spectrometry