

ABSTRACT

Iktiya Putri Nadiliayanti, 24020122130112. Exploration and Characterization of Endophytic Fungi as Protease Inhibitor Producers from Potential Plants at KHDTK Wanadipa, Universitas Diponegoro. Under the supervisions of Sri Pujiyanto and Endang Kusdiyantini.

Protease inhibitors are crucial protease enzyme control agents in various biological and biotechnological applications. Although traditionally extracted directly from plants, their utilization is constrained by seasonal dependence, limited biomass, and extraction inefficiency. Alternatively, endophytic fungi living in symbiosis within plant tissues can produce metabolites with biological activities similar to their hosts. KHDTK Wanadipa of Universitas Diponegoro serves as a strategic exploration site due to its ecological stability, low anthropogenic pressure, and high vegetation diversity supporting microbiome richness. This study aims to isolate, characterize, and evaluate the protease inhibitor activity of endophytic fungi from potential plants in this area. Methods included direct planting isolation, screening using paper discs, morphological characterization, mycelial dry weight-based growth curve determination, protease inhibitor assay (Folin-Lowry method), and compound profiling via *Gas Chromatography-Mass Spectrometry* (GC-MS). Inhibition percentages across extract concentrations (10, 40, 80, 120, 160, and 200 ppm) were analyzed using *One-Way* ANOVA, and IC_{50} was calculated via linear regression. The exploration successfully isolated an endophytic fungus from a sengon stem (*Falcataria moluccana*), identified as *Aspergillus* sp. This isolate exhibited significant protease inhibitory activity. *One-Way* ANOVA proved that extract concentration variations significantly affected the inhibition percentage ($p < 0.05$). Linear regression yielded an IC_{50} value of 54.91 ppm (strong category). GC-MS detected various compounds, including oleic acid, docosanoic acid, and Isochiapin B, which are suspected to work synergistically in inhibiting the protease enzyme.

Keywords: *Endophytic Fungi, Protease Inhibitor, KHDTK Wanadipa, Bioactive Compounds*