ABSTRACT

Christina Septiani. 24020121120044. **Optimization of Production and Identification of α-Amylase Inhibitor Compounds from Endophytic Fungal Isolates of Fig Plant (*Ficus carica* L.)**. Under the guidance of Sri Pujiyanto and Agung Suprihadi.

The global prevalence of diabetes mellitus (DM) continues to rise, posing a serious challenge, particularly in the development of more effective and innovative drugs. DM is a chronic metabolic disorder characterized by elevated blood glucose levels. One approach to controlling blood glucose levels is through the inhibition of α-amylase enzyme activity. This study aims to analyze the effect of carbon and nitrogen sources on the optimization of α-amylase inhibitor production from endophytic fungal isolates of the Fig plant (*Ficus carica* L.), and to identify metabolite compounds with potential as α-amylase inhibitors. A total of 10 endophytic fungal isolates were successfully isolated from leaf and stem samples of the Fig plant using a surface sterilization method and planting on PDA (potatoes dextrose agar) medium. The isolates were characterized based on macroscopic and microscopic observations. Based on the characterization results, 4 genera of endophytic fungi were identified, namely *Aspergillus*, *Colletotrichum*, *Penicillium*, and *Acremonium*. The purified endophytic fungal isolates were cultured in PDB (potatoes dextrose broth) medium, and their α-amylase inhibitory activity was tested using a spectrophotometric method at a wavelength of 540 nm. The isolate with the highest inhibitory activity was used to optimize the production of α-amylase inhibitor compounds by applying variations of carbon and nitrogen sources on PDB medium, followed by compound analysis and identification using GC-MS. The results showed that variations in carbon and nitrogen sources did not have a significant effect on inhibitory activity ($p > 0.05$). Nevertheless, starch exhibited the highest mean inhibitory activity among the carbon sources (7.85%), and yeast extract showed the highest mean activity among the nitrogen sources (22.1%). GC-MS analysis identified 2 metabolite compounds with potential as α-amylase inhibitors as well as antidiabetic agents, namely 4H-Pyran-4-one, 2,3-dihydro-3,5-dihydroxy-6-methyl- and 2-Furancarboxaldehyde, 5-(hydroxymethyl)-. Based on molecular docking literature studies, both compounds have relatively strong docking scores at the active site of α-amylase, with values of -4.456 and -4.7 kcal/mol, respectively, suggesting their potential to inhibit α-amylase.

Keywords: *Endophytic Fungi, α-Amylase Inhibitor, GC-MS*