SKRINING AKTIVITAS ANTI-DIABETES EKSTRAK ETIL ASETAT JAMUR ENDOFIT DAUN TANAMAN YAKON (*Smallanthus sonchifolius* [poepp. & endl.] h. robinson) TERHADAP PENGHAMBATAN ENZIM α-AMILASE DAN α-GLUKOSIDASE

ABSTRAK

Diabetes melitus merupakan masalah kesehatan global yang jumlah penderitanya terus meningkat, termasuk di Indonesia. Salah satu pendekatan pengobatan diabetes adalah dengan menghambat enzim α-amilase dan α-glukosidase yang berperan dalam metabolisme karbohidrat. Penelitian ini bertujuan untuk mengeksplorasi potensi antidiabetes dari ekstrak etil asetat jamur endofit yang diisolasi dari daun tanaman Yakon (*Smallanthus sonchifolius*). Isolasi jamur endofit dilakukan menggunakan media Saboraud Dextrose Agar (SDA), menghasilkan lima isolat berbeda (D1, D2, D4, D5 dan D6). Uji aktivitas penghambatan enzim α-amilase dilakukan menggunakan metode DNS, sedangkan α-glukosidase menggunakan substrat PNPG. Senyawa metabolit dianalisis menggunakan LC-MS, dan identifikasi spesies dilakukan secara molekuler. Hasil uji aktivitas terhadap penghambatan enzim α-amilase dan α-glukosidase menunjukkan bahwa isolat D5 memiliki aktivitas penghambatan tertinggi terhadap enzim α-amilase dengan nilai IC_{50} sebesar 11,96 ppm, sedangkan isolat D1 menunjukkan aktivitas penghambatan tertinggi terhadap enzim α-glukosidase dengan nilai IC_{50} sebesar 6,04 ppm. Dari hasil analisis LC-MS pada ekstrak D5 teridentifikasi 18 senyawa metabolit sekunder, yang diduga memiliki aktivitas terhadap enzim α-amilase dan α-glukosidase antara lain fenolik, alkaloid, poliketida, dan steroid, seperti asam klorogenat dan asam ferulat. Identifikasi molekuler menggunakan analisis sekuen DNA ITS menunjukkan bahwa isolat D1 adalah *Aspergillus tamarii*, sedangkan D5 adalah *Fusarium verticillioides*. Penelitian ini membuktikan bahwa isolat jamur endofit D1 aktif terhadap pengambatan enzim α-glukosidase dan isolat D5 aktif terhadap pengambatan enzim α-amilase. Temuan ini diharapkan dapat mendukung pengembangan obat atau suplemen antidiabetes berbasis bahan alam Indonesia.

Kata kunci: Antidiabetes, Daun Yakon, Jamur Endofit, α-amilase, α-glukosidase, LC-MS, Identifikasi Molekuler.

SCREENING OF ANTI-DIABETES ACTIVITY OF ETHYL ACETATE EXTRACT OF ENDOPHYTIC FUNGI FROM LEAVES OF YACON PLANT (*SMALLANTHUS SONCHIFOLIUS* [POEPP. & ENDL.] H. ROBINSON) AGAINST α-AMYLASE AND α-GLUCOSIDASE ENZYME INHIBITION

ABSTRACT

Diabetes mellitus is a global health problem with an increasing number of cases, including in Indonesia. One therapeutic approach for diabetes is to inhibit the enzymes α-amylase and α-glucosidase, which play key roles in carbohydrate metabolism. This study aims to explore the antidiabetic potential of ethyl acetate extracts from endophytic fungi isolated from the leaves of Yakon (Smallanthus sonchifolius). Isolation of endophytic fungi was carried out using Saboraud Dextrose Agar (SDA) medium, resulting in five different isolates (D1, D2, D4, D5, and D6). The inhibitory activity against α-amylase was using the DNS method, while α-glucosidase activity was using the PNPG substrate. Metabolite compounds were analyzed using LC-MS, and species identification was performed molecularly. The enzyme inhibition assays showed that isolate D5 exhibited the highest inhibitory activity against α-amylase with an IC_{50} value of 11.96 ppm, while isolate D1 demonstrated the highest inhibitory activity against α-glucosidase with an IC_{50} value of 6.04 ppm. LC-MS analysis of the D5 extract identified 18 secondary metabolite compounds, which are presumed to have activity against α-amylase and α-glucosidase, including phenolics, alkaloids, polyketides, and steroids, such as chlorogenic acid and ferulic acid. Molecular identification using ITS DNA sequence analysis revealed that isolate D1 is *Aspergillus tamarii*, however D5 is *Fusarium verticillioides*. This study demonstrates that the endophytic fungal isolate D1 is active as an α-glucosidase inhibitor and D5 is active as an α-amylase inhibitor. These findings are expected to support the development of antidiabetic drugs or supplements based on Indonesian natural resources.

Keywords: Antidiabetic, Yakon Leaves, Endophytic Fungi, α-amylase, α-glucosidase, LC-MS, Molecular Identification.