POTENSI ANTIDIABETES EKSTRAK ETANOLIK DAUN *Dendrocalamus asper* MELALUI INHIBISI ENZIM α-AMILASE SECARA *IN VITRO* DAN *IN SILICO*

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INTISARI

Diabetes melitus merupakan penyakit metabolik yang ditandai oleh hiperglikemia kronis dan dapat dikendalikan melalui penghambatan enzim pencerna karbohidrat, salah satunya α-amilase. Penelitian ini bertujuan untuk menganalisis potensi antidiabetes ekstrak etanol dan fraksi daun *Dendrocalamus asper* berdasarkan aktivitas inhibisi α-amilase secara *in vitro*, mengidentifikasi dugaan senyawa metabolit sekunder menggunakan LC-HRMS, serta menganalisis potensi senyawa kandidat sebagai inhibitor α-amilase secara *in silico* melalui *molecular docking*. Ekstraksi daun *D. asper* dilakukan menggunakan etanol 70%, dilanjutkan dengan fraksinasi cair-cair menggunakan n-heksan, etil asetat, dan etanol-akuades. Aktivitas inhibisi α-amilase diuji menggunakan metode DNS, sedangkan identifikasi senyawa dilakukan dengan LC-HRMS. Senyawa kandidat kemudian diseleksi berdasarkan parameter *drug-likeness*, absorpsi gastrointestinal, toksisitas, dan prediksi aktivitas biologis sebelum dilakukan *molecular docking* terhadap reseptor α-amilase 2QV4. Hasil penelitian menunjukkan bahwa rendemen ekstrak etanol sebesar 6,86%, sedangkan rendemen fraksi n-heksan, etil asetat, dan etanol berturut-turut sebesar 10,00%, 5,00%, dan 47,00%. Ekstrak etanol memiliki aktivitas inhibisi tertinggi dengan nilai IC_{50} sebesar 1213,91 ± 82,37 mg/L, sedangkan seluruh fraksi belum mencapai inhibisi 50% hingga konsentrasi 1600 mg/L. Analisis LC-HRMS menghasilkan 55 dugaan senyawa yang didominasi oleh flavonoid dan turunannya. Hasil *molecular docking* menunjukkan bahwa Apigenin memiliki nilai *binding affinity* terbaik di antara senyawa uji, yaitu -8,9 kcal/mol, tetapi afinitasnya belum sebaik acarbose sebagai ligan pembanding. Berdasarkan hasil tersebut, ekstrak daun *D. asper* menunjukkan aktivitas inhibisi α-amilase, namun kurang potensial sebagai kandidat antidiabetes melalui mekanisme ini dibandingkan acarbose.

Kata kunci: diabetes melitus, *Dendrocalamus asper*, α-amilase, *in vitro, in silico*

ANTIDIABETIC POTENTIAL OF *Dendrocalamus asper* ETHANOLIC LEAF EXTRACT THROUGH α-AMYLASE INHIBITION: *IN VITRO* AND *IN SILICO* APPROACHES

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ABSTRACT

Diabetes mellitus is a metabolic disease characterized by chronic hyperglycemia and can be managed through the inhibition of carbohydrate-digesting enzymes, including α-amylase. This study aimed to analyze the antidiabetic potential of ethanol extract and fractions of *Dendrocalamus asper* leaves based on *in vitro* α-amylase inhibitory activity, identify putative secondary metabolites using LC-HRMS, and evaluate candidate compounds as α-amylase inhibitors through *in silico* molecular docking. The leaves of *D. asper* were extracted using 70% ethanol and fractionated using n-hexane, ethyl acetate, and ethanol-aqueous solvents. The α-amylase inhibitory activity was evaluated using the DNS method, while compound identification was performed using LC-HRMS. Candidate compounds were selected based on drug-likeness, gastrointestinal absorption, toxicity, and biological activity prediction before molecular docking against the α-amylase receptor 2QV4. The results showed that the ethanol extract yield was 6.86%, while the yields of n-hexane, ethyl acetate, and ethanol fractions were 10.00%, 5.00%, and 47.00%, respectively. The ethanol extract exhibited the highest inhibitory activity with an IC_{50} value of 1213.91 ± 82.37 mg/L, whereas all fractions did not reach 50% inhibition at the highest tested concentration of 1600 mg/L. LC-HRMS analysis identified 55 putative compounds, predominantly flavonoids and their derivatives. Molecular docking results showed that Apigenin had the best binding affinity among the tested compounds, with a value of -8.9 kcal/mol; however, its affinity was less favorable than acarbose as the reference ligand. These findings indicate that *D. asper* leaves exhibit α-amylase inhibitory activity but have limited potential as antidiabetic candidates through this mechanism compared to acarbose.

Keywords: diabetes mellitus, *Dendrocalamus asper*, α-amylase, *in vitro*, *in silico*