Analisis fitokimia dan uji in vitro ekstrak n-heksana mangifera quadrifida sebagai inhibitor -amilase dan -glukosidase = Phytochemical analysis and in vitro study of n-hexane extract of mangifera quadrifida as an inhibitor of -amylase and -glucosidase

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Abstrak

Latar Belakang: Diabetes melitus (DM) merupakan penyakit metabolik dengan hiperglikemia sebagai karakteristik utamanya. Prevalensi DM meningkat setiap tahunnya. Apabila tidak diobati, DM dapat berkomplikasi menjadi retinopati, nefropati, mikroangiopati, stroke, hingga amputasi ekstremitas. Ekstrak n-heksana Mangifera indica diketahui memiliki aktivitas inhibisi terhadap Î±-amilase dan Î±-glukosidase. Oleh karena itu, ekstrak n-heksana Mangifera quadrifida berpotensi memiliki aktivitas inhibisi serupa dan dapat menjadi alternatif terapi DM.
Tujuan: Mengetahui kandungan senyawa fitokimia pada ekstrak n-heksana Mangifera quadrifida dan aktivitas inhibisinya terhadap Î±-amilase dan Î±-glukosidase.
Metode: Daging buah, kulit, dan biji Mangifera quadrifida kering diblender hingga menjadi bubuk dan dimaserasi dalam pelarut n-heksana. Ekstrak kemudian dianalisis menggunakan uji fitokimia dan kromatografi lapis tipis. Selanjutnya, uji inhibisi aktivitas ekstrak terhadap enzim Î±-amilase dan Î±-glukosidase dilakukan. Spektrofotometri digunakan untuk menilai absorbansi. Nilai absorbansi akan digunakan untuk menghitung persentase inhibisi.
Hasil: Mangifera quadrifida berhasil diekstrak ke dalam pelarut n-heksana. Hasil uji fitokimia menunjukkan bahwa ekstrak n-heksana Mangifera quadrifida mengandung tanin dan glikosida. Hasil kromatografi menunjukkan enam noda dengan nilai faktor retardasi (Rf) masing-masing 0,34; 0,48; 0,62; 0,72; 0,79 dan 0,90. Hasil uji aktivitas enzim menunjukkan nilai IC50 aktivitas inhibisi ekstrak n-heksana Mangifera quadrifida terhadap Î±-amilase dan Î±-glukosidase berturut-turut adalah 40,72 ± 1,56 dan 12,23 ± 0,27 ppm.
Diskusi: Metabolit sekunder yang terkandung dalam ekstrak n-heksana Mangifera quadrifida, yaitu tanin dan glikosida, memiliki aktivitas inhibisi terhadap enzim Î±-amilase dan Î±-glukosidase pada uji in vitro. Aktivitas inhibisi ekstrak n-heksana Mangifera quadrifida terhadap Î±-glukosidase lebih baik dibandingkan terhadap Î±-amilase.
Kesimpulan: Esktrak n-heksana Mangifera quadrifida memiliki potensi sebagai agen antidiabetes melalui mekanisme inhibisi aktivitas enzim Î±-amilase dan Î±-glukosidase.
.....Background: Diabetes mellitus (DM) is a metabolic disorder with hyperglycemia as its main characteristic. The prevalence of DM increases every year. If left untreated, DM can lead to several complications, such as retinopathy, nephropathy, microangiopathy, stroke, and amputation of limbs. N-hexane extract of Mangifera indica known to have an inhibitory effect on Î±-amylase and Î±-glucosidase. Therefore, n-hexane extract of Mangifera quadrifida has the potential to exhibit same activity, thus making it as a alternative therapy for DM.
Objective: This research was done to determine the phytochemical compound of n-hexane extract of Mangifera quadrifida and its inhibitory activity toward Î±-amylase and Î±-glucosidase.
Methods: Dried flesh, peel, and seeds of Mangifera quadrifida were grinded into fine powder and macerated

in n-hexane as a solvent. The extract was tested using phytochemical analysis and thin-layer chromatography. After that, inhibitory activity toward Î±-amylase and Î±-glucosidase was done and the absorbance value was observed. The absorbance value from spectrophotometry was then used to calculate inhibition percentage.
Result: Mangifera quadrifida was successfully extracted to n-hexane solvent. Phytochemical analysis showed that the extract contains tannin and glycoside. Chromatography showed six stains with retention factor (Rf) of 0.34, 0.48, 0.62, 0.72, 0.79, and 0.90, respectively. Enzymatic activity test showed IC50 value of n-hexane extract of Mangifera quadrifida toward Î±-amylase and Î±-glucosidase were 40.72 ± 1.56 and 12,23 ± 0.27 ppm, respectively.
Discussion: Tannin and glycoside, secondary metabolites contained in n-hexane extract of Mangifera quadrifida, have inhibitory activity toward Î±-amylase and Î±-glucosidase in an in vitro test. This action is greater in Î±-glucosidase compared to Î±-amylase.
Conclusion: N-hexane extract of Mangifera quadrifida has a great potential as an antidiabetic agent through inhibition activity of Î±-amylase and Î±-glucosidase.