Uji Aktivitas Penghambatan Enzim Alfa-glukosidase dan Dipeptidil Peptidase IV (DPP-IV) serta Formulasi Sediaan Kapsul dari Kombinasi Ekstrak Etanol Caesalpinia sappan, Andrographis paniculata, dan Syzygium cumini = Alpha-glucosidase and Dipeptidyl Peptidase IV (DPP-IV) Inhibition Activity and Formulation of Granules from Combination Ethanol Extract of Caesalpinia sappan, Andrographis paniculata, and Syzygium cumini

Sabila Robbani, author

Abstrak

Diabetes merupakan salah satu masalah kesehatan global yang tumbuh paling cepat di abad ke-21. Obat antidiabetes dengan berbagai mekanisme kerja telah banyak di produksi. Namun, sebagian besar penderita diabetes menggunakan tanaman untuk pengobatan alternatif karena merasa efek sampingnya lebih kecil dibandingkan obat antidiabetes. Tanaman yang telah terbukti berpotensi sebagai antidiabetes diantaranya adalah Caesalpinia sappan (secang), Andrographis paniculata (sambiloto), dan Syzygium cumini (jamblang). Penelitian ini bertujuan untuk menguji aktivitas antidiabetes dari kombinasi ekstrak etanol herba sambiloto, daun jamblang, dan kayu secang secara in vitro dengan penghambatan enzim alfa-glukosidase dan DPP-IV (Dipeptidil-peptidase IV). Kombinasi ketiga ekstrak dibuat dalam bentuk granul dan sediaan akhir berupa kapsul. Formula terbaik dilanjutkan untuk pengujian stabilitas selama 3 bulan. Caesalpinia sappan menunjukkan aktivitas paling kuat dalam menghambat enzim alfa-glukosidase dan DPP-IV dengan nilai masing-masing sebesar IC50 9,60 ± 1,05 µg/mL dan 59,98 ± 6,84%. Sementara, ekstrak kombinasi menghasilkan IC50 64,21 ± 1,37 µg/mL terhadap penghambatan alfa-glukosidase dan 45,14 ± 12,71% untuk penghambatan DPP-IV. Formulasi paling efisien adalah F1 yang menggunakan Avicel PH 101 dengan komposisi paling rendah. F1 memperoleh carr’s index 14,40 ± 1,38% dan hausner’s ratio 1,17 ± 0,02. Setelah penyimpanan tiga bulan, adanya perbedaan fisik. Kadar senyawa penanda turun setelah penyimpanan dua minggu. Namun, terjadi kenaikan setelahnya untuk brazilin dan andrografolid. Aktivitas penghambatan alfa-glukosidase berlangsung fluktuatif selama masa penyimpanan, namun mengarah pada peningkatan IC50. Caesalpinia sappan memiliki aktivitas paling kuat terhadap penghambatan alfa-glukosidase dan DPP-IV serta sediaan kapsul cenderung stabil selama penyimpanan 3 bulan.
.....Diabetes is one of the fastest growing global health problems of the 21st century. Antidiabetic drugs with various mechanisms of action have been produced. However, most diabetics use plants as alternative medicine because its side effects are lower than antidiabetic drugs. Plants that have been shown to have potential as antidiabetic are Caesalpinia sappan, Andrographis paniculata, and Syzygium cumin. This study aims to examine the antidiabetic activity in vitro of the combination of ethanol extract of those three plants by inhibiting alpha-glucosidase and DPP-IV enzymes. The combination of the three extracts was made in the form of granules in capsule. The best formula was continued for stability testing for 3 months. Caesalpinia sappan showed the strongest activity in inhibiting alpha-glucosidase and DPP-IV enzymes with IC50 values of 9.60±1.05 µg/mL and 59.98±6.84%, respectively. Meanwhile, the combined extract obtained an IC50 of 64.21±1.37 µg/mL for alpha-glucosidase inhibition and 45.14±12.71% for DPP-IV inhibition. The most efficient formulation was F1 which use Avicel PH 101 with the lowest composition. F1 obtained a

carr's index of 14.40±1.38% and a hausner's ratio of 1.17±0.02. After three months of storage, there was changed in physical appearance. The content of marker compounds decreased after two weeks of storage. However, there was a subsequent increase for brazilin and andrographolide. The alpha-glucosidase inhibitory activity fluctuated during storage but led to an increasing in IC50. Caesalpinia sappan extract has the strongest activity against alpha-glucosidase and DPP-IV inhibition and capsule tend to be stable for 3 months of storage.