

**STUDI PROFIL METABOLIT DAN UJI AKTIVITAS INHIBISI
ENZIM α -GLUKOSIDASE FRAKSI HEMWAT HERBA
SAMBILOTO (*Andrographis paniculata* Nees.)**

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ABSTRAK

Latar Belakang: Sambiloto (*Andrographis paniculata*) berpotensi sebagai antidiabetes melalui inhibisi enzim α -glukosidase, tetapi informasi mengenai profil metabolit dan aktivitas inhibisinya pada fraksi polar dan nonpolar masih terbatas.

Tujuan: Mengetahui profil metabolit serta aktivitas inhibisi α -glukosidase fraksi polar dan nonpolar HEMWat herba sambiloto secara *in silico* dan *in vitro*.

Metode: Ekstraksi dilakukan dengan maserasi etanol 96%, dilanjutkan fraksinasi menggunakan metode HEMWat. Profil metabolit dianalisis dengan LC-HRMS, kemudian dilakukan *virtual screening*, *molecular docking*, dan kajian farmakokinetika. Aktivitas inhibisi α -glukosidase diuji secara *in vitro* menggunakan *microplate reader*.

Hasil: Analisis LC-HRMS mengidentifikasi 454 senyawa metabolit, dengan 113 senyawa terpilih untuk analisis *in silico*. Hasil *molecular docking* menunjukkan 2-monolinolenin, 2-amino-1,3,4-octadecanetriol, dan phytosphingosine memiliki afinitas tertinggi terhadap α -glukosidase. Fraksi polar menunjukkan aktivitas inhibisi kuat dengan nilai IC₅₀ sebesar 2,547 μ g/mL, sedangkan fraksi nonpolar tidak mencapai 50% inhibisi sehingga nilai IC₅₀ tidak dapat dihitung.

Kesimpulan: Fraksi polar dan nonpolar herba sambiloto mengandung beragam metabolit yang berpotensi sebagai inhibitor α -glukosidase. Fraksi polar menunjukkan aktivitas inhibisi lebih kuat dibandingkan fraksi nonpolar dan berpotensi dikembangkan sebagai sumber antidiabetes alami.

Kata kunci: *Andrographis paniculata*, enzim α -glukosidase, profil metabolit

METABOLITE PROFILING AND α -GLUCOSIDASE INHIBITORY ACTIVITY OF HEMWAT FRACTIONS FROM *Andrographis paniculata* Nees.

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ABSTRACT

Background: Sambiloto (*Andrographis paniculata*) has potential as an antidiabetic agent through α -glucosidase inhibition; however, information regarding the metabolite profile and inhibitory activity of its polar and nonpolar fractions remains limited.

Objectives: To determine the metabolite profiles and α -glucosidase inhibitory activities of polar and nonpolar fractions of sambiloto herb using *in silico* and *in vitro* approaches.

Methods: Extraction was performed by maceration using 96% ethanol, followed by fractionation using the HEMWat method. Metabolite profiles were analyzed using LC-HRMS, followed by virtual screening, molecular docking, and pharmacokinetic profiling of selected compounds. α -Glucosidase inhibitory activity was evaluated *in vitro* using a microplate reader.

Results: LC-HRMS analysis identified 454 metabolites, of which 113 compounds were selected for *in silico* analysis. Molecular docking showed that 2-monolinolenin, 2-amino-1,3,4-octadecanetriol, and phytosphingosine had the highest affinity toward α -glucosidase. The polar fraction exhibited strong inhibitory activity with an IC₅₀ value of 2.547 μ g/mL, whereas the nonpolar fraction did not reach 50% inhibition, preventing IC₅₀ determination.

Conclusion: The polar and nonpolar fractions contain diverse metabolites with potential α -glucosidase inhibitory activity. The polar fraction exhibited stronger inhibitory activity than the nonpolar fraction and may have potential as a natural antidiabetic source.

Keywords: *Andrographis paniculata*, α -glucosidase enzyme, profiling metabolite