

Intisari

Pengaruh Lama Fermentasi *Sargassum hystrix* dengan *Lactobacillus plantarum* terhadap Aktivitas Antidiabetes

Diabetes melitus tipe II merupakan masalah kesehatan global yang prevalensinya terus meningkat. Penatalaksanaan diabetes meliputi perubahan gaya hidup dan penggunaan obat-obatan, namun obat herbal dari bahan alami seperti rumput laut berpotensi sebagai alternatif dengan efek samping minimal. Penelitian ini bertujuan untuk mengetahui pengaruh lama fermentasi *S. hystrix* dengan *L. plantarum* terhadap aktivitas antidiabetes melalui penghambatan enzim α -amilase dan α -glukosidase. Fermentasi dilakukan selama 0, 1, 2, 3, dan 4 hari, dan hasilnya dilakukan uji fitokimia, kandungan total fenol, kandungan florotanin, aktivitas penghambatan α -amilase dan α -glukosidase, serta analisis senyawa dengan Liquid Chromatography-Mass Spectrometry (LC-MS). Hasil penelitian menunjukkan bahwa fermentasi selama satu hari (hari ke-1) memberikan memiliki nilai total fenol (84.08 ± 0.29 mgGAE/g) dan florotanin (66.20 ± 0.19 mg PGE/g) tertinggi, serta aktivitas penghambatan terbaik dengan nilai %inhibisi α -amilase sebesar $97,78 \pm 0,61\%$ pada konsentrasi 10 mg/mL dan $66,88 \pm 0,62\%$ pada konsentrasi 0,625 mg/mL serta α -glukosidase sebesar $95,079 \pm 0,317\%$ pada konsentrasi 10 mg/mL dan $71,902 \pm 0,378\%$ pada konsentrasi 0,625 mg/mL. Selain itu, IC_{50} α -amilase sebesar $0,35 \pm 0,01$ mg/mL tidak berbeda signifikan dengan kontrol positif akarbose ($0,31 \pm 0,03$ mg/mL), α -glukosidase sebesar $0,059 \pm 0,006$ mg/mL tidak berbeda signifikan dengan kontrol positif akarbose ($0,048 \pm 0,004$ mg/mL). Pada uji fitokimia, sampel *S. hystrix* mengandung senyawa metabolit sekunder seperti flavonoid, triterpenoid, alkaloid, dan fenol hidrokuinon. Analisis LC-MS mengidentifikasi senyawa seperti ethylene glycol monoacetate, metemitron, dan asam amino seperti fenilalanin yang diduga berperan dalam aktivitas antidiabetes. Fermentasi *S. hystrix* dengan *L. plantarum* selama satu hari merupakan kondisi optimal untuk dikembangkan sebagai sumber inhibitor α -amilase dan α -glucosidase.

Kata kunci: *S. hystrix*, *L. plantarum*, fermentasi, antidiabetes, α -glukosidase, α -amilase

Abstract

The Effect of *Sargassum hystrix* Fermentation Duration with *Lactobacillus plantarum* on the Antidiabetic Activity

Type II diabetes melitus is a global health problem with increasing prevalence. Diabetes management includes lifestyle changes and use of drugs, but herbal medicines from natural ingredients such as seaweed have the potential as an alternative with minimal side effects. This study aims to determine the effect of fermentation time of *S. hystrix* with *L. plantarum* on antidiabetic activity through inhibition of α -amylase and α -glucosidase enzymes. Fermentation was carried out for 0, 1, 2, 3, and 4 days, and the results were tested for phytochemicals, total phenol content, phlorotannin content, α -amylase and α -glucosidase inhibitory activity, and Liquid Chromatography-Mass Spectrometry (LC-MS). The results of the study showed that fermentation for one day (day 1) gave the highest total phenol (84.08 ± 0.29 mgGAE/g) and phlorotannin (66.20 ± 0.19 mg PGE/g) values, as well as the best inhibitory activity with a % inhibition value of α -amylase of $97.78 \pm 0.61\%$ at a concentration of 10 mg/mL and $66.88 \pm 0.62\%$ and at a concentration of 0.625 mg/mL and α -glucosidase of $95.079 \pm 0.317\%$ at a concentration of 10 mg/mL and $71.902 \pm 0.378\%$ at a concentration of 0.625 mg/mL. In addition, IC_{50} α -amylase was 0.35 ± 0.01 mg/mL which was not significantly different from the positive control of acarbose (0.31 ± 0.03 mg/mL), α -glucosidase was 0.059 ± 0.006 mg/mL which was not significantly different from the positive control of acarbose (0.048 ± 0.004 mg/mL). In the phytochemical test, *S. hystrix* samples contained secondary metabolite compounds such as flavonoids, triterpenoids, alkaloids, and phenol hydroquinone. LC-MS analysis detected compounds such as ethylene glycol monoacetate, metamitron, and amino acids such as phenylalanine which are suspected to play a role in antidiabetic activity. Fermentation of *S. hystrix* with *L. plantarum* for one day is the optimal condition to be developed as a source of α -amylase and α -glucosidase inhibitors.

Keywords: *S. hystrix*, *L. plantarum*, fermentation, antidiabetic, α -glucosidase, α -amylase