

Intisari

Aktivitas Penghambatan Tirosinase Ekstrak Metanol *Ulva lactuca* dan Fraksinya secara *In Vitro*

Rumput laut hijau *Ulva lactuca* yang melimpah diketahui mengandung senyawa metabolit sekunder yang mempunyai bioaktivitas dan berpotensi untuk digunakan sebagai inhibitor tirosinase. Penelitian ini bertujuan untuk mengetahui aktivitas penghambatan enzim tirosinase serta mengidentifikasi senyawa aktif yang berpotensi sebagai inhibitor tirosinase pada *Ulva lactuca*. *Ulva lactuca* diekstraksi dengan metode maserasi menggunakan metanol kemudian dipartisi dengan heksana, kloroform, dan air. Ekstrak metanol, fraksi heksana, fraksi kloroform, dan fraksi air dianalisis uji kandungan total fenol dan total flavonoid serta diuji aktivitas penghambatan terhadap enzim tirosinase. Ekstrak metanol dan fraksi dengan penghambatan tertinggi dilakukan identifikasi senyawa menggunakan *Gas Chromatography-Mass Spectrometry* (GC-MS). Hasil menunjukkan bahwa fraksi heksana ($IC_{50}=584.34\pm35.07\mu\text{g/mL}$) mempunyai aktivitas penghambatan tertinggi terhadap enzim tirosinase dan termasuk dalam kategori aktif dengan kandungan total fenol ($11.66\pm0.53\text{ mgGAE/g}$) dan total flavonoid ($9.75\pm0.30\text{ mgQE/g}$), meskipun kekuatan penghambatannya lebih rendah daripada asam kojat ($IC_{50}=11.07\pm0.86\mu\text{g/mL}$). Senyawa yang diduga mempunyai aktivitas penghambatan terhadap enzim tirosinase pada ekstrak metanol yaitu 2,4-dimethoxycinnamic acid; chalcone; 2,4-dihydroxybenzoic acid, 3TMS derivative; dan benzenepropanoic acid, TMS derivative. Adapun senyawa yang diduga mempunyai aktivitas penghambatan terhadap enzim tirosinase pada fraksi heksana yaitu 2,4-dimethoxycinnamic acid; chalcone; 2,6-dihydroxybenzoic acid, 3TMS derivative; phloretin, tetra(trimethylsilyl) ether; adenosine, 2'-O-methyl-; dan 3-phenyllactic acid, 2TMS derivative.

Kata kunci: tirosinase, total fenol, total flavonoid, *Ulva lactuca*

Abstract

In Vitro Tyrosinase Inhibitory Activity of *Ulva lactuca* Methanolic Extract and Its Fractions

Ulva lactuca is abundant green seaweed has been known to have bioactivity and potential to use as tyrosinase inhibitor. The aims of this study to determine the tyrosinase inhibitory activity and identify active compounds that have potential as tyrosinase inhibitor from *Ulva lactuca*. *Ulva lactuca* was extracted by maceration method using methanol, then partitioned using hexane, chloroform, and water. The methanol extract and fractions were analyzed for the total phenolic content and total flavonoid using UV-Vis spectrophotometry. Test for inhibitory activity using the tyrosinase enzyme inhibition method in vitro. The methanol extract and the fraction with the highest inhibition was identified using Gas Chromatography-Mass Spectrometry (GC-MS). Results showed that the hexane fraction ($IC_{50}=584.34\pm35.07\ \mu\text{g/mL}$) has highest tyrosinase inhibition and include active category inhibitor with the total phenolic content ($11.66\pm0.53\ \text{mgGAE/g}$) and total flavonoid content ($9.75\pm0.30\ \text{mgQE/g}$), although the inhibiton strength is weaker than kojic acid ($IC_{50}=11.07\pm0.86\ \mu\text{g/mL}$). The identified compounds that had tyrosinase inhibitory activity in the methanol extract were 2,4-dimethoxycinnamic acid; chalcone; 2,4-dihydroxybenzoic acid, 3TMS derivative; and benzenepropanoic acid, TMS derivative. The identified compounds that had tyrosinase inhibitory activity in the hexane fraction were 2,4-dimethoxycinnamic acid; chalcone; 2,6-dihydroxybenzoic acid, 3TMS derivative; phloretin, tetra(trimethylsilyl) ether; adenosine, 2'-O-methyl-; and 3-phenyllactic acid, 2TMS derivative.

Keywords: total flavonoid, total phenolic, tyrosinase, *Ulva lactuca*