

Aktivitas Antitirosinase dan Analisis Kandungan Flavonoid Ekstrak Daun Kelor (*Moringa oleifera*) Terstandar dengan *Liquid Chromatography-Mass Spectrometry*

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INTISARI

Latar Belakang: Hiperpigmentasi merupakan kondisi kulit yang mengalami perubahan warna menjadi lebih gelap dari warna kulit normalnya. Hiperpigmentasi terjadi karena melanin yang pada proses produksi, distribusi, dan transportasinya berlebihan. Hiperpigmentasi dapat dihambat oleh flavonoid yang terkandung dalam tanaman kelor dengan cara menghambat enzim tirosinase.

Tujuan: Penelitian ini bertujuan untuk mengkaji pengaruh dua metode ekstraksi: (a) maserasi dan (b) *ultrasound assisted extraction* (UAE) terhadap aktivitas antitirosinase dan menganalisis kandungan flavonoid ekstrak daun kelor terstandar dengan LC-MS/MS.

Metode: Uji aktivitas antitirosinase dilakukan secara *in vitro*. Persen penghambatan uji aktivitas antitirosinase dianalisis menggunakan *One Way ANOVA* dan dibandingkan antara dua metode ekstraksi yang digunakan. Analisis kandungan flavonoid dilakukan menggunakan LC-MS/MS dan hasilnya dibandingkan dengan database *Chemspider MzCloud*.

Hasil: Hasil penelitian menunjukkan bahwa uji aktivitas antitirosinase pada kedua ekstrak memiliki perbedaan yang signifikan ($p < 0,05$) dengan nilai *inhibitory concentration* 50% (IC_{50}) pada ekstrak maserasi sebesar 3492 $\mu\text{g/mL}$ dan ekstrak UAE sebesar 11042 $\mu\text{g/mL}$. Senyawa flavonoid yang terkandung pada kedua ekstrak diantaranya 6"-O-acetylisouquercitrin, isorhamnetin 3-glucoside, luteolin 7-O-malonylglucoside, apigetrin, isoquercetin, quercetin, quercitrin, rosinidin, kaempferol dan rutin.

Kesimpulan: Metode ekstraksi yang digunakan mempengaruhi aktivitas antitirosinase ekstrak etanol daun kelor dan terdapat perbedaan profil senyawa kimia dengan LC-MS/MS pada dua jenis hasil ekstraksi, namun terdapat kemiripan kandungan senyawa flavonoid.

Kata kunci: Maserasi, *Ultrasound Assisted Extraction* (UAE), Antitirosinase, Flavonoid, LC-MS/MS

Antityrosinase Activity and Analysis of Flavonoid Content in Standardized Moringa (Moringa oleifera) Leaf Extract with Liquid Chromatography-Mass Spectrometry

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ABSTRACT

Background: *Hyperpigmentation is a skin condition that changes color to darker than normal skin color. Hyperpigmentation occurs because of excessive melanin in the process of production, distribution, and transportation. Hyperpigmentation can be inhibited by the flavonoids contained in the Moringa plant by inhibiting the tyrosinase enzyme.*

AIM: *This study aimed to examine the effect of two extraction methods: (a) maceration and (b) ultrasound assisted extraction (UAE) on antityrosinase activity and to analyze the flavonoid content of Moringa leaf extract standardized by LC-MS/MS.*

Methods: *Antityrosinase activity test was conducted in vitro. The percent inhibition of the antityrosinase activity was analyzed using One Way ANOVA and compared between the two extraction methods used. Analysis of flavonoid content was carried out using LC-MS/MS and the results were compared with the Chemspider MzCLOUD database.*

Results: *The results showed that the antityrosinase activity test in the second extract had a significant difference ($p < 0.05$) with the inhibitory concentration value of 50% (IC₅₀) in the macerated extract of 3492 g/mL and the UAE extract of 11042 g/mL. The flavonoid compounds contained in the second extract include 6"-O-acetylisoquercitrin, isorhamnetin 3-glucoside, luteolin 7-O-malonylglucoside, apigetrin, isoquercetin, quercetin, quercitrin, rosinidin, kaempferol and rutin.*

Conclusions: *The extraction method used to influence the antityrosinase activity of the ethanolic extract of Moringa leaves and there are differences in the profile of chemical compounds with LC-MS/MS in the two types of extraction results, but there is a content of flavonoid compounds.*

Keywords: *Maceration, Ultrasound Assisted Extraction (UAE), Antityrosinase, Flavonoids, LC-MS/MS*