KANDUNGAN FENOLIK TOTAL DAN FLAVONOID TOTAL SERTA AKTIVITAS INHIBISI ENZIM TIROSINASE PADA EKSTRAK DAUN KELOR DENGAN ULTRASONIK SECARA *IN VITRO*

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Abstrak

Radiasi sinar ultraviolet (UV) berdampak pada sintesis melanin dalam tubuh berlebih sehingga menyebabkan berbagai masalah pada kulit. Enzim tirosinase berperan penting dalam proses pembentukan melanin. Pada daun kelor (*Moringa oleifera* L) terkandung banyak senyawa flavonoid dan fenolik yang berperan sebagai inhibitor enzim tirosinase. Penelitian ini bertujuan untuk analisis kandungan fenolik total dan flavonoid total serta aktivitas inhibisi enzim tirosinase secara *in vitro* pada ekstrak etanol daun kelor (*Moringa oleifera* L.) dengan *Ultrasound Assisted Extraction* (UAE) variasi frekuensi 30 kHz, 40 kHz, dan 50 kHz berbasis *true experimental* dengan rancangan penelitian *post-test only with control group design*. Hasil pengujian kandungan fenolik total dan kandungan flavonoid total memiliki nilai tertinggi pada frekuensi 40 kHz sebesar 383,90 mgGAE/g dan 53 mgQE/g. Pengujian inhibisi enzim tirosinase yang dilakukan dengan *microplate reader* enzimatik, didapatkan nilai inhibisi enzim tirosinase tertinggi pada frekuensi 50 KHz dengan nilai sebesar 15.550,79 ppm. Hasil inhibisi enzim kemudian dianalisis dengan uji *Kruskal-Wallis* dan uji *Mann-Whitney*, berdasarkan hasil uji terdapat perbedaan antar variasi frekuensi terhadap nilai IC_{50} namun tidak signifikan ($p>0,05$) serta *pearson correlation* antara variasi frekuensi dan nilai IC_{50} bersifat negatif dan sangat kuat.

Kata kunci: Daun kelor, Enzim Tirosinase, IC_{50}, Kandungan Fenolik dan Flavonoid Total, *Ultrasound Assisted Extraction*.

TOTAL PHENOLIC AND TOTAL FLAVONOID CONTENTS AND TYROSINASE ENZYME INHIBITION ACTIVITY OF MORINGA LEAF EXTRACT BY ULTRASONIC IN VITRO

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Abstract

Ultraviolet (UV) radiation results in excess melanin synthesis in the body, causing various skin problems. The tyrosinase enzyme plays an important role in the melanin synthesis process. Moringa leaves (*Moringa oleifera* L) contain many flavonoids and phenolic compounds that act as tyrosinase enzyme inhibitors. This study aims to analyze the total phenolic content and total flavonoids as well as tyrosinase enzyme inhibitory activity in vitro in ethanol extract of Moringa leaves with Ultrasound Assisted Extraction (UAE) frequency variations of 30 kHz, 40 kHz, and 50 kHz based on true experimental with post-test only with control group design. The test results of total phenolic content and total flavonoid content had the highest value at a frequency of 40 kHz at 383.90 mgGAE/g and 53 mgQE/g. Tyrosinase enzyme inhibition test conducted with enzymatic microplate reader, obtained the highest tyrosinase enzyme inhibition value at a frequency of 50 kHz with a value of 15,550.79 ppm. The results of enzyme inhibition were then analyzed by Kruskal-Wallis test and Mann-Whitney test, based on the test results there were differences between frequency variations on IC50 values but not significant ($p>0.05$) and Pearson correlation between frequency variations and IC50 values was negative and very strong.

Keywords: Moringa leaf, Tyrosinase enzyme, IC50, Total phenolic and flavonoid content, Ultrasound assisted extraction.