

AKTIVITAS INHIBISI TIROSINASE EKSTRAK ETANOL RIMPANG PACING (*Costus speciosus*)

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ABSTRAK

Melanin merupakan pigmen utama yang menentukan warna kulit, namun produksinya yang berlebihan dapat menyebabkan hiperpigmentasi seperti melasma. Enzim tirosinase memiliki peran penting dalam biosintesis melanin, sehingga penghambatan aktivitas enzim ini menjadi target utama dalam penanganan hiperpigmentasi. Penelitian ini bertujuan untuk mengetahui aktivitas inhibitor tirosinase dari ekstrak etanol rimpang pacing (*Costus speciosus*), menentukan nilai persen inhibisi, dan nilai IC_{50} -nya. Proses ekstraksi dilakukan dengan metode maserasi menggunakan etanol 96%. Penapisan fitokimia menunjukkan adanya kandungan flavonoid, alkaloid, tanin, saponin, steroid, dan senyawa fenolik. Uji aktivitas tirosinase dilakukan secara in vitro menggunakan metode ELISA, dengan substrat L-DOPA dan enzim mushroom tirosinase, serta pengukuran absorbansi pada panjang gelombang 490 nm. Hasil menunjukkan bahwa ekstrak etanol rimpang pacing memiliki aktivitas penghambatan enzim tirosinase dengan persentase inhibisi tertinggi sebesar 65,91% pada konsentrasi 10.000 ppm dan nilai IC_{50} sebesar 4542,35 ppm. Meskipun ekstrak menunjukkan aktivitas penghambatan, daya hambatnya tergolong lemah dibandingkan kontrol positif asam kojat yang memiliki IC_{50} sebesar 45,96 ppm. Dengan demikian, ekstrak rimpang pacing memiliki potensi sebagai agen anti-hiperpigmentasi alami, namun masih memerlukan pengembangan lanjutan untuk meningkatkan efektivitasnya.

Kata kunci: tirosinase, hiperpigmentasi, *Costus speciosus*, ELISA, IC_{50} , asam kojat

INHIBITORY ACTIVITY OF TYROSINASE BY THE ETHANOL EXTRACT OF COSTUS SPECIOSUS RHIZOME (*Costus speciosus*)

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ABSTRACT

Melanin is the primary pigment responsible for skin color; however, excessive melanin production can lead to hyperpigmentation disorders such as melasma. Tyrosinase is a key enzyme in melanin biosynthesis, making it a primary target for the treatment of hyperpigmentation. This study aims to evaluate the tyrosinase inhibitory activity of ethanol extract from *Costus speciosus* rhizome, determine its percentage of inhibition, and calculate the IC_{50} value. The extraction was performed by maceration using 96% ethanol. Phytochemical screening revealed the presence of flavonoids, alkaloids, tannins, saponins, steroids, and phenolic compounds. Tyrosinase inhibitory activity was tested in vitro using the ELISA method with L-DOPA as substrate and mushroom tyrosinase enzyme, and absorbance was measured at 490 nm. Results showed that the ethanol extract of *Costus speciosus* rhizome exhibited inhibitory activity with a maximum inhibition percentage of 65.91% at 10,000 ppm and an IC_{50} value of 4542.35 ppm. Although the extract demonstrated inhibitory activity, its potency was relatively weak compared to kojic acid (positive control), which had an IC_{50} of 45.96 ppm. Therefore, *Costus speciosus* rhizome extract shows potential as a natural anti-hyperpigmentation agent but requires further development to improve its efficacy.

Keywords: tyrosinase, hyperpigmentation, *Costus speciosus*, ELISA, IC_{50} , kojic acid