

Purwarupa Krim Anti Penuaan Ekstrak Daun Pandan (*pandanus amaryllifolius*)

Berdasarkan Aktivitas Inhibitor Enzim Tirosinase

ABSTRAK

Paparan radiasi ultraviolet secara terus-menerus memicu pembentukan spesies oksigen reaktif (*Reactive Oxygen Species/ROS*) yang menyebabkan stres oksidatif dan kerusakan komponen biologis sel. Kondisi ini berkaitan erat dengan peningkatan aktivitas enzim tirosinase, yaitu enzim kunci dalam proses biosintesis melanin yang dapat menyebabkan hiperpigmentasi. Penelitian ini bertujuan untuk mengevaluasi aktivitas antioksidan dan potensi inhibisi enzim tirosinase dari ekstrak etanol daun pandan wangi (*Pandanus amaryllifolius*) secara *in vitro*. Metode penelitian diawali dengan ekstraksi serbuk daun pandan wangi menggunakan pelarut etanol 70%. Selanjutnya, dilakukan skrining fitokimia kualitatif untuk mengidentifikasi kandungan metabolit sekunder. Uji aktivitas antioksidan dievaluasi menggunakan metode DPPH pada berbagai tingkat konsentrasi dengan pembanding Vitamin C. Uji penghambatan enzim tirosinase dilakukan secara spektrofotometri menggunakan substrat L-DOPA pada panjang gelombang 492 nm. Hasil Skrining fitokimia menunjukkan bahwa ekstrak mengandung senyawa metabolit sekunder berupa flavonoid, alkaloid, saponin, dan tanin. Uji antioksidan menggunakan metode DPPH menunjukkan bahwa pada konsentrasi 500 ppm, ekstrak mampu memberikan persentase inhibisi sebesar 97,73%, yang setara dengan efektivitas Vitamin C (99,36%). Pada pengujian enzim tirosinase dengan substrat L-DOPA, diperoleh nilai absorbansi blanko sebesar 0,794 dan absorbansi sampel sebesar 0,907. Meskipun absorbansi sampel lebih tinggi karena faktor warna intrinsik ekstrak, hasil perhitungan menunjukkan efektivitas penghambatan enzim yang sangat kuat sebesar 90,7%. Berdasarkan hasil penelitian, dapat disimpulkan bahwa ekstrak etanol daun pandan wangi (*Pandanus amaryllifolius*) memiliki potensi ilmiah yang besar sebagai agen terapeutik alami untuk mengatasi stres oksidatif dan menghambat proses melanogenesis pada gangguan pigmentasi kulit.

Kata Kunci: *Pandanus amaryllifolius*, Antioksidan, DPPH, Inhibitor Tirosinase, Melanin.

**Prototype of Anti-Aging Cream from Pandan Leaf Extract (*pandanus amaryllifolius*)
Based on Tyrosinase Enzyme Inhibitory Activity**

ASBTRACT

Continuous exposure to ultraviolet radiation triggers the formation of Reactive Oxygen Species (ROS), leading to oxidative stress and damage to cellular biological components. This condition is closely associated with increased activity of the tyrosinase enzyme, a key enzyme in the melanin biosynthesis process that can cause hyperpigmentation. This study aims to evaluate the antioxidant activity and tyrosinase enzyme inhibition potential of the ethanolic extract of pandan leaves (*Pandanus amaryllifolius*) in vitro. The research method began with the extraction of pandan leaf powder using 70% ethanol as a solvent. Subsequently, qualitative phytochemical screening was conducted to identify secondary metabolites. The antioxidant activity was evaluated using the DPPH method across various concentrations, with Vitamin C as the standard comparison. The tyrosinase enzyme inhibition assay was performed spectrophotometrically using L-DOPA as a substrate at a wavelength of 492 nm. Phytochemical screening revealed that the extract contains secondary metabolites, including flavonoids, alkaloids, saponins, and tannins. The antioxidant test using the DPPH method showed that at a concentration of 500 ppm, the extract achieved an inhibition percentage of 97.73%, which is comparable to the effectiveness of Vitamin C (99.36%). In the tyrosinase enzyme assay using L-DOPA as a substrate, the blank absorbance was 0.794, while the sample absorbance was 0.907. Although the sample absorbance was higher due to the extract's intrinsic color pigments, the calculation indicated a very strong enzyme inhibition effectiveness of 90.7%. In conclusion, the ethanolic extract of pandan leaves (*Pandanus amaryllifolius*) holds significant scientific potential as a natural therapeutic agent to counteract oxidative stress and inhibit melanogenesis in skin pigmentation disorders.

Keywords: *Pandanus amaryllifolius*, Antioxidant, DPPH, Tyrosinase Inhibitor, Melanin.