POTENTIAL OF *CINNAMOMUM CULILAWAN* (LAWANG) OIL AS AN ANTIDIABETIC MEDICINE MEDICINE USING IN VITRO AND IN SILICO METHOD

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ABSTRACT

Potential of *Cinnamomum culilawan* (lawang oil) as an antidiabetic medicine was conducted. The research was intended to analyze the inhibitory activity of Lawang oil against the α-amylase enzyme, to compare its effectiveness with pure eugenol and safrole, and analyze their interactions using multiple ligand simultaneous docking techniques. The research was started with the characterizing the chemical components of Lawang oil with Gas Chromatography-Mass Spectroscopy (GC-MS), conducting α-amylase inhibitory assays, and performing multiple ligand simultaneous docking. These experiments were conducted to assess the oil's potential in inhibiting α-amylase, a key enzyme in carbohydrate digestion.

Lawang oil has the ability to inhibit α-amylase, with inhibition decreasing as the concentration increased. The highest percentage inhibition of α-amylase was observed at the lowest concentration (1.25%), with a value of 62.69 ± 0.50%. Therefore, Lawang oil has the potential to be used as an antidiabetic medication. Then, the multiple ligand binding of the safrole-eugenol combination with α-amylase enzyme showed lower binding energy (-6.21 kcal mol^{-1}) compared to single ligand binding with eugenol (-5.89 kcal mol^{-1}) and safrole (-5.73 kcal mol^{-1}).

Keyword: *lawang oil, antidiabetic, α-amylase inhibition, Multiple Ligand Molecular Docking*

POTENSI MINYAK LAWANG SEBAGAI OBAT ANTIDIABETES MENGGUNAKAN METODE IN VITRO DAN IN SILICO

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ABSTRAK

Potensi *Cinnamomum culilawan* (minyak lawang) sebagai obat antidiabetes telah diteliti. Penelitian ini bertujuan untuk menganalisis aktivitas penghambatan minyak lawang terhadap enzim α-amilase, membandingkan efektivitasnya dengan eugenol dan safrol murni, serta menganalisis interaksi keduanya menggunakan teknik *Multiple Ligand Simultaneous Docking*. Penelitian dimulai dengan karakterisasi komponen kimia minyak lawang melalui Gas Chromatography-Mass Spectroscopy (GC-MS), pengujian penghambatan enzim α-amilase, dan melakukan *Multiple Ligand Simultaneous Docking*. Eksperimen ini dilakukan untuk menilai potensi minyak lawang dalam menghambat enzim α-amilase, yang merupakan enzim kunci dalam pencernaan karbohidrat.

Minyak lawang memiliki kemampuan untuk menghambat α-amilase, dengan penghambatan yang menurun seiring dengan peningkatan konsentrasi. Persentase penghambatan tertinggi terhadap α-amilase diamati pada konsentrasi terendah (1,25%) dengan nilai sebesar 62,69 ± 0,50%. Oleh karena itu, minyak lawang berpotensi digunakan sebagai obat antidiabetes. Selain itu, pengikatan multiple ligand dari kombinasi safrol-eugenol dengan enzim α-amilase menunjukkan energi pengikatan yang lebih rendah (-6,21 kkal/mol) dibandingkan pengikatan single ligand dengan eugenol (-5,89 kkal/mol) dan safrol (-5,73 kkal/mol).

Kata kunci: *minyak lawang, antidiabetes, inhibisi α-amilase, Multiple Ligand Simultaneous Docking*