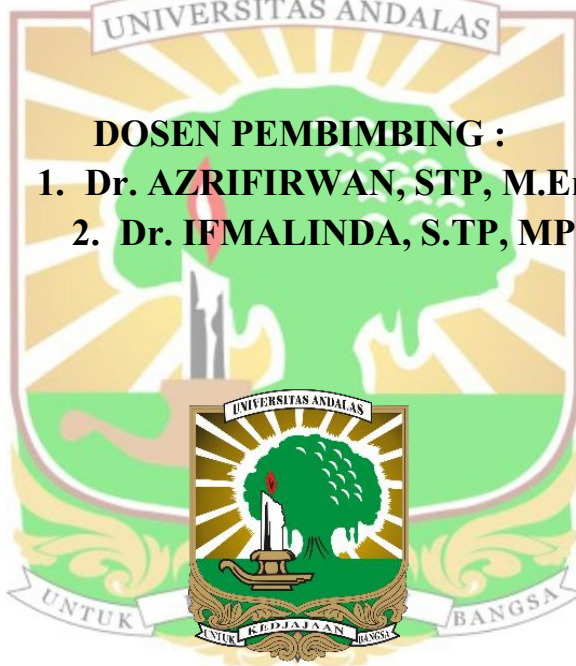


**ANALISIS *MICROWAVE ASSISTED EXTRACTION*
(MAE) DAN SIMULASI DISTRIBUSI SUHU
PADA EKSTRAKSI DAUN JERUK PURUT
(*Citrus hystrix* DC)**

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ANALISIS *MICROWAVE ASSISTED EXTRACTION* (MAE) DAN SIMULASI DISTRIBUSI SUHU PADA EKSTRAKSI DAUN JERUK PURUT (*Citrus hystrix* DC)

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ABSTRAK

Penelitian ini menyelidiki proses ekstraksi minyak atsiri dari daun jeruk purut (*Citrus hystrix* DC) menggunakan metode *microwave assisted extraction* (MAE) sebagai alternatif yang lebih efisien dan ramah lingkungan dibandingkan teknik distilasi konvensional. Penelitian ini bertujuan untuk mengkaji efektivitas metode MAE dalam meningkatkan rendemen dan kualitas minyak atsiri, serta mengevaluasi berbagai aspek teknis yang memengaruhi proses ekstraksi. Proses ekstraksi dilakukan dengan variasi daya 360 W dan 420 W selama 3 dan 4 jam, serta dua jenis perlakuan awal yaitu pengeringan kering angin dan paparan gelombang mikro. Hasil tertinggi sebesar 1,2% dengan kandungan citronellal dominan mencapai 78% diperoleh pada perlakuan daya 420 W selama 4 jam dengan *pretreatment* paparan *microwave*. Simulasi distribusi suhu dilakukan menggunakan pendekatan *computational fluid dynamics* (CFD). Dihasilkan model matematis untuk memprediksi rendemen minyak atsiri daun jeruk purut disajikan dalam bentuk persamaan regresi linear berganda $Y = 1,097 - 0,048X_1 + 0,003X_2 + 0,179X_3$ dengan koefisien determinasi (R^2) sebesar 0,927.

Kata Kunci : Daun jeruk purut, *Microwave Assisted Extraction*, Minyak atsiri, *Computational Fluid Dynamic*, Model Matematis.

ANALYSIS OF MICROWAVE ASSISTED EXTRACTION (MAE) AND SIMULATION OF TEMPERATURE DISTRIBUTION IN THE EXTRACTION OF KAFFIR LIME LEAVES (*Citrus hystrix* DC)

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ABSTRACT

This study investigates the process of extracting essential oil from kaffir lime leaves (*Citrus hystrix* DC) using microwave assisted extraction (MAE) as a more efficient and environmentally friendly alternative to conventional distillation techniques. The study aims to assess the effectiveness of the MAE method in improving the yield and quality of essential oil, as well as evaluating various technical aspects that influence the extraction process. The extraction process was conducted with power variations of 360 W and 420 W for 3 and 4 hours, respectively, along with two types of pretreatment air drying and *microwave* exposure. The highest yield of 1.2% with a dominant citronellal content of 78% was obtained at 420 W power for 4 hours with *microwave* exposure pretreatment. Temperature distribution simulations were performed using the computational fluid dynamics (CFD) approach. A mathematical model was developed to predict the essential oil yield of kaffir lime leaves, presented in the form of a multiple linear regression equation: $Y = 1.097 - 0.048X_1 + 0.003X_2 + 0.179X_3$, with a coefficient of determination (R^2) of 0.927.

Keywords : Kaffir Lime Oil, Microwave Assisted Extraction, Essential Oil, Computational Fluid Dynamics, Mathematical Model