PENENTUAN KONDISI OPTIMUM EKSTRAKSI KANDUNGAN ANTIOKSIDAN TOTAL DARI RIMPANG TEMULAWAK (*Curcuma xanthorrhiza* Roxb) MENGGUNAKAN *RESPONSE SURFACE METHODOLOGY* (RSM)

SKRIPSI SARJANA KIMIA

Oleh:

NADHYA ULHAQ

2110413006

Dosen Pembimbing I: Dr. Yefrida

Dosen Pembimbing II: Prof. Dr. Refilda

PROGRAM SARJANA

DEPARTEMEN KIMIA

FAKULTAS MATEMATIKA DAN ILMU PENGETAHUAN ALAM

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ABSTRACT

DETERMINATION OF OPTIMUM CONDITION EXTRACTION OF TOTAL ANTIOXIDANT CONTENT FROM TEMULAWAK RHIZOME (*Curcuma xanthorrhiza* Roxb) USING RESPONSE SURFACE METHODOLOGY (RSM)

by:

Nadhya Ulhaq (211013006)
Dr. Yefrida*, Prof.Dr.Refilda*
***Supervisor**

Curcuma xanthorrhiza Roxb, or temulawak, is a native Indonesian plant that has long been used as an ingredient in traditional medicine due to its bioactive compounds, particularly antioxidants. Antioxidants play a crucial role in neutralizing free radicals, which can lead to various degenerative diseases. One of the primary compounds functioning as an antioxidant in temulawak is curcuminoid. This study aims to determine the midpoint of the variables of temperature, time, and sample-to-solvent ratio as the basis for design in Response Surface Methodology (RSM), determine the optimal extraction conditions, and measure the total antioxidant content of temulawak rhizomes. The extraction method used is decoction, a traditional extraction technique commonly used by communities involving boiling the material with water as the solvent. The total antioxidant content in the extract was tested using spectrophotometry with DPPH reagent (2,2-diphenyl-1-picrylhydrazyl). To maximize the total antioxidant content obtained, process conditions such as temperature, time, and sample-to-solvent ratio need to be optimized. Extraction condition optimization was performed using RSM. Prior to that, the OFAT method was used to determine the experimental center point, which was then employed in the Central Composite Design (CCD) experimental design. The center point determined using the OFAT method was obtained at a temperature of 80°C, a time of 20 minutes, and a sample-to-solvent ratio of 1:25 (g/mL), which was used as the center point in the CCD design. Furthermore, the optimization results using the RSM method showed that the optimal conditions for extraction were a temperature of 90°C, a time of 30 minutes, and a sample-to-solvent ratio of 1:30. Under these conditions, the temulawak extract produced total antioxidants of 2,5152 mg AAE/g FW, which is very close to the predicted value of 2,5131 mg AAE/g FW. This indicates that the RSM model used is reliable in determining the optimal conditions for extracting total antioxidants from temulawak.

***Keywords**: Curcuma xanthorrhiza* Roxb*, Total antioxidant content, RSM, OFAT, DPPH*