

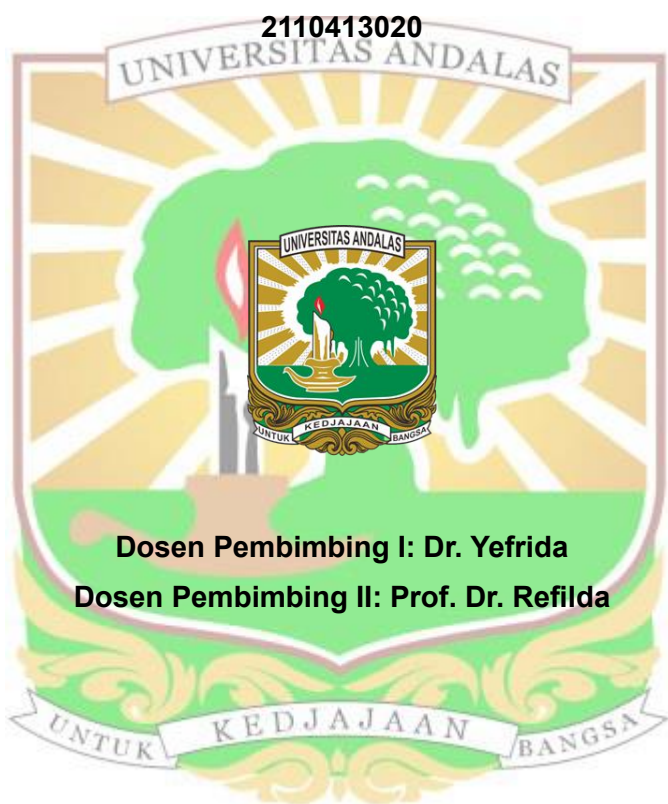
**PENENTUAN KONDISI OPTIMUM EKSTRAKSI KANDUNGAN  
ANTIOKSIDAN TOTAL DARI RIMPANG JAHE MERAH (*Zingiber  
officinale* var. *Rubrum*) MENGGUNAKAN *RESPONSE SURFACE  
METHODOLOGY* (RSM)**

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## ABSTRACT

### **Determination of Conditions Optimum Extraction of Total Antioxidant Content of Red Ginger Rhizome (*Zingiber officinale* var. *Rubrum*) Using Response Surface Methodology (RSM)**

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Oxidative stress occurs due to lack of antioxidants and excess free radicals in the body. If natural antioxidants are insufficient to neutralize free radicals in the body, then antioxidants are needed from outside, one of the plants that contain antioxidants is red ginger rhizome. The extraction method used is the decoction method, because this method is often used by the general public in extracting red ginger rhizomes. The purpose of this study is to determine the midpoint of the Response Surface Methodology (RSM) method obtained from the optimum conditions of extraction using the One Factor at a time (OFAT) method, determine the optimum conditions of extraction using the RSM method, and determine the total antioxidant content obtained from the optimum conditions of extraction using the RSM method. Determination of optimum extraction conditions in red ginger rhizome using RSM method Central Composite Design (CCD) design with test factors namely extraction temperature, extraction time, and sample to solvent ratio. Initial tests were carried out by the OFAT method first by varying one factor while the other factors were kept constant to determine the midpoint to be used in the range of test parameter limits in the RSM-CCD method. The results of optimizing the extraction conditions with the OFAT method were at a temperature of 80°C, a time of 40 minutes, and a sample ratio of 1:20 g/mL. Total antioxidant content was measured using the 2,2-diphenyl-1-1-picrylhydrazyl (DPPH) method and absorbance was measured using a UV-Vis spectrophotometer. The results of the study using the RSM method showed that the optimum extraction conditions were at a temperature of 90°C, a time of 50 minutes, and a sample to solvent ratio of 1:25 g/mL with a maximum total antioxidant content of 3,7811 mg AAE/g FW. This antioxidant content value is close to the predicted value of RSM which is 3,8759 mg AAE/g FW. The ANOVA model showed a p value <0,05, meaning that extraction temperature, extraction time, and sample to solvent ratio had a significant effect on the total antioxidant content response. Based on the results, it can be concluded that RSM method is an effective method to optimize the extraction conditions of total antioxidant compounds in samples.

**Keywords :** *Red ginger rhizome, Total antioxidant content, DPPH, RSM, OFAT*

