

***Optimization of Solvent Ratio and Stepwise Extraction Temperature on the
Yield of Polar Mango Seed Extract***

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ABSTRACT

Indonesia is one of the largest mango producers in the world, with a production volume of approximately 3,3 million tons in 2023, generating a substantial amount of mango seed waste. Mango seeds contain both polar and non-polar bioactive compounds with potential applications; however, their utilization remains limited. This study aims to determine the optimum conditions for the stepwise extraction of polar extracts from mango seed kernels using Response Surface Methodology (RSM) with a Central Composite Design, with yield as the response variable. The extraction parameters varied were temperature (45–50 °C) and solvent-to-material ratio (3:1 – 5:1). The quadratic model was suggested by the system, with an R-square (R^2) value of 0,9628, indicating optimum conditions at a temperature of 52,095°C and a solvent-to-material ratio of 4,094 : 1, with a predicted yield of 27,932%. Validation through three replicates yielded an actual average extract yield of 27,856%, and a one-sample T-Test showed no significant difference from the predicted value, resulting in an accuracy of 99,730%. The best extract exhibited a pH of 4,56, antioxidant activity (IC_{50}) of 5,919 µg/ml, Vitamin C content of 0,585%, and antimicrobial activity with a minimum inhibitory concentration (MIC) of 12,5 mg/ml and a minimum bactericidal concentration (MBC) of 25 mg/ml.

Keywords: *Stepwise Extraction, Polar Extract of Mango Seed Kernel, Response Surface Methodology, MIC (Minimum Inhibitory Concentration), MBC (Minimum Bactericidal Concentration).*