Pemodelan Kinetika Proses Pengeringan Jamur Merang (*Volvariella volvacea*) Menggunakan Teknik Osmotik-Microwave

(Kinetic Modelling of Straw Mushroom (Volvariella volvacea) Drying Process Using Osmotic-Microwave Technique)

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ABSTRACT

Straw mushrooms (*Volvariella volvacea*) are a high-value commodity with a short shelf life of 1-2 days due to their high moisture content of up to 90%. This study aims to determine a mathematical kinetic model, analyze the effective moisture diffusivity ($_{Deff}$) value, and evaluate the energi efficiency of straw mushroom drying using a combination of osmotic dehydration and microwave. Pre-treatment with osmotic dehydration using a 20% NaCl solution at a temperature of 60-70°C for 30 minutes, followed by microwave drying at varying power levels: Low, Medium-Low, and Medium-High. The result showed that the 30 minute osmotic pretreatment effectively reduced the initial moisture content through a Water Loss mechanism of 35,02% and a Solid Gain of 9,34%. During the microwave drying stage, Medium-High power proved to be the most efficient with the fastest drying time (3,5 minutes), compared to Low power (15,5 minutes) and Medium-Low power (8,5 minutes). Among the 13 models tested, the Hii et al. model was the best for Low and Medium-Low power, while the most accurate model for Medium-High power was the Page model. The effective diffusivity value ($_{Deff}$) increased with increasing power, ranging from $9{,}775\times10^{-9}$ to $5{,}124\times10^{-8}$ m^2/s. Energy analysis showed that Medium-High power had the highest exergy efficiency of 9,85%.

Keywords: straw mushrooms, osmotic dehydration, microwave drying, drying kinetics, energy efficiency.