

MATHEMATICAL MODELING OF MICROWAVE DRYING OF BIOMASS- BAGASSE AND RICE HUSK

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Abstract

Microwave drying being a rapid dehydration technique gives improved drying rate and precise drying. It can be applied to biomass. Online measurements of temperature and moisture are difficult at microwave frequencies. Modeling helps to predict moisture content at different drying time, and helps to achieve optimum heating of a material. The objective of this research was to understand the drying kinetics of bagasse and rice husk undergoing microwave drying and to propose best model which correlates moisture ratio and drying time at different microwave output powers. The effect of microwave drying on moisture content, moisture ratio, drying rate, drying time of bagasse and rice husk was investigated. According to statistical parameters χ^2 , root mean square error, residual sum of squares and modeling efficiency the performance of drying models is evaluated. The multiple regressions on the coefficients of Page model gave the successful results and showed to satisfactorily represent microwave drying of bagasse and rice husk. The kinetics of moisture ratio during microwave drying revealed that higher microwave powers reduced the drying time and accelerated the drying process.

Keywords: microwave drying; bagasse; rice husk; modeling; drying kinetics.