

## INTISARI

Metode pengeringan yang diterapkan dalam industri pembuatan tepung salah satunya adalah *pneumatic drying*. Berbagai macam variabel baik dari sifat-sifat bahan yang dikeringkan maupun kondisi proses pengeringan sangat mempengaruhi kualitas hasil pengeringan. *Fineness Modulus (FM)*, kadar air bahan ( $ka$ ), koefisien perpindahan panas konveksi ( $h$ ), dan kapasitas output ( $Q_o$ ) merupakan variabel-variabel yang penting dalam evaluasi proses pengeringan dan kualitas dari tepung yang dihasilkan. Tujuan dari penelitian ini adalah untuk mencari hubungan matematis antara *FM* dengan variabel-variabel kondisi proses pengeringan pneumatik ( $Q_i$ ,  $Q_o$ ,  $D_{pr}$ ,  $T_{bo}$ ,  $V_u$ ,  $T_u$ ,  $\theta$ , dan  $g$ ), hubungan matematis antara  $ka$  dengan variabel-variabel kondisi proses pengeringan pneumatik ( $\rho_{pr}$ ,  $Q_i$ ,  $T_{bo}$ ,  $T_u$ ,  $D_{pr}$ ,  $\theta$ , dan  $V_u$ ), hubungan matematis antara  $h$  dengan variabel-variabel kondisi proses pengeringan pneumatik ( $T_{bo}$ ,  $T_u$ ,  $D_{pr}$ ,  $V_u$ ,  $Q_i$ ,  $\rho_{pr}$ , dan  $C_{ppr}$ ), dan hubungan matematis antara  $Q_o$  dengan variabel-variabel kondisi proses pengeringan pneumatik ( $Q_o$ ,  $V_u$ ,  $D_p$ ,  $P_p$ ,  $g$ ,  $Q_i$ ,  $D_{pr}$ , dan  $\rho_{pr}$ ). Untuk dapat mewujudkan tujuan-tujuan tersebut telah dirancang peralatan *pneumatic drying* dan dilakukan pengujian dengan berbagai macam variasi perlakuan seperti kapasitas input, kecepatan udara pengering, diameter partikel tepung, dan temperatur udara pengering.

Berdasarkan hasil analisis data-data hasil penelitian, diperoleh hubungan antara *FM*,  $ka$ ,  $h$ , dan  $Q_o$  dengan variabel-variabel proses pengeringan. Ke empat Persamaan tersebut mempunyai nilai koefisien determinasi yang cukup besar, sehingga dapat digunakan untuk memprediksi *fineness modulus*, kadar air bahan, koefisien perpindahan panas konveksi, dan kapasitas output pada pengeringan tepung kasava secara pneumatik.

**Kata kunci:** Tepung kasava, *pneumatic drying*, analisis dimensi, *fineness modulus*, kadar air, koefisien perpindahan panas konveksi, kapasitas output

## ABSTRACT

One of the drying methods, which are applied in the industry of flour production, is that pneumatic drying. A wide variety of the variables that are from both of the characteristics of the dried material and drying process condition greatly affect the quality of drying result. Fineness modulus (FM), moisture content of the materials ( $k_a$ ), heat transfer coefficient ( $h$ ) and output capacity ( $Q_o$ ) are the important variables in determining evaluation of drying process the quality of the result flour. The purpose of this research are to find out the mathematical relationship between FM with the variables ( $Q_i$ ,  $Q_o$ ,  $D_{pr}$ ,  $T_{bo}$ ,  $V_u$ ,  $T_u$ ,  $\theta$ , and  $g$ ) of pneumatic drying process condition, to find out the mathematical relationship between  $K_a$  with the variables ( $\rho_{pr}$ ,  $Q_i$ ,  $T_{bo}$ ,  $T_u$ ,  $D_{pr}$ ,  $\theta$ , and  $V_u$ ) of pneumatic drying process condition, to find out the mathematical relationship between  $h$  with the variables ( $T_{bo}$ ,  $T_u$ ,  $D_{pr}$ ,  $V_u$ ,  $Q_i$ ,  $\rho_{pr}$ , and  $C_{ppr}$ ) of pneumatic drying process condition, and to find out the mathematical relationship between  $Q_o$  with the variables ( $Q_o$ ,  $V_u$ ,  $D_p$ ,  $P_p$ ,  $g$ ,  $Q_i$ ,  $D_{pr}$ , and  $\rho_{pr}$ ) of pneumatic drying process condition. In order to realize this goal, pneumatic drying equipment has been designed and tested with a wide variety of treatments such as the input capacity, drying air velocity, particle's flour diameter, and temperature of air dryer as well.

Based on the result research of data analysis, it is able to obtain the relationship between FM,  $k_a$ ,  $h$ ,  $Q_o$  value and the drying process variables. The fourth equation have quite high coefficient of determination, and potentially usable for predicting fineness modulus, moisture content, heat transfer coefficient and output capacity of drying kasava flour in metode pneumatic.

**Keywords:** Cassava flour, pneumatic drying, dimensional analysis, fineness modulus, moisture content, heat transfer coefficient, output capacity