

## INTISARI

### **Analisis Teknis Pengaruh Suhu Pengeringan Dan Kecepatan *Blower Cyclone* Pengeluaran Bahan Terhadap Sifat Fisik Tepung Talas (*Xanthosoma Sagittifolium*) Pada Proses Pengeringan Menggunakan *Pneumatic Conveying Recirculated Dryer***

Impor gandum Indonesia mencapai 9.9 juta ton pada tahun 2017. Di sisi lain, Indonesia memiliki komoditas lokal seperti umbi talas yang dapat ditepungkan dan untuk mensubstitusi gandum. Namun dalam pengolahan tepung talas, produsen mengalami kendala dalam proses pengeringan talas ketika musim hujan tiba. Sehingga untuk mengatasi permasalahan tersebut, maka dibutuhkan pengering mekanis yang tepat agar proses pengeringan menjadi efisien. Dewasa ini, telah berkembang pengering mekanis yang mengkombinasikan perpindahan panas, massa dan pengangkutan secara *pneumatic* dan teresirkulasi yang disebut *Pneumatic Conveying Resirculated Dryer* (PCRD). Pengeringan tepung talas menggunakan PCRD harus mampu mengurangi kadar air tanpa menurunkan kualitas tepung. Penelitian ini bertujuan untuk mengkaji pengaruh suhu udara pengeringan dengan kecepatan *blower cyclone* pengeluaran bahan terhadap kualitas fisik tepung talas hasil pengeringan menggunakan *Pneumatic Conveying Recirculated Dryer*. Variasi udara pengering yang digunakan adalah 75°C, 100 °C dan 125 °C serta kecepatan *blower* 12,75 m/s, 14,25 m/s dan 15,75 m/s. Proses pengeringan dilakukan menggunakan sampel 1,5 kg dengan kadar air 50-60% sampai dengan kadar air dibawah 13%. Dalam penelitian ini, dilakukan analisis mutu hasil pengeringan meliputi kadar air akhir, *whiteness*, densitas, *fineness modulus* dan diameter bahan. Selain itu dilakukan analisis proses pengeringan meliputi *Specific Energy Utilization*, efisiensi pemanasan, efisiensi pengeringan, efisiensi produksi, *Heat Utilization Factor*, *Coefficient of Performance*, *Effective Heat Efficiency*, kinetik laju pengeringan, suhu kolom pengering, dan waktu pengeringan. Secara umum hasil dari penelitian ini antara lain mutu hasil pengeringan meliputi kadar air akhir berkisar antara 5 – 11 %, *whiteness* berkisar antara 82-90, densitas gembur berkisar antara 0.46 – 0.72 g/cm<sup>3</sup>, densitas padat berkisar antara 0.62 – 0.98 g/cm<sup>3</sup> dan diameter bahan berkisar antara 0.13 – 0.24 mm. Analisis proses pengeringan meliputi *Specific Energy Utilization* berkisar antara 14 – 24 MJ/kg, efisiensi pemanasan berkisar antara 76 – 98%, efisiensi pengeringan berkisar antara 7 – 13 %, efisiensi produksi berkisar antara 71 – 85 %, *Heat Utilization Factor* berkisar antara 70 – 80%, *Coefficient of Performance* berkisar antara 20 – 30 %, *Effective Heat Efficiency* berkisar antara 77 – 87 %, kinetik laju pengeringan berkisar antara  $7 \times 10^{-5}$  hingga  $10 \times 10^{-5}$ , suhu udara kolom pengering berkisar antara 65 - 100 °C, waktu pengeringan berkisar antara 1100 – 1900 detik.

Kata kunci : Analisis teknis, *Xanthosoma sagittifolium*, Suhu Pengeringan, Kecepatan *blower cyclone* pengeluaran bahan, *Pneumatic Conveying Recirculated Dryer*

## ABSTRACT

### **Technical Analysis Influence of Drying Temperature and Cyclone Output Blower Velocity against Physical Characteristics of Taro Flour (*Xanthosoma Sagittifolium*) in Drying Process Using a Pneumatic Conveying Recirculated Dryer**

Indonesia's wheat grain import reaches 9.9 million tonnes in 2017. In the other hand, Indonesia have got its own commodities such as taro. Taro can be powderized and potentially substitute wheat flour. But, drying process of taro flour becomes problematic in rainy season. In the recent years, a drying machinery Pneumatic Conveying Recirculated Dryer (PCRD) combines the principles of mass transfer, heat transfer, and pneumatic system. One of advantages of PCRD is that it will not degrade the quality of the flour while still manage to reduce water content. The purpose of this research is to evaluate the correlation between drying temperature and velocity of cyclone output blower against physical properties of taro flour. The variation of drying temperature are 75, 100 and 125 °C, while the variation in blower velocity are 12.75, 14.25, and 15.75 m/s. The drying process uses 1.5 kg sample with water content 50-60%. The drying process is to reduce the water content down to 13%. In this research, the drying process cover Specific Energy Utilization, drying efficiency, heating efficiency, production efficiency, Heat Utilization Factor, Coefficient of Performance, Effective Heat Efficiency, drying rate kinetics, temperature of chamber, consumed time, and physical properties such as water content, whiteness, density, fineness modulus and diameter. The research shows that on average SEU ranged between 14 – 24 MJ/kg, heat efficiency ranged between 76 – 98%, drying efficiency ranged between 7 – 13 %, production efficiency ranged between 71 – 85 %, *Heat Utilization Factor* ranged between 70 – 80%, *Coefficient of Performance* ranged between 20 – 30 %, *Effective Heat Efficiency* ranged between 77 – 87 %, drying rate kinetics ranged between  $7 \times 10^{-5}$  -  $10 \times 10^{-5}$ , temperature of chamber ranged between 65 - 100 °C, consumed time ranged between 1100 – 1900 sekon, final water content ranged between 5 – 11 %, *whiteness* ranged between 82-90, uncompact bulk density ranged between 0.46 – 0.72 g/cm<sup>3</sup>, compacted bulk density ranged between 0.62 – 0.98 g/cm<sup>3</sup> dan diameter ranged between 0.13 – 0.24 mm.

Keyword : Technical Analysis, *Xanthosoma sagittifolium*, Drying Temperature, blower cyclone Output Velocity, Pneumatic Conveying Recirculated Dryer