

ABSTRAK

Analisis Teknis Pengaruh Suhu Dan Kecepatan *Blower* Udara Pendinger Terhadap Sifat Fisik Tepung Talas (*Xanthosoma sagittifolium*) Pada Proses Pendingeran Menggunakan *Pneumatic Conveying Recirculated Dryer*

Secara geografis iklim di Indonesia yang cocok untuk pertanian padi, menjadi salah satu faktor beras dijadikan makanan pokok penduduk Indonesia sejak jaman dahulu. Selain itu karena pengaruh globalisasi saat ini, Indonesia juga impor gandum untuk memenuhi kebutuhan yang diolah menjadi tepung. Di sisi lain Indonesia memiliki potensi umbi talas dengan produktivitas 30 ton/ha dan produksi nasional sebesar 57 ribu ton/tahun. Salah satu dari pengolahan umbi talas adalah dijadikan menjadi tepung talas. *Pneumatic Conveying Recirculated Dryer* (PCRD) merupakan alat pendinger tepung talas yang menggunakan prinsip perpindahan panas dan massa dengan sangat cepat sehingga dihasilkan produk dengan kualitas yang baik. Penelitian ini bertujuan untuk mengkaji pengaruh suhu dan kecepatan blower udara pendinger terhadap kualitas fisik tepung talas menggunakan *Pneumatic Conveying Recirculated Dryer*. Variasi udara pendinger yang digunakan adalah 75°C, 100 °C dan 125 °C serta kecepatan *blower* udara pendinger 15 m/s, 28 m/s dan 31 m/s. Proses pendingeran dilakukan menggunakan sampel 1 kg dengan kadar air 50-60%. Dalam penelitian ini, dilakukan analisis mutu hasil pendingeran meliputi kadar air akhir, *whiteness*, densitas, *fineness modulus* dan diameter bahan. Selain itu dilakukan analisis proses pendingeran meliputi *Specific Energy Utilization*, efisiensi pemanasan, efisiensi pendingeran, efisiensi produksi, *Heat Utilization Factor*, *Coefficient of Performance*, *Effective Heat Efficiency*, kinetik laju pendingeran, suhu kolom pendinger, dan waktu pendingeran. Secara umum hasil dari penelitian ini antara lain mutu hasil pendingeran meliputi kadar air akhir berkisar antara 7 – 15%, *whiteness* berkisar antara 89-94, densitas gembur berkisar antara 0.44 – 0.49 g/cm³, densitas padat berkisar antara 0.56 – 0.65 g/cm³ dan diameter bahan berkisar antara 0.19 – 0.25 mm. Analisis proses pendingeran meliputi *Specific Energy Utilization* berkisar antara 18 – 36 MJ/kg, efisiensi pemanasan berkisar antara 46 – 92%, efisiensi pendingeran berkisar antara 5 – 11 %, efisiensi produksi berkisar antara 70 – 89 %, *Heat Utilization Factor* berkisar antara 69 – 88%, *Coefficient of Performance* berkisar antara 12 – 31 %, *Effective Heat Efficiency* berkisar antara 78 – 95 %, kinetik laju pendingeran berkisar antara 3 x 10⁻⁵ hingga 8 x 10⁻⁵, suhu udara kolom pendinger berkisar antara 56 - 81 °C, waktu pendingeran berkisar antara 1100 – 1400 detik.

Kata Kunci : Analisis Teknis, *Xanthosoma sagittifolium*, *Pneumatic Conveying Recirculated Dryer*, Suhu Pendingeran, Kecepatan Udara Pendinger.

ABSTRACT

Technical Analysis of the Effect of Temperature and Dryer Air Blower Speed on the Physical Properties of Taro Flour (*Xanthosoma sagittifolium*) in the Drying Process Using Pneumatic Conveying Recirculated Dryer

Geographically the climate in Indonesia which is suitable for rice farming has become one of the factors in rice being the staple food of the Indonesian population since ancient times. Besides, due to the influence of globalization at this time, Indonesia also imports wheat to meet the needs that are processed into flour. On the other hand, Indonesia has the potential of taro tubers with a productivity of 30 tons/ha and a national production of 57 thousand tons/year. One of the processing of taro tubers is made into taro flour. Pneumatic Conveying Recirculated Dryer (PCRD) is a taro flour dryer that uses the principle of heat and mass transfer very quickly so that a good quality product is produced. This study aims to examine the effect of temperature and speed of dryer air blowers on the physical quality of taro flour using Pneumatic Conveying Recirculated Dryer. The variations of drying air used are 75 ° C, 100 ° C and 125 ° C and the drying air blower speeds are 15 m / s, 28 m / s and 31 m / s. The drying process is carried out using a 1 kg sample with a water content of 50-60%. In this study, an analysis of the quality of the results of drying includes final water content, whiteness, density, fineness modulus, and material diameter. Also, the drying process analysis includes Specific Energy Utilization, heating efficiency, drying efficiency, production efficiency, Heat Utilization Factor, Coefficient of Performance, Effective Heat Efficiency, kinetic drying rate, drying column temperature, and drying time. In general, the results of this study include the quality of drying results including final water content ranging from 7-15%, whiteness ranging from 89-94, loose density ranging from 0.44 - 0.49 g / cm³, solid density ranging from 0.56 - 0.65 g / cm³ and the diameter of the material ranges from 0.19 - 0.25 mm. Analysis of the drying process includes the Specific Energy Utilization ranging from 18 - 36 MJ / kg, heating efficiency ranging from 46 - 92%, drying efficiency ranges from 5 - 11%, production efficiency ranges from 70 - 89%, Heat Utilization Factor ranges from 69 - 88%, Coefficient of Performance ranges from 12 - 31%, Effective Heat Efficiency ranges from 78 - 95%, kinetic rate drying ranges from 3 x 10⁻⁵ to 8 x 10⁻⁵, drying column air temperature ranges from 56 - 81 ° C, drying time ranges from 1100 - 1400 seconds.

Keywords: Technical Analysis, *Xanthosoma sagittifolium*, Pneumatic Conveying Recirculated Dryer, Drying Temperature, Drying Air Speed.