PERPINDAHAN PANAS DAN MASSA PENGERINGAN *CHIPS* PORANG (*Amorphophallus muelleri*) MENGGUNAKAN *CABINET DRYER* DENGAN PENAMBAHAN NATRIUM SULFIT

INTISARI

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Chip porang merupakan produk olahan umbi porang yang dirajang dan dikeringkan serta digunakan sebagai bahan baku utama dalam produksi tepung glukomanan. Kualitas chip porang dipengaruhi oleh proses pengeringan dan proses *pre-treatment* yang dilakukan. Perendaman irisan porang dengan larutan pencegah browning (natrium sulfit) dapat mencegah terjadinya oksidasi enzimatis selama proses pengeringan meskipun dapat meningkatkan kadar air irisan porang sebelum dikeringkan. Tujuan penelitian ini adalah menentukan nilai koefisien perpindahan panas konveksi dan konstanta laju pengeringan berdasarkan perpindahan panas dan massa pada proses pengeringan chips porang dan mengkarakterisasi kualitas chips porang yang dikeringkan dengan variasi ketebalan, penambahan natrium sulfit, dan kondisi suhu pengeringan.

Irisan porang sebanyak 3 kg direndam dalam larutan sulfit 0,4% selama 15 menit, kemudian ditiriskan, dan dikeringkan menggunakan cabinet dryer dengan variasi suhu 50, 60, dan 70^{o}C. Selama proses pengeringan, perubahan massa, suhu dan warna sampel diamati dengan interval waktu tertentu selama 24 jam. Data perubahan suhu dan kadar air digunakan untuk menganalisis koefisien perpindahan panas konveksi (h) dan konstanta laju pengeringan (k_p) yang dihitung secara simultan menggunakan metode runge kutta. Sedangkan data perubahan warna digunakan untuk menganalisis nilai *whiteness index*

Hasil penelitian menunjukkan bahwa nilai koefisien perpindahan panas konveksi (h) pada rentang 24,602 – 73,048 W/m^{2}°C dan nilai konstanta laju pengeringan (k_p) pada rentang 3,636 – 16,775 $\%_{b.k/jam}$. Kadar air akhir chip porang yang dikeringkan pada suhu 60, dan 70^{o}C memenuhi standar SNI (<12%), sedangkan pengeringan pada suhu 50^{o}C belum mampu menghasilkan chip porang yang memenuhi standar SNI. Nilai *whiteness index* sampel pemberian natrium sulfit lebih tinggi dibanding tanpa natrium sulfit.

Kata kunci: Konveksi; Laju pengeringan; Natrium sulfit; Pindah panas; Porang

HEAT AND MASS TRANSFER DURING DRYING OF PORANG *CHIPS* (*Amorphophallus muelleri*) USING CABINET DRYER WITH SODIUM SULPHITE ADDITION

ABSTRACT

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Porang chips are processed products of the porang tuber, which is sliced, dried, and used as the primary raw material in producing glucomannan flour. The quality of porang chips is influenced by the drying and *pre-treatment* processes. Soaking the sliced porang in a browning prevention solution (sodium sulfite) can prevent enzymatic oxidation during the drying process, although it may increase the moisture content of the sliced porang before drying. This study aims to determine the values of convective heat transfer coefficient and drying rate constant based on heat and mass transfer in the drying process of porang chips and to characterize the quality of dried porang chips with variations in thickness, the addition of sodium sulfite, and drying temperature conditions.

Three kilograms of sliced porang were soaked in a 0.4% sulfite solution for 15 minutes, drained, and dried using a cabinet dryer with temperature variations of 50, 60, and 70oC. During the drying process, sample mass, temperature, and color changes were observed at regular intervals for 24 hours. The data on temperature and moisture content changes were used to analyze the convective heat transfer coefficient (h) and drying rate constant (k_p), which were calculated simultaneously using the Runge-Kutta method. Meanwhile, the data on color changes were used to analyze the *whiteness index* value.

The results showed that the convective heat transfer coefficient (h) ranged from 24.602 to 73.048 $W/m^{2o}C$, and the drying rate constant (k_p) ranged from 3.636 to 16.775 $\%_{db/hour}$. The final moisture content of porang chips dried at 60 and 70^oC met the SNI standard (<12%), while drying at 50^oC could not produce porang chips that met the SNI standard. The *whiteness index* value of the samples with added sodium sulfite was higher than that of non-sodium sulfite.

Keywords: Convection; Drying rate; Heat transfer; Sodium sulphite; Porang