

**KARAKTERISTIK PENGERINGAN UMBI PORANG (*Amorphophallus muelleri* Blume) MENGGUNAKAN TIGA JENIS CABINET DRYER
DENGAN PENAMBAHAN SULFUR MELALUI METODE PENGASAPAN**

INTISARI

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Chips porang merupakan produk pangan yang dihasilkan dari umbi porang yang melalui tahapan perajangan dan pengeringan. Kualitas *chips* porang sangat dipengaruhi oleh proses pengeringan dan proses *pre-treatment*. Proses *pre-treatment* dengan pengasapan sulfur dapat mencegah terjadinya *browning* secara enzimatis maupun non-enzimatis meskipun dapat memberikan residu sulfit pada produk *chips* porang. Tujuan dilakukannya penelitian ini adalah mengkarakterisasi kualitas *chips* porang secara fisik dan kimia yang dikeringkan menggunakan tiga jenis *cabinet dryer* dengan penambahan sulfur melalui metode pengasapan. Selain itu, penelitian ini bertujuan untuk menentukan nilai koefisien perpindahan panas konveksi dan konstanta laju pengeringan proses pengeringan *chips* porang.

Proses pengolahan umbi porang menjadi *chips* porang kering melalui tahapan pencucian, perajangan 5 mm hingga pengeringan. Proses *pre-treatment* dilakukan menggunakan sulfur yang dibakar dan dimasukkan ke dalam ruang tertutup bersama dengan *chips* porang selama 30 menit. Kemudian umbi porang yang telah dirajang dan diasap menggunakan sulfur dikeringkan menggunakan *cabinet dryer* dengan suhu 80⁰C. Selama proses pengeringan, perubahan massa dan suhu diamati pada interval waktu tertentu selama pengeringan 6 jam yang nantinya data tersebut digunakan untuk menganalisis koefisien perpindahan panas konveksi (h) dan konstanta laju pengeringan (kp) yang dihitung menggunakan metode runge kutta. Selain itu, karakteristik fisik dan kimia yang diamati, yaitu kadar air, rendemen, viskositas, warna, kadar abu, kadar glukomanan, kadar kalsium oksalat, dan kadar residu sulfit.

Hasil pengeringan mampu menurunkan kadar air irisan umbi porang dari 78,18 - 80,80% menjadi 6,58 – 9,54% dengan laju pengeringan (kp) pada rentang 16,17 – 21,61/jam dan menghasilkan rendemen total 15,56 – 19,58%. Kualitas *chips* porang yang dihasilkan memiliki *whitness index* 42,17 – 54,48 dengan nilai tertinggi sampel *chips* pengasapan sulfur dari Perhutani. Kadar glukomanan yg dihasilkan pada rentang 38,48 – 46,38 %, kadar abu (5,94 – 6,33 %), kadar kalsium oksalat (0,974 – 1,249%), dan viskositas pada (1537,78 - 2488,78 mPa.s.). Adapun residu sulfur yang dihasilkan berada pada rentang 127,56 – 327,09 ppm dan lolos standar China. Perpindahan konveksi termasuk dalam jenis konveksi paksa dengan nilai (h) pada rentang 25,02 – 28,59 W/m² °C.

Kata kunci : *chips* porang, karakterisasi, laju pengeringan, pengasapan sulfur.

CHARACTERISTICS OF DRYING PORANG TUBERS (*Amorphophallus muelleri* Blume) USING THREE TYPES OF CABINET DRYERS WITH SULFUR ADDITION THROUGH SMOKING METHOD

ABSTRACT

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Porang chips are a food product made from porang tubers that have undergone slicing and drying processes. The quality of porang chips is greatly influenced by the drying process and pre-treatment process. Pre-treatment with sulfur fumigation can prevent enzymatic and non-enzymatic browning, although it can leave sulfite residues on the porang chip product. The purpose of this research is to characterize the physical and chemical quality of porang chips dried using three types of cabinet dryers with the addition of sulfur through the fumigation method. In addition, this research aims to determine the value of the convection heat transfer coefficient and the drying rate constant of the porang chip drying process.

The processing of porang tubers into dried porang chips involves several steps, including washing, slicing into 5 mm pieces, and drying. The pre-treatment process is carried out using sulfur that is burned and placed in a closed chamber with the porang chips for 30 minutes. The sliced and sulfur-smoked porang tubers are then dried using a cabinet dryer at a temperature of 80°C. During the drying process, changes in mass and temperature are observed at certain time intervals during the 6-hour drying period. This data is then used to analyze the convective heat transfer coefficient (h) and drying rate constant (k_p), which are calculated simultaneously using the Runge-Kutta method. In addition, the physical and chemical characteristics observed are moisture content, yield, viscosity, color, ash content, glucomannan content, calcium oxalate content, and sulfite residue content.

The drying results were able to reduce the water content of porang tuber slices from 78.18 - 80.80% to 6.58 - 9.54% with a drying rate (k_p) in the range of 16.17 - 21.61/hour and produced a total yield of 15, 56 – 19.58%. The quality of the porang chips produced has a whiteness index of 42.17 – 54.48 with the highest value for the sulfur fumigation chips sample from Perhutani. The glucomannan content produced is in the range of 38.48 – 46.38 %, the ash content is (5.94 – 6.33 %), the calcium oxalate content is (0.974 – 1.249%), and the viscosity is (1537.78 - 2488.78 mPa .s.). The sulfur residue produced is in the range of 127.56 – 327.09 ppm and passes Chinese standards. Convection transfer is included in the type of forced convection with a value (h) in the range 25.02 – 28.59 W/m² °C.

Keywords: porang chips, characterization, drying rate, sulfur fumigation