

## INTISARI

### **PERPINDAHAN PANAS DAN MASSA PADA PENGERINGAN *CHIP* PORANG (*Amorphophallus muelleri* Blume) MENGGUNAKAN *CABINET DRYER* DAN KARAKTERISASI KUALITAS PRODUK**

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Porang (*Amorphophallus muelleri* Blume) merupakan salah satu jenis tanaman umbi-umbian yang banyak dijumpai di Indonesia. Tanaman ini memiliki kandungan glukomanan dan memiliki potensi yang tinggi untuk dibudidayakan. *Chip* porang merupakan salah satu contoh pengolahan umbi porang yang dapat meningkatkan nilai jual dari porang. Kualitas *chip* porang yang dihasilkan di Indonesia masih rendah, akibat proses pengeringan dengan menggunakan metode penjemuran sinar matahari langsung. Penelitian ini bertujuan untuk memperoleh menentukan nilai koefisien perpindahan panas konveksi ( $h$ ) dan konstanta laju pengeringan ( $k$ ) berdasarkan perpindahan panas dan massa pada proses pengeringan *chip* porang menggunakan *cabinet dryer* dan karakterisasi produk

Pembuatan *chip* porang dilakukan menggunakan *cabinet dryer*. Pengeringan dilakukan dengan variasi penempatan *chip* porang pada 3 lokasi rak yang berbeda. Selama pengeringan dilakukan pengamatan terhadap perubahan massa, suhu, dan warna *chip* porang selama 12 jam. Data suhu dan kadar air yang diperoleh digunakan untuk analisis koefisien perpindahan panas konveksi ( $h$ ) dan konstanta laju pengeringan ( $k$ ) menggunakan metode Runge-Kutta. Selain itu dilakukan analisis kualitas fisik dan kimia lain meliputi kadar air, kadar abu, warna, kadar glukomanan, dan kadar kalsium oksalat.

Hasil penelitian menunjukkan bahwa nilai koefisien perpindahan panas konveksi ( $h$ ) berkisar antara 5,61–13,74 W/m<sup>2</sup>.°C. Sementara itu konstanta laju pengeringan ( $k$ ) berkisar antara 7,00–11,04/jam. Kualitas fisik *chip* porang yang dihasilkan meliputi kadar air berada pada kisaran 7,98–12,59% (w.b) tergolong pada kelas mutu I, kadar abu 3,72–4,45% pada kelas mutu I dan II, *whiteness index* antara 35,26–44,04%, konstanta laju perubahan warna berkisar -0,054 hingga -0,030/jam. Kualitas kimia meliputi kadar glukomanan berkisar antara 37,00–45,64%. dan tergolong pada kelas mutu I. Sementara itu kadar kalsium oksalat berkisar antara 200,16–390,29 mg/100 g. Variasi rak hanya berpengaruh signifikan pada kadar abu, *whiteness index* dan nilai konstanta laju perubahan warna *chip* porang.

Kata kunci: laju pengeringan; kualitas fisik dan kimia; porang; glukomanan, oksalat.

## ABSTRACT

### Heat and Mass Transfer in Drying Porang Chip (*Amorphophallus muelleri* Blume) Using Cabinet Dryer and Product Quality Characterization

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Porang (*Amorphophallus muelleri* Blume) is one of the tuberous plant species commonly found in Indonesia. This plant contains glucomannan and has high potential for cultivation. Porang chip are an example of processing porang tubers that can increase the value of porang. The quality of porang chip produced in Indonesia is still low due to the drying process using direct sunlight drying methods. This research aims to determine the values of convection heat transfer coefficient ( $h$ ) and drying rate constant ( $k_p$ ) based on heat and mass transfer in the drying process of porang chip using a cabinet dryer and product characterization.

Porang chip were made using a cabinet dryer. Drying was carried out with variations in the placement of porang chip on 3 different shelves. During drying, observations were made on changes in mass, temperature, and color of porang chip for 12 hours. The temperature and moisture data obtained were used for the analysis of convection heat transfer coefficient ( $h$ ) and drying rate constant ( $k_p$ ) using the Runge-Kutta method. In addition, other physical and chemical quality analyses were conducted, including moisture content, ash content, color, glucomannan content, and calcium oxalate content.

The research results showed that the values of the convection heat transfer coefficient ( $h$ ) ranged from 5,61–13,74 W/m<sup>2</sup>.°C. Meanwhile, the drying rate constant ( $k$ ) ranged from 7,00–11,04/hour. The physical quality of the porang chip produced included moisture content ranging from 7,98–12,59% (w.b), classified as grade I, ash content ranging from 3,72–4,45%, classified as grades I and II, whiteness index ranging from 35,26–44,04%, and the rate constant of color change ranging from -0,054 to -0,030/hour. Chemical quality included glucomannan content ranging from 37–45,64%, classified as grade I, while calcium oxalate content ranged from 200,16–390,29 mg/100 g. Shelf variation only significantly affected ash content, whiteness index, and the rate constant of color change of porang chip.

Keywords: drying rate; physical and chemical quality; porang; glucomannan, oxalate.