EVALUASI KUALITAS *CHIPS* DAN TEPUNG PORANG (*Amorphophallus oncophyllus*) PADA BERBAGAI UMUR PANEN DAN UKURAN UMBI

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INTISARI

Porang (*Amorphophallus oncophyllus*) mengandung glukomanan yang dapat dimanfaatkan pada industri pangan, industri farmasi, dan industri kimia. Teknologi ekstraksi glukomanan dari porang dapat dilakukan dengan tahapan perajangan porang, pengeringan *chips* porang, penggilingan, dan penghilangan kalsium oksalat tepung porang serta esktraksi tepung porang menjadi glukomanan. Kandungan glukomanan dalam porang dipengaruhi oleh umur tanaman porang dan bobot umbi yang dapat dikorelasikan sebagai ukuran umbi. Penelitian ini bertujuan untuk mengevaluasi kualitas *chips* dan tepung porang pada berbagai umur panen dan ukuran umbi.

Porang sebanyak 13 – 20 kg dicuci dan dirajang menggunakan *slicer* dengan ketebalan ± 7 mm, kemudian dikeringkan menggunakan *cabinet dryer* pada suhu 50^{o}C selama 24 jam. *Chips* porang dengan kadar air ± 12% digiling menggunakan *disk mill*, diayak menggunakan ayakan *Tyler* dan dihembus menggunakan *cyclone separator* untuk menghilangkan kalsium oksalat. Selama pengeringan dilakukan pengukuran perubahan berat sampel *chips*, suhu, densitas, dan warna dengan interval waktu satu jam. Pengukuran kualitas tepung porang dilakukan pada akhir proses yang meliputi pengukuran kadar air, warna, densitas, viskositas, kadar glukomanan, dan distribusi ukuran partikel. Data perubahan berat sampel digunakan untuk menentukan perubahan kadar air yang selanjutnya dianalisis untuk menghitung konstanta laju pengeringan (k). Data perubahan suhu untuk menentukan koefisien perpindahan panas konveksi (h). Penentuan nilai k dan h menggunakan persamaan keseimbangan massa dan panas pada proses pengeringan, yang dianalisis menggunakan metode Runge Kutta. Perubahan kualitas warna dan densitas *chips* porang dianalisis menggunakan persamaan kinetika untuk menentukan konstanta laju perubahan fisik. Selain kualitas fisik, dihitung juga rendemen total tepung porang dari umbi porang segar sampai tepung porang hembus yang memiliki umur panen dan ukuran berbeda.

Hasil penelitian menunjukkan laju konstanta pengeringan *chips* porang pada berbagai umur panen dan ukuran umbi berkisar antara 2,11 – 2,60 per hari dan koefisien perpindahan panas konveksi 5,778 – 8,33 J/m^{2}.^{o}C.s. Konstanta laju perubahan kualitas fisik *chips* porang berdasarkan warna 0,044 – 0,091 per jam dan densitas 0,070 – 0,156 per jam. *Chips* porang memiliki kualitas rerata *whiteness* 30,257 – 38,365 % dan rerata densitas 0,716 – 0,889 g/cm^{3}. Sedangkan tepung porang memiliki kualitas warna dengan nilai *whiteness* 54,948 – 65,643 %, densitas 0,609 – 0,780 g/cm^{3}, viskositas 5111,112 – 6555,556 mPas, kadar glukomanan 32,410 – 42,990 %, dan rata-rata diameter partikel 0,224 – 0,266

mm. Rendemen dari porang segar menjadi *chips* porang berkisar antara 13,517 – 18,149%, rendemen *chips* porang menjadi tepung porang setelah hembus antara 45,025 – 71,980% dan rendemen dari porang segar menjadi tepung porang setelah hembus sebesar 8,172 – 11,971%. Kecenderungan kualitas *chips* porang menunjukkan semakin tua umur panen porang maka warna *chips* semakin cerah dan densitas semakin menurun. Sedangkan kualitas tepung porang menunjukkan semakin tua umur panen porang maka warna tepung semakin gelap, densitas semakin menurun, kadar glukomanan dan viskositas semakin tinggi.

Hasil uji statistik diperoleh bahwa terdapat perbedaan nyata pada umur panen dan ukuran umbi terhadap kualitas fisik *chips* porang berdasarkan *whiteness* dan densitas. Selain itu, terdapat perbedaan nyata pada kualitas tepung porang yang meliputi kadar air, warna, densitas, kadar glukomanan dan viskositas.

Kata kunci: umur panen, ukuran umbi, *chips* porang, tepung porang, kualitas

EVALUATION OF CHIPS AND PORANG FLOUR (*Amorphophallus oncophyllus*) QUALITY BASED ON VARIOUS HARVEST AGES AND TUBER SIZES

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ABSTRACT

Porang (*Amorphophallus oncophyllus*) contains glucomannan which can be used in the food industry, pharmaceutical industry and chemical industry. Extraction technology from porang can be done by chopping, drying, milling, removing calcium oxalate from porang flour and extracting porang flour into glucomannan. The glucomannan is influenced by the age of the porang plant and the weight of the tuber which can be correlated as tuber size. This study aims to evaluate the quality of chips and porang flour at various harvest ages and tuber sizes.

The number of 13 to 20 kgs of Porang is washed and chopped using a slicer with a thickness of about 7 mm, then dried using a cabinet dryer at 50^{o}C in 24 hours. Porang chips with ± 12% moisture content are ground using a disk mill, sieved using a Tyler sieve and blown using a cyclone separator to remove calcium oxalate. During drying, changes in sample weight, temperature, density, and color are measured with one hour intervals. Measurement of the quality of porang flour is carried out at the end of the process which includes measurements of moisture content, color, density, viscosity, glucomannan content, and particle size distribution. The changes in sample weight data are used to determine changes in water content which is analyzed to calculate the drying rate constant (k). Temperature changes data to determine the convection heat transfer coefficient (h). Determination of k and h values use the equations of mass and heat balance in the drying process, which are analyzed using the Runge Kutta method. Changes in color quality and density of porang chips are analyzed using kinetics equations to determine the constant rate of physical change. In addition to physical quality, the total yield of porang flour is also calculated from fresh porang tubers to blown porang flour which have different harvest ages and sizes.

The results show the constant drying rate of porang chips at various harvesting ages and tuber sizes ranged from 2.11 to 2.60 per day and the convection heat transfers coefficient of 5.778 - 8.33 J/m^2.^{o}C.s. The constant rate of change in the physical quality of chips porang is based on color 0.044 - 0.091 per hour and density 0.070 - 0.156 per hour. Porang chips have an average quality of whiteness 30.257 - 38.365% and an average density of 0.716 - 0.889 g/cm^3. Porang flour has color quality with whiteness values of 54.948 - 65.643%, density 0.609 - 0.780 g/cm^3, viscosity of 5111,112 – 6555,556 mPas, glucomannan content 32.410 - 42.990%, and an average particle diameter of 0,224 – 0266 mm. The yield from fresh porang to chips porang ranges from 13,517 – 18,149%, the

yield of chips porang to porang flour after blowing between 45,025 – 71,980% and the yield from fresh porang to porang flour after blowing between 8,172 – 11,971%.The trend of porang chips quality shows that the older the harvest age of the porang is, the brighter the chips' color and the decreasing of the density. Meanwhile, the quality of porang flour shows that the older the porang harvest is, the darker the color of the flour, the lower the density, the higher the glucomannan content and viscosity.

The results of statistical tests show that there are significant differences in the age of harvest and tuber size on the physical quality of porang chips based on whiteness and density. In addition, there are significant differences in the quality of porang flour which includes moisture content, color, density, glucomannan content and viscosity.

Keywords: harvest age, tubers size, porang chips, porang flour, quality