

## KINETIKA EKSTRAKSI DAN KARAKTERISASI GLUKOMANAN DARI VARIASI TEPUNG PORANG (*Amorphophallus oncophyllus*) YANG DIPROSES DENGAN PERLAKUAN PENYOSOHAN

### INTISARI

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Kualitas glukomanan dipengaruhi oleh kualitas bahan baku tepung porang yang digunakan. Beberapa penelitian terdahulu membuktikan bahwa metode dan proses pembuatan tepung porang berdampak pada kualitas glukomanan yang dihasilkan. Akan tetapi, belum ada penelitian terkait kecepatan ekstraksi dan karakterisasi glukomanan dari berbagai tepung porang yang diproses dengan perlakuan penyosohan. Tujuan penelitian ini adalah mengkaji kinetika ekstraksi dan karakterisasi glukomanan dari variasi tepung porang yang diproses dengan perlakuan penyosohan. Dalam penelitian ini, tepung porang yang diproses dengan variasi frekuensi penyosohan diekstraksi secara kimia dengan pelarut etanol. Tahapan utama ekstraksi meliputi, pelarutan tepung porang ke air panas (ekstraksi tahap 1), penyaringan supernatan, presipitasi dengan etanol (ekstraksi tahap 2), pengeringan, penggilingan dan pengayakan. Kecepatan proses ekstraksi tahap 1, penyaringan supernatan dan ekstraksi tahap 2 dianalisis menggunakan kinetika avrami. Kualitas glukomanan dikarakterisasi dengan parameter rendemen, kadar air, pH, viskositas, kelarutan, warna, transparansi, diameter granula tepung glukomanan, kadar glukomanan dan kadar kalsium oksalat. Pengaruh variasi tepung porang terhadap kualitas glukomanan dianalisis menggunakan ANOVA.

Selama proses ekstraksi glukomanan dari berbagai kualitas tepung porang menunjukkan kecepatan ekstraksi tahap 1 berada pada kisaran 0,0002 – 0,346 mPa.s/menit, kecepatan penyaringan supernatan 0,0102 – 0,0237 mL/menit dan kecepatan ekstraksi tahap 2 0,0755 – 0,6887 g/detik. Hasil karakterisasi sifat kimia tepung glukomanan dari berbagai tepung porang menunjukkan kadar glukomanan berkisar 70,16 – 92,17% dan kadar kalsium oksalat 0,014 – 0,024%. Sedangkan, hasil karakterisasi sifat fisik untuk rendemen 38,67 – 72,67%; kadar air 6,16 – 9,86 %wb; pH 6,63 – 6,87; viskositas 8.000 – 30.000 mPa.s; kelarutan 99,04 – 99,15%; derajat warna putih 48,67 – 80,73%; transparansi 6,95 – 66,4% dan diameter granula tepung glukomanan 0,04 – 0,07 mm. Nilai kadar air dan pH sudah memenuhi standar komersial China dan Eropa. Sedangkan, nilai kadar kalsium oksalat tepung glukomanan sudah memenuhi batas aman untuk konsumsi perhari. Kualitas glukomanan terbaik diperoleh dari tepung porang yang diproses dengan perlakuan penggilingan menggunakan *hammer mill* dan penyosohan dengan frekuensi dua kali. Hasil analisis statistik menunjukkan adanya pengaruh perlakuan penggilingan dan penyosohan pada pembuatan tepung porang terhadap kualitas tepung glukomanan yang meliputi kadar glukomanan, viskositas, kelarutan, warna dan transparansi. Penyosohan dengan frekuensi yang lebih banyak pada pembuatan tepung porang menghasilkan tepung glukomanan dengan kualitas yang lebih baik.

Kata kunci: ekstraksi, glukomanan, penyosohan, tepung porang

## EXTRACTION KINETICS AND CHARACTERIZATION OF GLUCOMANN FROM VARIATIONS OF PORANG FLOUR (*Amorphophallus oncophyllus*) PROCESSED WITH POLISHING TREATMENT

### ABSTRACT

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The quality of glucomannan is influenced by the quality of the porang flour raw materials used. Several previous studies have proven that the method and process of making porang flour has an impact on the quality of the glucomannan produced. However, there has been no research regarding the extraction speed and characterization of glucomannan from various porang flours processed using polishing treatment. The aim of this research is to examine the extraction kinetics and characterization of glucomannan from variations of porang flour processed with polishing treatment. In this research, porang flour processed with varying polishing frequencies was chemically extracted with ethanol solvent. The main stages of extraction include dissolving porang flour in hot water (extraction stage 1), filtering the supernatant, precipitation with ethanol (extraction stage 2), drying, grinding and sieving. The speed of the extraction process in stage 1, filtering of the supernatant and extraction in stage 2 were analyzed using Avrami kinetics. The quality of glucomannan is characterized by the parameters yield, water content, pH, viscosity, solubility, color, transparency, glucomannan flour granule diameter, glucomannan content and calcium oxalate content. The effect of variations in porang flour on the quality of glucomannan was analyzed using ANOVA.

During the extraction process of glucomannan from various qualities of porang flour, the stage 1 extraction speed was in the range of 0.0002 – 0.346 mPa.s/minute, the supernatant filtration speed was 0.0102 – 0.0237 mL/minute and the stage 2 extraction speed was 0.0755 – 0.6887 g/sec. The results of characterization of the chemical properties of glucomannan flour from various porang flours showed glucomannan levels ranging from 70.16 – 92.17% and calcium oxalate levels from 0.014 – 0.024%. Meanwhile, the results of the characterization of physical properties for the yield were 38.67 – 72.67%; water content 6.16 – 9.86 %wb; pH 6.63 – 6.87; viscosity 8,000 – 30,000 mPa.s; solubility 99.04 – 99.15%; degree of whiteness 48.67 – 80.73%; transparency 6.95 – 66.4% and glucomannan flour granule diameter 0.04 – 0.07 mm. The water content and pH values meet Chinese and European commercial standards. Meanwhile, the calcium oxalate content of glucomannan flour has met the safe limit for daily consumption. The best quality glucomannan is obtained from porang flour which is processed by milling using a hammer mill and polishing with twice the frequency. The results of statistical analysis show that there is an influence of milling and polishing treatments in making porang flour on the quality of glucomannan flour which includes glucomannan content, viscosity, solubility, color and transparency. Polishing with greater frequency in making porang flour produces glucomannan flour of better quality.

Keywords: extraction, glucomannan, polishing, porang flour