KARAKTERISASI PATI BERPORI DARI GANYONG (*Canna edulis* Kerr.) YANG DIHASILKAN DENGAN HIDROLISIS ENZIM ALFA AMILASE TERMOSTABIL

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ABSTRAK

Porous starch (pati berpori) merupakan pati termodifikasi yang memiliki pori-pori dipermukaan granulanya, sehingga sering diaplikasikan pada berbagai bidang industri seperti pangan, pertanian, dan farmasi sebagai bahan enkapsulasi maupun adsorben. Beberapa penelitian telah menggunakan umbi dan serealia seperti beras, jagung dan kentang sebagai bahan dalam pembuatan *porous starch*, namun penelitian *porous starch* dengan menggunakan bahan berupa ganyong belum pernah dilakukan. Ganyong berpotensi digunakan sebagai bahan baku *porous starch* karena mengandung kadar pati dan amilosa yang tinggi. Penelitian ini bertujuan untuk melakukan karakterisasi pati berpori dari pati ganyong (*Canna edulis* Kerr.) yang dihasilkan dengan proses hidrolisis enzimatis menggunakan -amilase termostabil. Pada penelitian ini, suspensi pati ganyong (25%, w/v) dihidrolisis enzimatis dengan -amilase termostabil dengan dua konsentrasi yaitu 100 u/g (AMS-100) dan 300 u/g (AMS-300) pada suhu sub-gelatinisasi pati (60°C) selama 8 jam. *Porous starch* yang terbentuk diendapkan dengan sentrifugasi kemudian dikeringkan dengan oven pada suhu 40°C, 48 jam. *Dry porous starch* dilakukan analisis meliputi kadar air, warna, kadar amilosa, solubilitas (S) dan *swelling power* (SP), absorbsi minyak dan air (AC), kapasitas adsorpsi (AR), morfologi granula pati (SEM), *Fourier Transform Infrared Spectroscopy* (FT-IR) dan *X-ray diffraction* (XRD). Produk *dry porous starch* kontrol, AMS-100 dan AMS-300 secara berurut memiliki karakteristik granula berpori dengan kadar air (10,70%, 9,08 % dan 7,83%), rendemen (93,66%, 56,67% dan 61,96%), kadar amilosa (38,27%, 32,31% dan 34,89%), kelarutan (5,36%, 75,21% dan 78,51%), *swelling capacity* (5,21 g/g, 2,51 g/g dan 2,24 g/g), kapasitas absorpsi air (79,55%, 84,62% dan 75,16%), kapasitas absorpsi minyak (69,47%, 111,21% dan 86,32%)

dan kapasitas absorpsi metilen biru (32,34%, 19,22% dan 14,15%). *Porous starch* ganyong memiliki tipe kristalin A. Proses hidrolisis tidak mengakibatkan adanya perubahan struktur pati ditandai dengan tidak adanya pergeseran *peak* pada spektra FTIR. Penambahan konsentrasi enzim memperbesar ukuran pori dan mengakibatkan penurunan kemampuan pati seperti absorpsi minyak, air, maupun metilen biru. Oleh karenanya, konsentrasi enzim alfa amilase termostabil 100 U/g merupakan konsentrasi enzim terbaik pada penelitian ini untuk menghasilkan pati berpori dari ganyong.

Kata kunci : *Porous starch*, ganyong, *Canna edulis*   rr   -amilase terrmostabil.

CHARACTERIZATION OF POROUS STARCH FROM EDIBLE CANNA (*Canna edulis* Kerr.) PRODUCED BY ENZYMATIC HYDROLYSIS USING THERMOSTABLE ALPHA AMYLASE

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ABSTRACT

Porous starch is a modified starch that has pores on the surface of the granules, so it is often applied to various industrial fields such as food, agriculture, and pharmaceuticals as encapsulations and absorbent materials. Several studies have used tubers and cereals such as rice, corn, and potatoes as ingredients in the manufacture of porous starch, but research on porous starch using ingredients in the form of *ganyong* (*Canna edulis* Kerr.) has never been carried out. Canna has the potential to be used as raw material for porous starch because it contains high levels of starch and amylose. This study aimed to characterize the porous starch of canna starch (*Canna edulis* Kerr.) produced by enzymatic hydrolysis using thermostable α-amylase. In this study, *ganyong* stach suspension (25%, w/v) was enzymatically hydrolyzed with thermostable alpha-amylase with two concentrations, namely 100 u/g (AMS-100) and 300 u/g (AMS-300) at sub-gelatinization temperature of starch (60°C) for 8 hours. The formed porous starch was precipitated by centrifugation and dried in an oven at 40°C, 48 hours. Dry porous starch was analyzed, including moisture content, color, amylose content, solubility (S) and swelling power (SP), oil and water absorption (AC), adsorption capacity (AR), starch granule morphology (SEM), Fourier Transform Infrared Spectroscopy (FT-IR) and X-ray diffraction (XRD). Dry porous starch products control, AMS-100 and AMS-300 respectively have the characteristics of porous granules with moisture content (10.70%, 9.08 % and 7.83%), yield (93.66%, 56.67% and 61.96%), amylose content (38.27%, 32.31% and 34.89%), solubility (5.36%, 75.21% and 78.51%), swelling capacity (5.21 g/g, 2.51 g/g and 2.24 g/g), water absorption capacity (79.55%, 84.62% and 75.16%), oil absorption capacity (69.47%, 111.21% and 86.32%), and methylene blue absorption capacity (32.34%, 19.22% and 14,15%). The porous

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starch of canna has a crystalline type A. The hydrolysis process did not change the starch structure, which was indicated by the absence of a peak shift in the FTIR sprectra. The addition of enzyme concentration increases the pore size and results in a decrease in the ability of starch such as absorption of oil, water, and methylene blue. Therefore, the thermostable alpha amylase enzyme concentration of 100 U/g was the best enzyme concentration in this study to produce porous starch from canna.

Keywords : Porous starch, *ganyong*, *Canna edulis* Kerr., thermostable -amylase.