

## ABSTRACT

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Snake fruit (*Salacca zalacca*) is one of the typical fruits from Indonesia. *Pondoh* is one of the snake fruit species largely found in Yogyakarta. The kernels of snake fruit are wastes at a high percentage and contain cellulose. Cellulose can be processed into methyl cellulose that is an additional food ingredient. The study aims at examining the synthesis and characterization of methyl cellulose through optimizing the concentration of NaOH, dimethyl sulfate and reaction temperature.

The study was conducted by extracting cellulose using NaOH with various concentrations of 4, 8, 12, 16 and 20%. Dehemicellulose and bleaching were done to dilute hemicellulose and lignin. The characterization of cellulose was shown by yield, ash content, OHC, cellulose content, lightness, crystallinity, and functional group using FT-IR. The optimization of methyl cellulose was done using RSM on the various concentrations of NaOH (10, 15, 20, 25, 30%), dimethyl sulfate (2, 3, 4, 5, 6 ml), and temperature (45, 50, 55, 60, 65°C). NaOH served to change the crystalline region and formed Na-cellulose. Dimethyl sulfate is substituting agent and temperature create appropriate conditions for reaction. The characteristics of methyl cellulose included yield, ash content, WHC, OHC, solubility, viscosity, lightness, crystallinity, and functional group using FT-IR.

The results of the study showed that the characteristics of cellulose from snake fruit kernels with the concentration of 4% NaOH were yield of 28.17%, ash content of 1.85%, lightness of 89.23; OHC of 2.18 g/g; crystallinity of 28.80%, and cellulose content of 72.25%. FT-IR in the cellulose of snake fruit kernels had pattern similar to that of commercial cellulose. The optimum condition of methyl cellulose was at concentration of 10.91% NaOH; 3.52 ml of dimethyl sulfate, and at a temperature of 46.51°C. Methyl cellulose produced had a substitution degree of 1.43; lightness of 83.28; WHC of 3.93 g/g; as well as OHC of 2.41 g/g; ash content of 4.43%; solubility of 7.66%; viscosity of 3.32 cps; crystallinity of 19.68 %, and yield of 109.69%. It can be concluded that the FT-IR spectra of methyl cellulose from snake fruit kernels had pattern similar to that of commercial methyl cellulose.

**Keywords:** snake fruit kernels, cellulose, methyl cellulose

## INTISARI

Salak merupakan salah satu jenis buah khas dari Indonesia. Salak pondoh merupakan salah satu jenis salak yang banyak dijumpai di Yogyakarta. Biji salak sebagai limbah persentasenya dan mengandung selulosa. Selulosa dapat diolah menjadi metil selulosa yang merupakan bahan tambahan pangan. Tujuan penelitian adalah sintesis dan karakterisasi metil selulosa dengan optimasi pada konsentrasi NaOH, dimetil sulfat dan suhu.

Penelitian dilakukan dengan cara ekstraksi selulosa menggunakan NaOH dengan variasi konsentrasi 4, 8, 12, 16 atau 20 %. Selanjutnya proses dehemiselulosa dan *bleaching* bertujuan melarutkan hemiselulosa dan lignin. Karakterisasi selulosa ditunjukkan dari rendemen, kadar abu, OHC, kadar selulosa, *lightness*, kristalinitas dan gugus fungsi menggunakan FT-IR. Proses optimasi metil selulosa menggunakan RSM pada variasi konsentrasi NaOH (10, 15, 20, 25, 30 %), dimetil sulfat (2, 3, 4, 5, 6 ml), dan suhu (45, 50, 55, 60, 65 °C). NaOH berperan mengubah daerah kristalin dan membentuk Naselulosa. Dimetil sulfat sebagai agen pensubstitusi dan suhu berperan dalam menciptakan kondisi yang mendukung untuk reaksi. Karakteristik metil selulosa ditunjukkan dari rendemen, kadar abu, WHC, OHC, kelarutan, viskositas, *lightness*, kristalinitas dan gugus fungsi menggunakan FT-IR.

Hasil penelitian menunjukkan bahwa karakteristik selulosa biji salak dengan konsentrasi NaOH 4 % adalah rendemen 28,17 %; kadar abu 1,85 %; *lightness* 89,23; OHC 2,18 g/g; kristalinitas 28,80 % dan kadar selulosa 72,25 %. Spektra FT-IR pada selulosa biji salak mempunyai pola yang sama dengan selulosa komersial. Kondisi optimum metil selulosa pada konsentrasi NaOH 10,91 %, dimetil sulfat 3,52 ml dan suhu 46,51 °C. Metil selulosa yang dihasilkan memiliki derajat substitusi 1,43; *lightness* 83,28; WHC 3,93 g/g; serta OHC pada 2,41 g/g; kadar abu 4,43 %. Kelarutan 73,66 %; viskositas 3,32 cps; kristalinitas 19,68 % serta rendemen 109,69 %. Berdasarkan penelitian diketahui bahwa spektra FT-IR metil selulosa biji salak memiliki pola yang hampir sama dengan metil selulosa komersial.

Kata kunci : biji salak, selulosa, metil selulosa.