INTISARI

Biji kakao (*Theobroma cacao* L.) bermanfaat sebagai bahan utama dalam industri coklat sedangkan kulit biji kakao merupakan limbah dari industri kakao. Produksi biji kakao Indonesia tahun 2013 sebesar 720.862 ton dengan 90.107 ton kulit biji kakao yang merupakan limbah. Kulit biji kakao memiliki selulosa 11-13,7%, hemiselulosa 8% sehingga peningkatan nilai ekonomis dari kulit biji dapat dibuat produk turunan selulosa. Tujuan dari penelitian ini adalah 1) mengetahui pengaruh konsentrasi NaOH, penambahan NaMCA dan suhu reaksi karboksimtilasi pada sintesis CMC terhadap nilai derajat substitusi, 2) memperoleh kondisi optimum sintesis CMC kulit biji kakao berdasarkan derajat substitus yang masuk dalam standar *food grade*, dan 3) mengetahui karakteristik CMC dengan derajat substitusi *food grade.*

Penelitian dilakukan dua tahapan yaitu isolasi selulosa dari kulit biji kakao yang kemudian selulosa dimodifikasi menjadi *carboxy methyl cellulosa* (CMC). Sintesa CMC dilakukan dengan selulosa yang dialkalisasi menggunakan NaOH 1,59%;5%;10%;15% dan18,41% pada 25 º C selama 1 jam. NaMCA ditambahkan 2,32 ;3 ;4 ;5 dan 5,68 g pada suhu 46,59 ;50 ;55 ;60 ; dan 63,41ºC selama 3 jam. *Respone Surface Methodology* (RSM) digunakan untuk mendapat kondisi optimum dari sintesis CMC. CMC yang otpimum berdasarkan hasil RSM kemudian diuji derajat substitusi (DS), pH, viskositas, kelarutan, *Water Holding Capacity* (WHC), *Oil Holding Capacity* (OHC), *purity*, dan *lightness*.

Selulosa dari kulit biji kakao dapat dijadikan CMC. Derajat substitusi CMC lebih dipengaruhi oleh konsentrasi NaOH dan penambahan NaMCA. Pada konsentrasi NaOH yang tinggi, penambahan NaMCA yang tinggi nilai derajat substitusi CMC tinggi. Hasil RSM titik optimum sintesa CMC kulit biji kakao ialah konsentrasi NaOH 12,84 %; penambahan NaMCA 4,98 g; dan suhu reaksi karboksimetilasi 53,94 ºC. CMC kulit biji kakao dengan DS 0,79 memiliki pH 6,74; viskositas 5,10 cPa; kelarutan 71,83 %;WHC 7,56 g/g; OHC 1,46 g/g; *purity* 85,06%; dan *lightness* 73,53.

Kata kunci: kulit biji kakao, selulosa, CMC

ABSTRACT

Cacao nib (*Theobroma cacao* L.) is used as the main raw material in cacao industry, on the other hand, cacao shell is waste in that industry. Indonesia production of cacao nib in 2013 was 720.862 tons with the cacao shell waste production was 90.107 tons. Cacao shell contains cellulose 11-13.7% and hemicellulose 8%, which make it as potential candidate for cellulosa derivatives. The objectives of this study were 1) to study the effect of variation of NaOH concentration, NaMCA addition, and temperature, 2) to determine optimum condition of CMC which including food grade, and 3) to study characteristic of CMC which including food grade.

The research was conducted in two steps which were the isolation cellulose from cacao shell and the modification of cacao shell into carboxymethyl cellulosa (CMC). Carboxymethyl cellulosa (CMC) synthesis was conducted using NaOH at concentration of 1.59%; 5%; 10%; 15% and 18.41% at 25ºC for 1 hour. The addition of NaMCA were 2.32; 3; 4; 5 and 5.68 g at various temperature 46.59; 50; 55; 60; and 63.41ºC for 3 hours. Respone Surface Methodology (RSM) was used to obtain the optimum condition of synthesis CMC. The degree of substitution (DS), pH, viscosity, solubility, Water Holding Capacity (WHC), Oil Holding Capacity (OHC), purity, and lightness of optimum CMC based on RSM were analyzed.

The results showed that cellulose isolated from cacao shell could be modified into CMC. The degree of substitution (DS) of CMC was affected by NaOH concentration and NaMCA addition. The higher NaOH concentration and NaMCA addition, the higher DS of CMC synthesis. Based on RSM, optimum condition was obtained with NaOH concentration at 12,84 %, NaMCA addition 4,98 g and the temperature at 53,94 ºC. Obtained CMC from cacao shell with DS 0.79 had pH 6.74; viscosity 5.10 cPa; solubility 71.83%; WHC 7.56 g/g; OHC 1.46 g/g; purity 85.06 % and lightness 73.53.

Keywords : cacao shell, cellulose, CMC