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**SINTESIS DAN KARAKTERISASI NATRIUM KARBOKSIMETIL
SELULOSA (NA-CMC) DARI PELEPAH PISANG KLUTUK (*Musa
balbisiana* Colla) DENGAN MEDIA REAKSI ISOPROPANOL-ETANOL**

ABSTRAK

Latar Belakang: Natrium Karboksimetil Selulosa (Na-CMC) banyak digunakan dalam industri farmasi, pangan, dan kosmetik. Pelepah pisang klutuk (*Musa balbisiana* Colla) berpotensi sebagai bahan baku alternatif Na-CMC karena kandungan selulosa tinggi (>80%) dan ketersediaannya melimpah di Indonesia. Media reaksi isopropanol-etanol dalam sintesis Na-CMC dapat memengaruhi karakteristik produk yang dihasilkan.

Metode : Na-CMC disintesis melalui delignifikasi, bleaching, alkalisasi, dan karboksimetilasi dengan variasi media reaksi isopropanol-etanol 50:50 dan 80:20 (v/v). Karakterisasi meliputi organoleptik, kadar air, kelarutan, gugus fungsi, derajat substitusi, viskositas, *swelling index*, kemurnian, dan pH, dianalisis menggunakan *One Way ANOVA* atau *Kruskal-Wallis*.

Hasil: Na-CMC berupa serbuk halus krem muda, tidak berbau, larut dalam air. Rasio 50:50 menghasilkan kadar air 0,58%; COO⁻ simetris 1412,92 cm⁻¹; derajat substitusi 0,92; viskositas 280,0 cP; *swelling index* 1338,96%; kemurnian 98,73%; pH 6,94. Rasio 80:20 menghasilkan kadar air 0,44%; COO⁻ simetris 1413,07 cm⁻¹; derajat substitusi 0,75; viskositas 177,5 cP; *swelling index* 1233,08%; kemurnian 97,86%; pH 7,55. Terdapat perbedaan signifikan ($p < 0,05$) pada semua parameter kecuali kadar air.

Kesimpulan: Media reaksi isopropanol:etanol 50:50 menghasilkan Na-CMC dengan karakteristik lebih baik. Kedua rasio memenuhi standar SNI 06-3134-2006 dan Farmakope Indonesia Edisi VI, kecuali kemurnian. Pelepah pisang klutuk berpotensi sebagai bahan baku alternatif Na-CMC yang berkelanjutan.

Kata Kunci: Pelepah Pisang Klutuk, Natrium Karboksimetil Selulosa, Media Reaksi Isopropanol-Etanol

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**SYNTHESIS AND CHARACTERIZATION OF SODIUM
CARBOXYMETHYL CELLULOSE (NA-CMC) FROM KLUTUK BANANA
PSEUDOSTEM (*Musa balbisiana* Colla) WITH ISOPROPANOL-ETHANOL
REACTION MEDIA**

ABSTRACT

Background: Sodium Carboxymethyl Cellulose (Na-CMC) is widely used in the pharmaceutical, food, and cosmetic industries. The stem of the klutuk banana (*Musa balbisiana* Colla) has the potential as an alternative raw material for Na-CMC due to its high cellulose content (>80%) and abundant availability in Indonesia. The isopropanol-ethanol reaction medium in the synthesis of Na-CMC can affect the characteristics of the resulting product.

Methods: Na-CMC was synthesized through delignification, bleaching, alkalization, and carboxymethylation with variations of isopropanol-ethanol reaction media of 50:50 and 80:20 (v/v). Characterization included organoleptic, water content, solubility, functional groups, degree of substitution, viscosity, swelling index, purity, and pH, analyzed using One Way ANOVA or Kruskal-Wallis.

Results: Na-CMC is a fine, light beige powder, odorless, soluble in water. The 50:50 ratio produces a water content of 0.58%; symmetrical COO^- 1412.92 cm^{-1} ; degree of substitution 0.92; viscosity 280.0 cP; swelling index 1338.96%; purity 98.73%; pH 6.94. The 80:20 ratio produces a water content of 0.44%; symmetrical COO^- 1413.07 cm^{-1} ; degree of substitution 0.75; viscosity 177.5 cP; swelling index 1233.08%; purity 97.86%; pH 7.55. There are significant differences ($p < 0.05$) in all parameters except water content.

Conclusion: The 50:50 isopropanol:ethanol reaction medium produced Na-CMC with improved characteristics. Both ratios met SNI 06-3134-2006 and the Indonesian Pharmacopoeia Edition VI standards, except for purity. Klutuk banana stems have the potential to be a sustainable alternative raw material for Na-CMC.

Keywords: Klutuk Banana Pseudostem, Sodium Carboxymethyl Cellulose, Isopropanol-Ethanol Reaction Media.