

# ISOLASI NANOSERAT SELULOSA DARI TANDAN KOSONG SAWIT (*Elaeis guinensis* Jack) DENGAN MENGUNAKAN TEMPO

## ABSTRAK

Isolasi nanoserat selulosa dari tandan kosong sawit (*Elaeis guinensis* Jack) dengan menggunakan TEMPO telah dilakukan. Tandan kosong sawit didelignifikasi dengan HNO<sub>3</sub> 3,5% dan NaNO<sub>2</sub>, kemudian diendapkan dengan NaOH 17,5% serta proses pemutihan dengan H<sub>2</sub>O<sub>2</sub> 10%. Nanoserat selulosa diperoleh melalui media oksidasi TEMPO, Homogenisasi dan Ultrasonikasi. Hasil analisa ukuran partikel diukur dengan *Transmission Electron Microscopy* (TEM) menunjukkan bahwa nanoserat selulosa yang diperoleh memiliki diameter 11-69 nm. Hasil analisa ketahanan termal diukur dengan *Thermogravimetric Analysis* (TGA) menunjukkan bahwa nanoserat selulosa terdekomposisi pada suhu 240°C. Hasil Analisa gugus fungsi diukur dengan *Fourier Transform Infra-Red* (FT-IR) menunjukkan adanya serapan gugus C-H pada bilangan gelombang 2900 cm<sup>-1</sup>. Pada bilangan gelombang 3348 cm<sup>-1</sup> menunjukkan adanya gugus O-H dan pada bilangan gelombang 1064 cm<sup>-1</sup> menunjukkan adanya serapan gugus C-O-C yang menunjukkan bahwa adanya ikatan glikosida dalam sturuktur nanoserat selulosa. Hasil analisa TEM, TGA dan FT-IR menunjukkan bahwa media oksidasi TEMPO dapat menghasilkan serat selulosa berukuran nano dari tandan kosong sawit.

Kata kunci: TEMPO; Nanoserat selulosa; Ketahanan Termal; Tandan Kosong Sawit (TKS)

**ISOLATION OF CELLULOSE NANOFIBER OF OIL PALM  
EMPTY FRUIT BUNCH (*Elaeis guinensis* Jack)  
BY USING TEMPO**

**ABSTRACT**

Isolation of cellulose nanofiber of Oil Palm Empty Fruit Bunch (*Elaeis guinensis* Jack) by using TEMPO has been performed. A bunch of empty palm delignificated with 3,5% nitrit acid and sodium nitrite, then the residue was treated with 17,5% sodium hydroxide, and bleached with 10% hydrogen peroxide. Cellulose nanofiber was obtain through TEMPO mediated oxidation, Homogenization and Ultrasonication. The result of the particle size was investigated by *Transmission Electron Microscopy* (TEM) analysis showed that cellulose nanofiber have diameter is 11-69 nm, the result of the thermal resistance was investigated by *Thermogravimetric Analysis* (TGA) showed that cellulose nanofiber decomposition at 240°C and the result of the function group was investigated by *Fourier Transform Infra-Red* (FT-IR) analysis showed there are the C-H group of wave number at 2900 cm<sup>-1</sup>. The wavenumber at 3448 cm<sup>-1</sup> is representative of the O-H group and wave number at 1064 cm<sup>-1</sup> showed there are C-O-C group which indicated that there are glycoside bonding in the structure of cellulose nanofiber. The result of the TEM, TGA and FT-IR analysis indicated that TEMPO mediated oxidation can produce cellulose fiber nano sized of Oil Palm Empty Fruit Bunch (*Elaeis guinensis* Jack).

*Keywords: TEMPO; Cellulose Nanofiber; Thermal resistance; Oil Palm Empty Fruit Bunch (OPEFB)*