

ABSTRAK

PEMBUATAN BIOCHAR DARI LIMBAH TANDAN KOSONG KELAPA SAWIT (*Elaeis Guineensis*) DENGAN ETODE PIROLISIS MENGGUNAKAN VARIASI SUHU DAN WAKTU SERTA APLIKASINYA DALAM PROSES *ANAEROBIC DIGESTION*

(Veronica Aprilia, 2026, 78 Halaman, 8 Tabel, 17 Gambar, Lampiran)

Limbah tandan kosong kelapa sawit (TKKS) berpotensi dimanfaatkan sebagai bahan baku biochar karena kandungan karbonnya yang tinggi. Biochar dihasilkan melalui proses pemanasan pada kondisi minim oksigen, dan karakteristiknya dipengaruhi oleh suhu pemanasan. Penelitian ini bertujuan untuk menganalisis pengaruh variasi suhu pemanasan terhadap karakteristik biochar TKKS serta pengaruhnya terhadap kinerja anaerobic digestion dalam menghasilkan biogas. Karakterisasi biochar meliputi kadar air, kadar abu, zat terbang (*volatile matter*), karbon terikat (*fixed carbon*), pH, morfologi permukaan menggunakan SEM, serta luas permukaan spesifik dengan metode BET. Selanjutnya biochar diaplikasikan pada reaktor *anaerobic digestion* skala laboratorium dan dibandingkan dengan reaktor tanpa penambahan biochar. Parameter yang diamati meliputi pH slurry dan volume biogas. Hasil penelitian diharapkan menunjukkan suhu pemanasan optimum yang menghasilkan biochar dengan karakteristik terbaik serta meningkatkan produksi biogas.

Kata kunci: Biochar, Tandan kosong kelapa sawit (TKKS), *Elaeis guineensis*, Pemanasan, *Anaerobic digestion*.

ABSTRACT

PRODUCTION OF BIOCHAR FROM EMPTY FRUIT BUNCHES OF OIL PALM (*Elaeis Guineensis*) USING THE PYROLYSIS METHOD WITH VARYING TEMPERATURE AND TIMES, AND ITS APPLICATION IN THE ANAEROBIC DIGESTION

(Veronica Aprilia, 2026, 85 Pages, 8 Table, 17 Pictures, Appendices)

Empty fruit bunches (EFB) from oil palm plantations have potential as a raw material for biochar production due to their high carbon content. Biochar is produced through a pyrolysis process under limited oxygen conditions, and its characteristics are strongly influenced by pyrolysis temperature. This study aims to analyze the effect of pyrolysis temperature variation on the characteristics of EFB biochar and its impact on anaerobic digestion performance for biogas production. Biochar characterization includes moisture content, ash content, volatile matter, fixed carbon, pH, surface morphology using SEM, and specific surface area using the BET method. The biochar was then applied in laboratory-scale anaerobic digestion reactors and compared with a control reactor without biochar addition. Observed parameters include slurry pH and biogas volume. The expected results are to identify the optimal pyrolysis temperature that produces biochar with the best characteristics and enhances biogas production

Keyword: *Biochar, Empty fruit bunches (EFB), *Elaeis guineensis*, Pyrolysis, Anaerobic digestion.*