

**PENGARUH VEGETASI PIONIR TERHADAP KELIMPAHAN
BAKTERI AMONIFIKASI DAN KADAR KARBON ORGANIK TANAH
DI LAHAN BEKAS TAMBANG BATUBARA
PT. BERAU COAL KALIMANTAN TIMUR**

INTISARI

Kondisi tapak setelah proses *backfilling* pada lahan bekas tambang batubara umumnya kurang sesuai bagi pertumbuhan tanaman. Untuk memperbaiki kondisi tapak setelah *backfilling* dapat dilakukan dengan pendekatan suksesi vegetasi melibatkan vegetasi pionir. Salah satu faktor yang paling penting dalam memperbaiki kondisi lahan bekas pertambangan adalah proses perkembangan tanah. Mikroorganisme tanah berperan penting dalam proses perkembangan tanah. Tipe vegetasi dan kualitas seresah merupakan faktor pendukung aktivitas mikroorganisme tanah yang lebih penting daripada kualitas substrat tanahnya sendiri. Penelitian ini bertujuan untuk mengetahui pengaruh vegetasi pionir terhadap kadar C-organik tanah dan bakteri amonifikasi.

Penelitian ini dilakukan di Laboratorium Fisiologi Pohon dan Laboratorium Tanah Hutan, Fakultas Kehutanan, UGM. Pengambilan sampel dilakukan di Tapak Binungan (1 tahun setelah *backfilling*), Lati (9 bulan setelah *backfilling*), dan Sambarata (4 bulan setelah *backfilling*) PT. Berau Coal Kalimantan Timur. Pengambilan sampel tanah dilakukan pada tanah permukaan (0-5cm) di bawah tajuk *Trema cannabina*, *Macaranga conifera*, dan *M. triloba* serta di areal tanpa vegetasi sebagai kontrol. Pengujian sampel dilakukan dengan menggunakan metode *Plate Count* untuk Bakteri Total, *Most Portable Number* untuk Bakteri Amonifikasi, dan Walkey dan Black untuk C-organik tanah.

Kadar C-organik tanah, kelimpahan bakteri total, dan bakteri amonifikasi pada tanah permukaan yang ditumbuhi vegetasi pionir lebih tinggi daripada tanah permukaan tanpa vegetasi. Kadar C-organik tanah, kelimpahan bakteri total, dan bakteri amonifikasi dipengaruhi oleh jenis vegetasi pionir. Vegetasi pionir yang meningkatkan kadar C-organik tanah (0,39%), kelimpahan bakteri total ($2,5 \times 10^5$ cfu), dan bakteri amonifikasi ($2,1 \times 10^4$ sel) tertinggi adalah *T. cannabina*, kecuali kelimpahan bakteri amonifikasi ($1,5 \times 10^4$ sel) pada Tapak Lati tertinggi dihasilkan oleh vegetasi *M. conifera*. Kadar C-organik tanah, kelimpahan bakteri total, dan bakteri amonifikasi pada tanah permukaan di bawah 3 jenis vegetasi pionir di ke 3 tapak tidak dipengaruhi oleh umur tapak.

Kata kunci: Vegetasi pionir, bakteri amonifikasi, C-organik tanah

EFFECT OF PIONEER VEGETATION TO THE ABUNDANCE OF AMMONIFICATION BACTERIA AND SOIL ORGANIK CARBON AT THE COAL POST MINED LAND BERAU COAL CONCESSION IN EAST KALIMANTAN

ABSTRACT

Soil condition in coal post-mining landscape after backfilling is not suitable for plant growth. Vegetation succession involving pioneer vegetation could be used to rehabilitate soil condition after backfilling. One of the most important preconditions of ecosystem rehabilitation in post mining landscapes is the process of soil development, in which soil microorganisms play important roles. Vegetation type and litter quality have important effect to soil microbial activity than substrate quality. The objective of this research was to assess the effect of pioneer vegetation (*Trema cannabina*, *Macaranga conifera*, and *M. triloba*) to the content of soil organic carbon, the abundance of total bacteria, and ammonification bacteria.

This research was done in the Laboratory of Forest Soil and Plant Fisiology, Faculty of Forestry, Gadjah Mada University. Sampling was done in Binungan site (1 year after backfilling), Lati site (9 months after backfilling), and Sambarata site (4 months after backfilling) Berau Coal Concession in East Kalimantan. Soil samples were taken from surface soil (0-5 cm) under crown of *T. cannabina*, *M. conifera*, and *M. triloba*. Soils without pioneer vegetation were taken as control. Population of total soil bacteria and ammonification bacteria was assessed using Plate Count and Most Probable Number method, and the content of soil organic carbon was assessed using Walkey and Black method.

The result showed that the content of soil organic carbon, the abundance of total bacteria and ammonification bacteria under pioneer vegetation were higher than in soil without vegetation. The content of soil organic carbon and abundance of ammonification bacteria were affected by pioneer vegetation species. The greatest content of soil organic carbon (0,39%), bacteria ($2,5 \times 10^5$ cfu), and ammonification bacteria ($2,1 \times 10^4$ sel) was on *T. cannabina*, except the abundance of ammonification bacteria in Lati site was on *M. conifera* ($1,5 \times 10^4$ sel). The content of soil organic carbon, the abundance of total bacteria and ammonification bacteria under pioneer vegetation were not affected by site.

Keywords: pioneer vegetation, ammonification bacteria, soil organic carbon