

Soil microbial population and soil enzyme activity on pt bukit asam various reclaimed land sites in South Sumatra

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Abstrak

Open mining activities result in decreased microbial biomass and negatively impacts soil fertility. Soil microbes play a role in the decomposition of soil organic matter and in nutrient cycles through the process of mineralization by the enzymes they produce. The purpose of this study was to analyse soil fertility levels in PT Bukit Asam's various reclaimed land sites at Muara Enim Regency, South Sumatra, Indonesia, as determined by these areas' microbial populations and soil enzyme activity. The research was conducted by using the explorative method in PT Bukit Asam's various reclaimed land. Soil sample from 7 different reclamation age area were analysed. Our results showed that soil conditions and soil enzyme activity vary by reclamation age. At KTU, a 12-year-old reclaimed land site, urease enzyme activity had a value of 68.83 mg NH₄⁺.g⁻¹dm.h⁻¹ with a microbial population of 82.64 x 10⁴ CFU.g⁻¹soil. The highest phosphatase enzyme activity value of 95.66 mg pNP.g⁻¹ dm.h⁻¹ was found on the 9-year-old SP702 reclaimed land site, with a soil pH of 5.23. Cellulase enzyme activity on the 21-year-old Udongan reclaimed site had a value of 21.51 mg GE.g⁻¹dm.h⁻¹ with a cellulolytic microbial population of 1.9 x 10⁴ CFU.g⁻¹soil, higher than on other reclamation sites. Invertase enzyme activity on the 15-year-old Tupak reclaimed land site had a value of 24.37 mg GE.g⁻¹dm.h⁻¹. Soil enzyme activity can be an indicator of soil quality and soil microbial activity as it relates to all forms of biochemical transformations occurring in the soil and is highly sensitive to environmental changes.