

INTISARI

Penelitian mengenai sekuestrasi karbon tanaman hasil reklamasi tambang belum banyak yang mengungkap tentang pentingnya interaksi antar sifat fisikokimia tanah. Oleh karena itu, penelitian ini bertujuan menguantifikasi total simpanan karbon, potensi tanaman hasil reklamasi dalam menyerap gas CO₂ dan interaksinya terhadap sifat fisikokimia tanah. Penelitian menggunakan tanaman reklamasi revegetasi tahun tanam 2019 yaitu johar, jabon, waru, dan gempol, serta tanaman hutan sebagai penampakan rona awal pra penambangan. Metode yang digunakan secara *stratified random sampling*. Pendugaan biomassa pohon secara non destruktif menggunakan pendekatan model alometri dan pendugaan biomassa akar menggunakan model *root to shoot ratio*. Biomassa tumbuhan bawah dan serasah diperoleh dari berat kering. Potensi serapan CO₂ dihitung berdasarkan total simpanan karbon biomassa pohon dikonversi ke CO₂e. Contoh tanah diambil pada 4 tingkat kedalaman setiap 10 cm. Hasil yang diperoleh menunjukkan potensi tanaman reklamasi yang tertinggi dalam menyerap CO₂ yaitu tanaman johar sebesar 7,54 ton ha⁻¹ tahun⁻¹ namun tidak menunjukkan perbedaan yang signifikan dengan tanaman reklamasi lainnya pada uji DMRT taraf 5%. Interaksi potensi serapan CO₂ dengan sifat fisikokimia tanah memiliki nilai koefisien korelasi negatif pada nilai berat volume tanah, dan berkorelasi positif pada nilai KPK, karbon organik tanah, dan N total dengan uji korelasi pearson. Analisis komponen utama (PCA) menunjukkan pH tanah pada PC1 dan fraksi tanah (pasir, debu dan lempung) pada PC2 memiliki kontribusi yang dominan terhadap pembentukan variabel yang lain pada penelitian dengan nilai varians berturut-turut 29,63% dan 26,15%.

Kata kunci: Sekuestrasi karbon, reklamasi tambang, simpanan karbon tanah dan biomassa, serapan CO₂ tanaman, interaksi sifat fisikokimia tanah.

ABSTRACT

Research on the carbon sequestration of reclaimed mine plants has not revealed much about the importance of the interaction between the physicochemical properties of the soil. Therefore, this study aims to quantify the total carbon stock, the potential of reclaimed plants to sequester CO₂ gas, and its interaction with the physicochemical properties of the soil. The research used revegetation reclamation plants in the 2019 planting year, namely johar, jabon, waru, and gempol, as well as forest plants as the appearance of the land before mining. The method used was stratified random sampling. Tree biomass was estimated non-destructively using an allometric model approach and root biomass was estimated using a root-to-shoot ratio model. Understory biomass and litter were obtained from dry weight. The potential for CO₂ sequestration is calculated based on the total carbon stock of tree biomass converted to CO₂e. Soil samples were taken at 4 depth levels every 10 cm. The results obtained show that the highest potential for CO₂ sequestration in reclamation plants is that of johar plants at 7.54 tons ha⁻¹ year⁻¹, but this does not show a significant difference with other reclamation plants at DMRT test level 5%. The interaction of CO₂ sequestration potential with soil physicochemical properties has a negative correlation coefficient value on the soil bulk density value, and is positively correlated on the CEC, soil organic carbon, and total N values with the Pearson correlation test. Principal component analysis (PCA) shows that soil pH on PC1 and soil fractions (sand, silt, and clay) on PC2 have a dominant contribution to the formation of other variables in the study with variance values of 29.63% and 26.15%, respectively.

Keywords: Carbon sequestration, mine reclamation, soil and biomass carbon stocks, CO₂ sequestration, interaction of soil physicochemical properties.