

INTISARI

Tanah Andisol di lereng gunung berapi memiliki kesuburan tinggi, namun rentan terhadap erosi dan kehilangan karbon organik. Pemupukan dengan Nitrodiamine Plus diharapkan mampu meningkatkan fraksi karbon organik tanah yang dapat menunjang produktivitas tanaman teh. Penelitian ini bertujuan untuk mengetahui pengaruh kemiringan lereng berdasarkan kelas sudut lereng dan melihat efek pemupukan Nitrodiamine Plus terhadap fraksi karbon organik labil dan stabil pada tanah Andisol, guna mendukung strategi pengelolaan tanah berkelanjutan. Penentuan titik lokasi pengambilan sampel tanah mengacu pada peta kelas sudut lereng yang diklasifikasikan berdasarkan persentase kemiringan lereng (%) dari data DEMNAS, yang dibagi menjadi lima kelas (0-8%, 8-15%, 15-25%, 25-45%, > 45%). Sampel tanah diambil pada kedalaman 0-30 cm di bawah tegakan teh dengan umur, kerapatan tanaman, klon, dan dosis pupuk yang sama. Tanah yang dianalisis terdiri dari tanah awal dan tanah 2 bulan setelah pemupukan Nitrodiamine Plus. Analisis meliputi sifat fisika tanah, sifat kimia tanah, fraksi karbon organik labil (C-mineralisasi, C-BMT, C-POM, C-larut air), serta fraksi karbon organik stabil (asam humat, asam fulvat, humin). Data dianalisis menggunakan ANOVA satu faktor dengan faktor tunggal berupa kelas sudut lereng, dan dilanjutkan dengan uji HSD Tukey apabila hasilnya signifikan. Sedangkan data yang tidak berdistribusi normal dianalisis dengan Kruskal-Wallis, dilanjutkan dengan uji Dunn apabila hasil signifikan. Analisis korelasi Pearson digunakan untuk mengetahui hubungan antara variabel bebas dan terikat. Data tanah awal dan 2 bulan setelah pemupukan dibandingkan secara deskriptif untuk melihat efek pemupukan terhadap fraksi karbon organik labil dan stabil pada setiap kelas sudut lereng. Hasil menunjukkan kelas sudut lereng tidak berpengaruh signifikan terhadap fraksi karbon organik labil maupun stabil, sedangkan pemupukan Nitrodiamine Plus mampu meningkatkan fraksi karbon organik labil. Namun, pada fraksi karbon organik stabil terdapat variasi peningkatan dan penurunan di beberapa lokasi, yang diduga dipengaruhi oleh adanya perbedaan dinamika dekomposisi bahan organik dan respons mikroba tanah dalam proses stabilisasi bahan organik.

Kata kunci: Andisol, karbon organik labil, karbon organik stabil, kelas sudut lereng, Nitrodiamine Plus

ABSTRACT

Andisol soils on volcanic slopes have high fertility but are prone to erosion and organic carbon loss. Fertilization using Nitrodiamine Plus is expected to improve soil organic carbon fractions, which can support the productivity of tea plants. This study aimed to examine the effects of slope gradient based on slope angle classes and to evaluate the impact of Nitrodiamine Plus fertilization on labile and stable carbon organic fractions in Andisol soils to support sustainable soil management strategies. The soil sampling locations were determined based on the slope angle class map classified by slope gradient percentages (%) from DEMNAS data, which were divided into five classes (0-8%, 8-15%, 15-25%, 25-45%, > 45%). Soil samples were collected at a depth of 0-30 cm under tea stands with uniform age, plant density, clone, and fertilizer dosage. The analyzed soils consisted of initial soil and soil sampled two months after the application of Nitrodiamine Plus fertilizer. The analyses included soil physical properties, soil chemical properties, labile organic carbon fractions (C-mineralization, microbial biomass carbon (C-BMT), particulate organic matter carbon (C-POM), water-soluble carbon), and stable carbon organic fractions (humic acid, fulvic acid, humin). Data were analyzed using one-factor ANOVA with slope angle class as the single factor, followed by Tukey's HSD test if the results were significant. Whereas data that were not normally distributed were analyzed by Kruskal-Wallis, followed by the Dunn test if the results were significant. Pearson correlation analysis was used to determine the relationship between independent and dependent variables. Baseline soil data and data obtained two months after fertilization were descriptively compared to observe the effects of fertilization on labile and stable fractions of organic carbon at each slope angle class. Results showed that slope angle classes had no significant effect on either labile or stable carbon organic fractions. Meanwhile, Nitrodiamine Plus fertilization increased the labile carbon organic fraction. However, the stable carbon organic fraction showed varying increases and decreases across locations, which were presumably influenced by differences in the dynamics of organic matter decomposition and the response of soil microbes in the process of organic matter stabilization.

Keywords: Andisol, labile organic carbon, stable organic carbon, slope angle class, Nitrodiamine Plus