# Intisari

Dinamika karbon pada siklus biogeokimia pertukaran karbon sangatlah kompleks. Tanah sebagai salah satu *reservoir* turut berperan penting dalam menjaga neraca pergerakan karbon untuk tetap seimbang. Tujuan penelitian ini adalah mengkaji keragaman komposisi dan distribusi fraksi-fraksi C-organik serta mengidentifikasi pengaruh perbedaan jenis tanah terhadap variabilitas dan simpanan fraksi-fraksi C-organik dalam tanah. Pengambilan sampel tanah dilakukan dengan metode *purposive random sampling* dengan membuat lubang mini (50 x 80 x 50 cm). Parameter yang dianalisis dalam penelitian ini adalah sifat fisikokimia tanah serta fraksi karbon seperti C-partikulat, C-BMT, C-min, senyawa humus dan kompleks logam organik. Uji-T, *ANOVA* dua arah dan analisis korelasi regresi digunakan untuk analisis statistik data dalam penelitian ini. Sebaran fraksi C-organik labil seperti C-partikulat dan C-BMT serta C-min lebih tinggi di makroagregat dibandingkan mikroagregat tanah sedangkan sebaran fraksi C-organik yang lebih stabil dan kompleks logam organik seperti C-asam humat, C-asam fulvat, Al-organik, dan Fe-organik tidak bergantung pada ukuran agregat tanah dan keberadaannya di dalam tanah hampir merata baik dalam makroagregat dan mikroagregat tanah. Perbedaan jenis tanah hasil proses pedogenesis seperti sebaran dan jenis fraksi lempung, BV tanah, porositas tanah, pH tanah, kation tukar tanah dan kejenuhan basa mempengaruhi variabilitas dan simpanan fraksi C-organik dalam tanah. Fraksi C-Hu, C-AH+C-AF dan kompleks logam organik mempengaruhi indeks stabilitas agregat tanah.

Kata Kunci : Dinamika karbon, *purposive random sampling*, makroagregat, mikroagregat, fraksi C-organik.

# Abstract

Carbon dynamics in the biogeochemical cycle of carbon exchange are very complex. Soil as a reservoir plays an important role in maintaining the balance of carbon movements, especially in terrestrial ecosystems. The aim of this research is to examine the diversity of composition and distribution of C-organic fractions and identify the influence of different soil types on the variability and stock of C-organic fractions in soil. The soil sampling was done using the purposive random sampling method by making a minipit (50 x 80 x 50 cm). The parameters analyzed in this study are the soil physicochemical properties as well as carbon fractions such as POC, MBC, mineralized C, humus substances, and organic metal complexes. The T-test, two-way ANOVA, and regression correlation are used for the statistical analysis in this study. The distribution of labile C-organic fractions such as POC and MBC, as well as C-min, is higher in macroaggregates compared to soil microaggregates, while the distribution of more stable C-organic fractions and organic metal complexes such as C-HA, C-FA, Alp, and Fep does not depend on the soil aggregate size, and their presence in the soil is almost evenly distributed both in macroaggregates and microaggregates. Differences in soil types resulting from pedogenesis processes such as the distribution and types of clay fractions, soil BV, soil porosity, soil pH, soil exchange cations, and base saturation influence the variability and stock of organic C fractions in the soil. The C-Hu, C-AH+C-AF fractions, and organic metal complexes influence the soil aggregate stability index.

Keyword : Carbon dynamics, *purposive random sampling*, macroaggregates, microaggregates, C-organic fraction.