Organic matter, carbon and humic acids in rehabilitated and secondary forest soils

Abstract

Problem Statement: Tropical rainforests cover about 19.37 million ha (60%) of Malaysia's total area and about 8.71 million ha can be found in Sarawak, Malaysia. Excessive logging, mining and shifting cultivation contribute to deforestation in Sarawak. The objectives of this study were to: (i) Quantify soil Organic Matter (SOM), Soil Organic Carbon (SOC) and Humic Acids (HA) in rehabilitated and secondary forest soils and (ii) Compare SOM, SOC and HA sequestrations of both forests. Approach: Soil samples were collected from a 16 year old rehabilitated forest and a secondary forest at Universiti Putra Malaysia, Bintulu Campus. Fifteen samples were taken at random with a soil auger at 0-20 cm and 20-40 cm depths. The bulk densities at these depths were determined by the coring method. The bulk density method was used to quantify the total C (TC), Total Organic Carbon (TOC), Organic Matter (OM), Humic Acids (HA) and total N at the stated sampling depths. Results: Regardless of forest soil type and depth, the amount of SOM of the two forests was similar. Except for 20-40 cm of the secondary forest soil whereby the quantity of total C sequestered was significantly lower than that of the rehabilitated forest soil, C sequestration was similar irrespective of forest type and depth. Nevertheless, stable C (organic carbon) sequestered in HA was generally higher in the rehabilitated forest soil compared with the secondary forest soil. This was attributed to higher yield of HA in the rehabilitated forest soil partly due to better humification at 20-40 cm in the rehabilitated forest soil. Conclusion: Hence, the findings suggest that organic C in HA realistically reflects C sequestration in the soils of the two forests investigated.