

Labile and Humified Carbon Storage in Natural and Anthropogenically Affected Luvisols

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Abstract : The main task of this research was to investigate the chemical composition of the differently used soil in profiles. To identify the differences in the soil were investigated organic carbon (SOC) and its fractional composition: dissolved organic carbon (DOC), mobile humic acids (MHA) and C to N ratio of natural and anthropogenically affected Luvisols. Research object: natural and anthropogenically affected Luvisol, Akademija, Kedainiai, distr. Lithuania. Chemical analyses were carried out at the Chemical Research Laboratory of Institute of Agriculture, LAMMC. Soil samples for chemical analyses were taken from the genetics soil horizons. SOC was determined by the Tyurin method modified by Nikitin, measuring with spectrometer Cary 50 (VARIAN) in 590 nm wavelength using glucose standards. For mobile humic acids (MHA) determination the extraction procedure was carried out using 0.1 M NaOH solution. Dissolved organic carbon (DOC) was analyzed using an ion chromatograph SKALAR. pH was measured in 1M H₂O. N total was determined by Kjeldahl method. Results: Based on the obtained results, it can be stated that transformation of chemical composition is going through the genetic soil horizons. Morphology of the upper layers of soil profile which is formed under natural conditions was changed by anthropomorphic (agrogenic, urbogenic, technogenic and others) structure. Anthropogenic activities, mechanical and biochemical disturbances destroy the natural characteristics of soil formation and complicates the interpretation of soil development. Due to the intensive cultivation, the pH values of the curve equals (disappears acidification characteristic for E horizon) with natural Luvisol. Luvisols affected by agricultural activities was characterized by a decrease in the absolute amount of humic substances in separate horizons. But there was observed more sustainable, higher carbon sequestration and thicker storage of humic horizon compared with forest Luvisol. However, the average content of humic substances in the soil profile was lower. Soil organic carbon content in anthropogenic Luvisols was lower compared with the natural forest soil, but there was more evenly spread over in the wider thickness of accumulative horizon. These data suggest that the organization of geo-ecological declines and agroecological increases in Luvisols. Acknowledgement: This work was supported by the National Science Program 'The effect of long-term, different-intensity management of resources on the soils of different genesis and on other components of the agro-ecosystems' [grant number SIT-9/2015] funded by the Research Council of Lithuania.

Keywords : agrogenization, dissolved organic carbon, luvisol, mobile humic acids, soil organic carbon

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