



Eco-physiological indicators as an assessment of materials quality applied for the urban Technosols construction

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A greening system of modern cities should be provided the Technosols creation performing ecological functions, considering that soil microorganisms are responsible for the most of them. Our previous field experiments showed that 30-40% carbon (C) loses as CO₂ from the constructed turf grass Technosols within a few years due to intensive microbial decomposition. Such microbial functioning is one of the reasons of substantial CO₂ efflux from urban soils. Consequently, exploring microbial indicators to assessment of the organic-mineral materials quality prior to urban Technosols construction is a priority task for the best-management practices within cities. The research focuses on the assessment of microbial respiration per unit biomass (qCO₂) and portion of microbial biomass-C per unit total carbon (MBC:C or C-availability) in the materials' components (low-moor peat, sediments of the lake and drinking water treatment station) and mixtures I (soil fertile layer/low-moor peat/compost/sand) and II (low-moor peat/sand) containing minor (30%) and major (75%) amount of the peat, respectively. Albic Retisols topsoil was used as a control. The materials were got from various private companies performing the greening work in Moscow, Russia.

Considering the highest MBC:C (1.1%) in the control, the lowest C-availability was observed in the peats. In the sediments it was on average 3.4 times high compared to the peats. Based on the control value the specific respiration in the peats was identified as unbalanced: qCO₂ was 2.9 and 3.5 times higher compared to the sediments and control, respectively. In the mixtures with minor peat amount the balanced specific respiration and high C-availability were found compared to those with major peat amount. Thereby in terms of microbial energetics some quality deterioration of the studied peats and mixtures with high their' portion was found. It means that in these materials the major portion of carbon is being lost as CO₂ and only traces amount accumulate in microbial cells.

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