



Application of loss-of-ignition method to the soil organic carbon determination

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The aim of this work was to compare two frequently used methods of the soil organic matter (SOM) and the soil organic carbon (SOC) determination. The SOC determination has been carried out by the volumetric Walkley-Black method using correction factor of 1.33. The SOM value was determined by the loss-on-ignition (LOI) method, at three different temperatures and four time intervals. Both methods have been applied to not too populated ($n = 42$), however as for as soil parameters heterogeneous enough set of soil samples. Ten grams of a soil sample grounded to pass 0.25 mm sieve was weighed into a porcelain crucible with volume approx. 75 ml. After drying in air oven at 100°C and re-weighing, the crucible was ignited in muffle furnace for 1 and/or 10 hours at 373°C, for 8 h at 460°C and for 6 h at 530°C. LOI values were compared both mutually and with the volumetric Walkley-Black method. None from so provided LOI method show significantly positive increase of SOM content due to a thermal decomposition of soil carbonates in spite of their occurrence. The content of soil carbonates (CaCO_3 , $\text{CaCO}_3 \cdot \text{MgCO}_3$) ranged from 1 to 38% in the most of samples with average of 11%. The same held true for possible influence of interstitially present water due to presence of higher clay content in some samples. Clay content varied from 9 to 51% with average 26%. There was a very close correlation among LOI values at any three temperatures ($R^2 = 0.975-0.997$), but their relation to SOC value (Walkley-Black method) was looser than it was expected ($R^2 = 0.827$ as the highest value for LOI 373°C). LOI value attained during one-hour ignition gave similar, only by 16% lower (however significant) results, comparing to ten-hour ignition ($R^2 = 0,940$). On the basis of a regression equation between one-hour LOI at 373°C and SOC, i.e. " C_{ox} " determined by Walkley-Black method it seems that this

economically advantageous ignition procedure would serve after a verification on a large, representative soil set, at least, as a screening method for the soil organic matter assessment.