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Distribution of hydrophobic and hydrophilic components of soil organic matter over granulometric fractions of chernozem

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The aim of the research was to investigate soil organic components distribution over granulometric fractions of chernozem soil by means of micromorpholodgy and hydrophobic interaction chromatography.

Samples and methods. Four fractions (diameter $>$5, 5-2, $<$2 μm and colloidal) were isolated from humic horizons of typical chernozem (Central Russia, Kursk region) by centrifuge method with ultrasonic pre-treatment. Granulometric fractions were investigated by means of submicroscopic analysis. Carbon content, hydrophilic and hydrophobic components of soil organic matter (SOM) were also studied. For this aim SOM was isolated from granulometric fractions by 0.1M $Na_4P_2O_7$+0.1N NaOH solution, soil-solution ratio being 1:10. Mineral particles were eliminated from humus extract by centrifugation (8000 rpm; 15 min) and filtration through the 0.45-μm membrane filter. Hydrophobic interaction chromatography was operated on Octyl-Sepharose CL-4B.

Results and conclusions. The results of microscopic and chromatographic analyses indicate that there are separate fragments of slightly decomposed plant residues in the fraction $>$5 μm. SOM in the fraction 2-5 μm is present in free-form, not bound to mineral components of soil. SOM of the fraction $<$2 μm and colloides is likely to be present in organo-mineral forms. This fact is supported by carbon content distribution in granulometric fractions and extracted SOM. The fraction 2-5 μm is characterised by the highest carbon content (from 16.0% in upper horizons to 3.5% weight content of fraction in B horizons), unlike the clay and colloidal fractions (from 10.2% to 2.5%) and the fraction $>$5 μm (from 2.8% to 0.2%). Carbon content of SOM is also the

highest in this fraction: weight content of carbon varies from about 38.0% to 50.0%, against 37.0% to 28% of carbon in fraction <2 μm and colloids. The hydrophobic components are dominant in SOM of the fraction 2-5 μm, but in the clay fraction and especially in the colloidal fraction the hydrophilic components far exceed the hydrophobic ones. These facts indicate the hydrophobic fractions to be concentrated in the silt fraction, which may play the most important role in waterstable aggregate formation.