Geophysical Research Abstracts, Vol. 9, 03568, 2007
SRef-ID: 1607-7962/gra/EGU2007-A-03568

Effect of phosphates on release of dom from mucks*

D. Matyka-Sarzynska (1), **Z. Sokolowska (1)**, P. Warcholska (1), L. Szajdak (2)

1. Institute of Agrophysics Poish Academy of Science, ul. Doświadczalna 4, 20-290 Lublin, Poland (zosia@maja.ipan.lublin.pl / Phone: +48817445061)
2. Research Center for Agricultural and Forest Environment, Polish Academy of Science, ul. Bukowska 19, 60-809 Poznań, Poland (szajlech@man.poznan.pl / Fax: +48 61 8473668 / Phone: +48 61 8475601)

The availability and mobility of organic matter in the soil is a result of many factors: properties of the soil, temperature, pH [Nambu and Yonebayashi, 2000]. The chemical composition of the soil solution significantly influences the amount of organic matter released from soil. Phosphates present in soil solution can affect the release of the organic matter [Reemtsma et al., 1999; Turner et al., 2001]. The transfer of organic matter and different forms of phosphate in drainage from agricultural soils to water course can cause water quality problems. Despite the importance of organic matter transfer process caused by the presence of phosphate, it remains still poorly understood. At present it is reported the model investigation on the effect of the increase of concentration of NaH_2PO_4 on the humic acids release process.

The study was conducted on five muck samples (Terric Histosols). The samples were collected at depth of 5-20 cm from sites located in a low moor area of the Wieprz-Krzna canal (Polesie Lubelskie) and Biebrza river in Poland. Calcium forms of the studied mucks were treated by NaH_2PO_4solutions at increasing concentration. Concentrations of the DOM released in the 0.45 μm filtered were determined spectrophotometrically at 465 nm using Jasco V-500 apparatus. Because the absorption spectra for organic matter released from the studied mucks were almost the same to that for sodium humate (Aldrich H1, 675-2) solutions, the calibration curve was based on a series of 10 various concentrations (from 0,005 to 0,15 mg/ml) of the Aldrich reagent.

The release of soil organic matter from calcium forms of the mucks was significantly affected by concentration of added salt. Generally, the increase in concentration of

phosphate resulted in the increase in release of humic substances up to 0,025 M of the added salt. At very low, initial phosphate concentration, the secondary coagulation of dissolved organic matter was observed i.e. the concentration of organic matter was lower that in control samples. These effects can be explained by interaction of inorganic electrolytes with soil organic matter leading to their sorption on metal oxides and clay minerals or precipitation (coagulation) of organic material itself. Negatively charged organic matter molecules do not sorb phosphate directly, but it can strongly influence the sorption or desorption of phosphate by other soil components for example polyvalent cations, sesquioxides, clay minerals. The oxides and hydroxides of iron and aluminium present on surfaces of organic compounds probably play an important part in the sorption of phosphate and finally caused the additional coagulation of humic substances. The initial coagulation of humic substances may be also due to the decrease of pH after increasing addition of NaH_2PO_4 solution.

1. Nambu K., Yonebayashi K. (2000). Quantative relationship between soil properties and adsorption of dissolved organic matter into volcanic ash and non-volcanic ash soils.In *Soil Sci. Plant Nutr*., 46, pp. 559.

2. Reemtsma T., Bredow A., Gehring M. (1999). The nature and kinetic of organic matter release from soil by salt solutions. In *European J. of Soil Sci.* 50, pp. 53.

3. Turner B.L., McKelvie I.D., Hayagrth P.M. (2002). Characterisation of water-extractable soil organic phosphorus by phosphatase hydrolysis. In *Soil Biology and Biochemistry*, 34, pp. 27.

*This work was partly supported by the State Committee for Scientific Research, Poland under grant No. 2 P04G 079 29.