



## **Relationship between selected physicochemical properties of peaty-mucks soils and main absorbance bands of its FTIR spectra\***

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Peatlands are a large reservoir of organic matter that is responsible for sorption properties, structure of soils and microbial activity. However, most of the peatlands in Poland have been drained and subjected to agricultural use. Processes of such kind cause acceleration of peat mass transformation to mucks. Changes in peat evolution under melioration processes are mostly characterised by mineralisation and humification. The above processes lead to changes in the morphological, chemical, biological and physical properties of peat soils. Knowledge about changes of these parameters is very important in suitable application of conditions and fertilisers in order to improve agricultural value of soil. One of the indicators which could describe the changes in peat mass could be the water holding capacity index proposed by Gawlik. This parameter characterises the secondary transformation processes taking place in soils. Mucking processes are also well described by humification indexes and organic/inorganic carbon content. However, changes of above physical and physicochemical properties of soils are also connected with changes of chemical structure of organic matter contained in soil material. Organic matter is a significant component of organic soils and it influences such important parameters of all soil like sorptivity. So that, it is also valuable to control state of functional groups which determine sorption capacity of soil. One of the methods which could be applied in this case is observation of absorbance values of functional groups in infrared spectra of samples. This is quick and method but it could be used only in approximate way because of some content of ash and inorganic parts.

Main aim of this work was attempt to find relationships between selected physicochemical properties of peats soils and height of the most important infrared bands of these materials.

11 peaty-muck soils were taken from different places in Eastern part of Poland from depth 0-20cm. After homogenizing, selected parameters were determined for all samples. Content of organic carbon was investigated using TOC analyzer (MultiNC 2000, Analytik Jena), water holding capacity indexes were determined via centrifugation/weighting method proposed by Gawlik, humification index was calculated using colorimetric method proposed by Springer. Infrared spectra were recorded for samples in form of pellets with KBr. Absorbance of the most important bands were measured: carboxylic for COO<sup>-</sup> as. (1619-1639cm<sup>-1</sup>), COO<sup>-</sup> sym. (1383 – 1387cm<sup>-1</sup>), COOH sym. (1240 – 1266cm<sup>-1</sup>) and phenolic groups for (~3389-3401cm<sup>-1</sup>). After this, relationships between all parameters were found. Results showed presence of statistically significant correlation between absorbance of functional groups and organic carbon content. This relation indicated that increase in organic carbon caused increase in functional groups of organic matter. No statistically significant correlation was found for relation of bands height and water holding capacity and humification index.

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