

Influence of drainage on peat organic matter : implications for development, stability, and transformation.

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Streszczenie

The agricultural use of peatlands, the stabilization of the substrate for building or road construction or for increasing the capacity of soil to support heavy machinery for industrial activities (peat and petroleum extraction), harvesting to provide peat for energy, and the growing media and initiation of chemical processes must be preceded by drainage. As a consequence of drainage, peat underwent an irreversible conversion into moorsh (secondary transformation of the peat). The object of the study was to investigate comparatively the organic matter composition and molecular structure of humic acids (HAs) in the raised bog, fen, and peat-moorsh soils developed in various compositions of botanical cover, peat-forming species, and oxic and anoxic conditions as a result of the oscillation of ground water during drainage as well as to evaluate the vulnerability of soil organic matter (SOM) to decomposition. Drainage was shown to be the principal factor causing the various chemical compositions and physicochemical properties of HAs. Large and significant differences in chemical composition of peat and the properties of HAs were found to be related to the degree of decomposition. The HAs from drained peatlands were less chemically mature. In contrast, the HAs from fen and raised bog were found to be more mature than that of the corresponding drained peatlands. The above findings showed the distinguishable structure of HAs within the soil profile created by the plant residue biodegradation and formed in both oxic and anoxic conditions. The analytical methods of thermal analysis together with the optical densities and paramagnetic behaviour are suitable and effective tools for studying structure–property relationships characterizing the origin and formation process of HAs in various environmental conditions.

Słowa kluczowe

drained and undrained peatlands, peats, humic acids, thermal, paramagnetic and optical properties

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