



Changes of the soil environment affected by fly ash dumping site of the electric power plant

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In this study the effect of fly ash dumping site of the electric power plant on the surrounding soil environment was investigated. The fly ash dumping site collect wastes form brown coal combustion of Belchatow electric power station, central Poland. The dumping site is surrounding by forest, where pine trees overgrow Podzols derived from loose quartz sands. The soil profiles under study were located at a distance of 50, 100, 400 and 500 m from the dumping site, while control profiles were located 8 km away from the landfill. In all horizons of soil profiles the main physico-chemical and chemical properties were determined. The humic substances were extracted from ectohumus horizons by Shnitzer's method, purified using XAD resin and freeze-dried. The fulvic acids were passed through a cation exchange column and freeze-dried. Optical density, elemental composition and atomic ratios were determined in the humic and fulvic acids. Organic carbon by KMnO_4 oxidation was also determined in the organic soil horizons. The fly ash from the landfill characterized by high salinity and strong alkaline reaction ($\text{pH}=10$), which contributed significantly to the changes of the pH values in soils horizons. The alkalization of soils adjacent to the landfill was found, which manifested in increasing of pH values in the upper soil horizons. The impact of the landfill was also noted in the changes of the soil morphology of Podzols analysed. As a result of the alkalization, Bhs horizons have been converted into a Bs horizons. Leaching of low molecular humus fraction – typical for podzolization – has been minimized as a result of pH changes caused by the impact of the landfill, and originally occurring humic substances in the Bhs horizon (present in the control profiles) have been probably transported out of the soil profile and then into the groundwater.