

The utilization of bottom sediments to improve soil fertility

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Introduction: Today one of the major problems in agriculture is the progressive degradation soil properties. We often need to supply of soils some additives containing organic matters, macronutrients and appropriate trace elements to improve them the chemical and physical proprieties. One of these additives could be the bottom sediment accumulated in the bottom of dam reservoirs from natural process and over-erosion in drainage areas, which contain nutritional elements much needed in soils [1, 2, 3]. If the bottom sediment does not pose a hazard for the environment, the environmentally justified method of such sediment management is their use as structure and soil forming material on soilless grounds and wastelands. The aim of the study was to assess the effect of bottom sediments on the selected properties of the light soil and the chemical composition of the plants test.

Methods: The bottom sediments originated from the Rzeszów dam reservoirs situated in the southern Poland. The pot experiment was conducted on a light soil with weak loamy sand grain size composition and acid reaction, which was enriched by a supplement of bottom sediment. The bottom sediments were added to the soil in the amount of 5, 10, 30 and 50% of air-dried sediment in relation to dry soil mass. The test plants were maize and faba bean. Yield and concentrations of macro and microelements were assessed in the plant material. In the soil samples collected after of the experiment was assessed: pH, organic matter, cation exchange capacity, total nitrogen and concentration of trace elements.

Results: An applied bottom sediments revealed in its composition a considerable share of clay fractions, alkaline reaction and low total heavy metal content, therefore it may be applied as an admixture to light soils to improve their productivity. The addition of sediment to soil resulted to the improvement of soil indicators of acidification: increased soil pH and reduced the value of hydrolytic acidity, improved sorption properties of the soil. Bottom sediments added to soil had a positive effect to maize and faba bean biomass (Fig. 1). No excess of the permissible concentration of metals in plants used as animals forage were found in the maize and faba bean biomass.

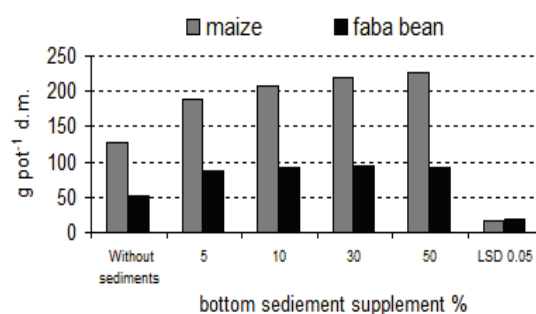


Fig. 1 Yield of plants

References: [1] Fonseca et al. (1998) *Episodes*, 21(4): 218-224; [2] Baran et. al. (2012) *Ecological Chemistry and Engineering* 19(8): 863-872; [3] Jasiewicz et al. (2010) *Journal of Elementology* 15(2): 281-291.

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