

Figure 2 presents a point cloud illustrating the relation of soil water absorption capacity to its initial moisture.

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THE EFFECT OF ADDITION OF ZEOLITE ON CHANGES IN SURFACE CHARGE OF SELECTED SOILS

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Zeolites are natural aluminosilicates composed of AlO_4 and SiO_4 tetrahedra arranged into ordered crystallographic network. They were formed after volcanic ash settling in ancient alkaline lakes.

Zeolites have been widely used in agriculture (Reháková et al. 2004), microelectronics, optics, medicine, environmental protection and chemical industry. In agriculture zeolites are used as fertilizers, feed additives and soil conditioners. One of the main advantages of a zeolite is a high sorption capacity and its ability to bind cationic nutrients and water molecules (Mansouri et al. 2013). As a result, zeolites prevent the elution of the nutrients from the soil, thereby increasing their availability to the plants as well as increase water retention in the soil during periods of drought. Furthermore zeolites have a storage capacity for gases (eg. air) and have a positive effect on soil ventilation.

Potentiometric titration method enables estimation of surface charge amount as well as determination of distribution function of the apparent dissociation constants of surface charge generating functional groups (Dubach et al. Ephraim et al. 199, Kohler et al. 2002, Maes et al. 1999, Matyka-Sarzyńska et al. 2000, Sposito et al. 1979).

The aim of this study was to determine the effect of different doses of zeolite on surface charge of the two soils – black earth and brown soil formed from loess using back-titration method according to the procedure described

in Matyka-Sarzyńska et al. 2000. The experimental apparatus Titrino provided by Mettler Toledo equipped with Orion combined electrode was applied for titration.

The results of the experiments are presented in Table 1.

Table 1. Surface charge (CEC) and average surface dissociation constants (aK_{ppav}) of the studied soils before and after zeolite addition:

Black earth			Brown soil formed from loess		
Dose of zeolite	CEC	aK_{ppav}	Dose of zeolite	CEC	aK_{ppav}
0%	20.5	7.14	0%	13.46	7.94
1%	18.46	7.22	1%	12.46	6.53
5%	29.53	6.27	5%	14.42	6.26
10%	29.01	7.35	10%	22.1	7.04
20%	29.93	7.48	20%	24.6	7.84
40%	42.6	6.88	40%	41.20	6.76

The zeolite addition increased surface charge of all soils, however it was not proportional to the amount of zeolite dose

ACKNOWLEDGEMENTS

This research was financed by the Project No IPBU.01.01.00-06-570/11-00 Developing an innovative model of the cross-border use of zeolitic tuff.

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