

DYNAMICS OF SELECTED CHEMICAL AND MICROBIOLOGICAL PROPERTIES CHANGES IN SOILS AFTER APPLICATION OF ULTRA-FINE POWDERED CALCIUM CARBONATE – INCUBATION STUDIES

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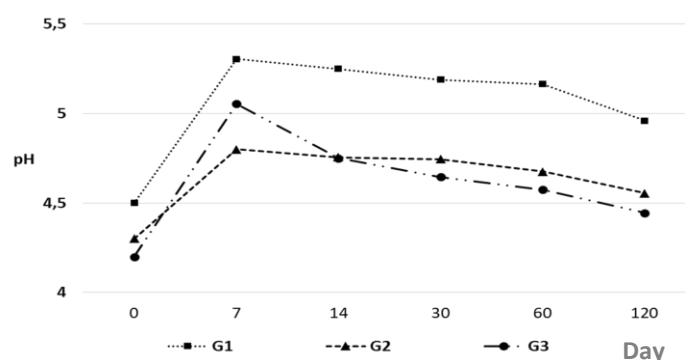
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Soil acidification is one of the major global drivers of soil degradations this negative effect cause that soils becoming less useful for food production. The solution to the problem of soil acidification may be liming. The aim of this research was to determine the rate of action and influence of ultra-fine powdered calcium carbonate on selected chemical and microbiological soil properties.

The incubation studies were conducted on the three soils (G1, G2 – silt loam and G3 – sandy loam). Soil samples were taken from the 0-20 cm layer. Soil properties were measured after 7, 14, 30, 60 and 120 days of incubation. Liming treatment consisted of very fine-powdered CaCO_3 (below 0.08 mm), applied with dose calculated for 0.5 hydrolytic acidity of soil; a no-lime treatment served as control. Soil properties measured after incubation: pH_{KCl} , buffer capacity, microbial biomass carbon (MBC) and dissolved organic carbon content (DOC).

The very fine-powdered lime characterise high reactivity, as a result already after a few days of incubation changes of pH_{KCl} value and microbiological soil properties are noticeable. In examined soils long-term changes in buffer capacity were not noted. The study showed higher buffer capacity in the alkaline range than in the acid range. The microbial biomass carbon content was varied during the incubation in all studied soils. Generally, the dissolved organic carbon content increased during the incubation and samples with dose had higher values than the control.

pH_{KCl}



Buffer capacity

	G1			G2			G3		
	Day								
	0	7	120	0	7	120	0	7	120
*P _{NaOH}	20.89	24.84	20.07	16.35	17.89	19.38	24.87	25.19	25.79
*P _{HCl}	9.36	13.25	10.12	9.64	8.97	9.49	8.74	10.20	6.25
*P	30.25	38.09	30.20	25.99	26.86	28.87	33.61	35.29	32.03

* P_{NaOH} - alkaline surface area; P_{HCl} - acid surface area; P - total buffer area.

MBC and DOC

Day	MBC		DOC	
	Dose	Control	Dose	Control
	[$\mu\text{g C} \cdot \text{g}^{-1}$]			
G1				
7	74.61	88.44	9.88	10.78
14	36.00	78.19	8.47	12.02
30	74.35	84.72	7.85	12.74
60	77.17	81.53	13.68	13.58
120	27.91	81.49	11.83	12.88
G2				
7	84.83	84.79	1.31	4.72
14	84.43	81.42	5.20	1.34
30	95.03	84.29	11.74	6.83
60	74.63	82.03	11.23	6.05
120	84.04	79.52	13.86	8.11
G3				
7	76.72	76.61	2.59	4.75
14	75.60	69.80	3.84	3.68
30	76.25	69.50	6.80	4.78
60	72.90	71.78	7.45	4.82
120	66.23	62.51	7.84	5.49