

Effect of very fine-powdered lime on soil properties – incubation experiment

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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. Soil acidification leads to loss of base cations, increase of toxic heavy metals, unavailability of nutrients, structural deterioration of soil, and reduction of soil biological activity. The solution to the problem of soil acidification may be limning. It is a long established practice, and its effectiveness depends on the composition, reactivity and fragmentation of the lime material added. Although the effect of limning have been known for centuries, agriculture continues to develop and change this method. The aim of the study was to investigate the influence of very fine-powdered lime on soil properties such as: pH_{HKCl}, dehydrogenases activity (DHA) and sorption properties.

Soil samples were taken from the 0-20 cm depth. Samples, during incubation, were analysed for soil pH, DHA and sorption properties. Incubation experiment were conducted on three soils of different texture (silty loam, sandy loam and clay loam). Limning treatment consisted of very fine-powdered CaCO₃ (below 0.08 mm), applied with dose calculated for 0.5 hydrolytic acidity of soil; a no-lime treatment served as control. Soil samples were stored in polyethene boxes and kept in the laboratory at 24±2°C for 150 days; while maintaining moisture at the level of 60% of the water holding capacity. Soil properties were measured after 3, 5, 7, 15, 30, 60, 90, 120, 150 days of incubation.

The average increase of pH after application of lime was 0.5, 0.6, 0.3 units for silty loam, sandy loam and clay loam soils respectively. On the sandy loam soil was observed significantly decrease pH_{HKCl} value after 30 days of incubation. The same relation was noted for silty loam and clay loam soils, but this effect was observed after 60 days of incubation. On the all types of soils greater DHA was found in lime-treated than in no-limed soils, however DHA decreased over time. Liming significantly improved sorption properties of soils, especially sandy loam soil, in which base saturation increased on average from 57.6% to 92.2%. These studies show that use very fine-powdered lime is effective and fast way of decreasing soil acidity, increasing dehydrogenases activity and sorption properties of soil.

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