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## Influence of the degree of soil organic matter lability on the calcium carbonate equilibrium of soil water

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: In average samples of three sandy-loamy acid Cambisols from a South Bohemian area labile organic matters were determined by the permanganate method modified by the dichromate method, and the rate constant of their biochemical oxidation was determined in hot water extracts of the samples. The need of liming was determined by means of 2 methods. In soil solutions of these samples, all values necessary to evaluate their calcium carbonate equilibria were determined. The soil samples were enriched with 3% of dry matter of two organic materials, farmyard manure and meadow clover meal, and were incubated at 25°C for 180 days under wetting above 50% of their retention water capacity, and after this procedure all analyses were repeated. Both methods were found to increase the need of liming in all three soils: the more labile the organic matter in 3% addition, the higher the need. The meadow clover matter was more labile than the farmyard manure matter. All three methods for the study of soil carbon lability yielded similar results while the potassium permanganate method was more sensitive than the dichromate one. Increases were observed in equilibrium  $[Cr(H_2CO_3^*)]$  and in Langelier saturation index  $I_s$ . This means that soil liming cannot be considered only as an adjustment to the soil acidity and supply of calcium to plants to meet their requirements, but also as a replacement of the spontaneous adjustment to calcium carbonate equilibrium of soil water, for which through mineralisation of labile organic matters in conditions of our experiment about 220 kg  $CaCO_3$  per hectare of land were consumed on condition that it was not necessary to re-establish it. The process of Ca-compound consumption to establish the calcium carbonate equilibrium is controlled exclusively by the degree of mineralising organic matters lability while the influence of soil properties is only marginal. The same results were provided by the comparison of calcium carbonate equilibria in nine Šumava brooks of the total watershed area 78 564 km<sup>2</sup> with the degree of lability of organic matters in their sediments in 1986, 2001 and 2004. A reduction in the intensity of agricultural production in 1986–2004 resulted in an increase in the stability of organic matters in the sediments, in a decrease in  $I_s$ , and in a lower corrosivity of brooks water towards  $CaCO_3$ . However, the quality of soils and their potential soil fertility decreased due to the loss of labile organic matters.

### Keywords:

calcium carbonate equilibrium; degree of lability; liming need; soil organic matter; soil water

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