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Kommission VII: Bodenmineralogie

Mineral-organische Wechselwirkungen: Bildung, Eigenschaften und Auswirkungen auf Stoffkreisläufe

## Autoren
C. Vogel[1], F. K. Olagoke[1], M. R. Gordon[2], K. Kalbiltz[1]
[1]TU Dresden, Institut für Bodenkunde und Standortslehre , Tharandt; [2]Rothamsted Research, Sustainable Soil and Grassland Systems, Harpenden

## Titel
Clay content influences the production of extracellular polymeric substances in soil – Implications for soil aggregation

## Abstract
The excretion of extracellular polymeric substances (EPS) as microbial glue is an enthralling mechanism probably determining aggregate turnover and C sequestration. However the role of EPS in soils and the factors influencing the production by microorganisms are poorly understood. Moreover, interdependencies between important factors like the amount of fine-sized particles (clay content), the decomposability of organic matter and the microbial community (size and composition, as well as the excretion and composition of EPS) affecting aggregation and C sequestration are still under debate. Here, we studied the complex interactions between these factors and their role in aggregate turnover. Therefore, an incubation experiment has been conducted across a gradient of clay content (addition of montmorillonite) and substrate decomposability (starch and cellulose) as main drivers of the microbial activity. A combination of microbial parameters as well as aggregation parameters (formation and stability) have been determined. The first results showed a strong response by microorganisms to the increased clay contents, with reduced and decelerated microbial biomass production and $CO_2$respiration, respectively. Interestingly, the EPS measurements indicate a change in EPS production and composition with increasing clay contents, as the ratio of EPS sugars to EPS proteins changed with increasing clay contents. The highest concentrations of EPS sugars were found in the soils without clay addition, whereas the highest EPS proteins could be found in the soils with the largest increase in clay content. Effects of these changes on aggregate turnover and changes in the microbial community are examined at the moment. This study is expected to provide insights on the role of changes in amount and composition of EPS in soils, the underlying mechanisms and there implications on aggregation. Thus, the results of this study will provide an improved base for a better understanding of C sequestration in soils.