Geophysical Research Abstracts, Vol. 7, 07905, 2005
SRef-ID: 1607-7962/gra/EGU05-A-07905

1 Transport of Microorganisms in Unsaturated Soils: Role of Matrix and Cell Properties

G. Gargiulo, P. Ustohal, P. Klauth, H. Vereecken and **E. Klumpp**

Institute Agrosphere, Research Centre Juelich, D-52425 Juelich, Germany

The understanding of the bacteria transport in the subsurface is an important challenge concerning health safety and environmental risk assessment.

We investigated the transport of suspended soil bacteria in columns packed with quartz sand as function of cell characteristic as well as the hydraulic conditions. The selected bacteria strains differed extremely in cell shape and hydrophobicity. Especially, the moisture content influence on the bacteria transport has been studied in correlation with the single strain hydrophobicity. To understand how the bacteria cells interact with the matrix pore space, transport experiments with different grain size have also been performed. The different bacteria growth condition effect has been investigated using metabolically active bacteria harvested in the Log phase.

Unlike in field experiments with natural soils, the laboratory setup allowed a thorough control and monitoring of the experimental conditions as well as a complete budget of the microorganisms. This was achieved by determining the distribution of the biomass at the inlet, outlet and inside the packing.

The breakthrough curves of the investigated strains did not show any considerable retardation when compared to a conservative tracer but a significant part of the microorganisms was retained in the packing. The bacteria retention appeared irreversible with respect to the gradient of ambient concentration (no detachment observed when bacteria suspension was displaced by pure water) and strongly dependent on packing

saturation degree and grain size as well as cells characteristics like hydrophobicity, age and size.