# Soil carbon accumulation process as affected by infiltration pattern.

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Soils are largest terrestrial carbon storage body, however, these days this fertile zone is suffering from soil erosion, permeability descent and thus carbon loss. Therefore, we introduced artificial macropore to enhance vertical infiltration along with organic carbon accumulation. At the same time, non-structural flow, fingering infiltration, was also examined. Toyoura standard sand was packed in a Hele-Shaw cell and artificial macropore made of glass fiber was installed. 100mL of Benzoic acid (500mg/L) with nutrient (N:P:K=6:10:5) was applied with 60mm/h rainfall intensity. Hele-Shaw cells were incubated with 30 °C with RH60%, which were sampled at 1,3,6 days after the rainfall.
Results showed that bypass flow with spot at the bottom was observed for artificial macropore, while wetted vertical downward belt was observed for finger flow. Benzoic acid was observed at the surface for most of the experiments even after 6 days, and there were not clear difference in Benzoic acid contents between surface and lower part. However, water contents were higher at lower part of the cell, which meant macropores were beneficial for vertical infiltration along with evaporation suppression.
Multiple regression analysis for upper and lower part showed that water content contribution, rather than EC, was significant for Benzoic acid concentration. Partial regression coefficient showed negative for upper part of the cell, thus higher the water contents, lower the Benzoic acid concentration. On the other hand, the coefficient showed positive for lower part of the cell, thus higher the water contents, higher the Benzoic acid concentration.
Overall, Benzoic acid showed higher concentration and higher degradation trend at the surface, while degradation resistance was observed at the lower part of the cell. Macropore infiltration showed bypass flow with spot at the lower part, therefore, we estimated that macropore had advantages for organic carbon accumulation with enhanced infiltration.

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