Foam Fertilizers for Healthy Soils

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Fertilizers play a critical role in supporting the agricultural activities worldwide. The conventional fertilizer application methods often utilize the fertilizer granules or liquids over the agricultural land. The fertilizer is thus transported into the soil with percolating irrigation water. However, the presence of preferential liquid flow pathways in the soil affects the transport of the fertilizer into deeper soil layers, bypassing the roots and leaching into the groundwater resources. Hence the application does not serve the intended purpose of supplying nutrients to the plants resulting in less healthy soils and higher possibility of groundwater pollution.

Different agronomic practices have been proposed to improve the efficiency of fertilizer application and reduce leaching to the environment. In this project, the application of a novel method for improving the efficiency of liquid fertilizer delivery using foam as a carrier will be investigated. The idea has been established in a recent study by Prof. Shokri and co-workers [Shojaei et al., 2022]. We thus aim to experimentally address the impact of soil and foam characteristics on the retention of nutrients in agricultural soils and the uptake of essential agricultural macronutrients by plants under foam-based fertilizer delivery.

If you are interested in this project, please feel free to contact Dr. Milad Aminzadeh (milad.aminzadeh@tuhh.de) for further details.

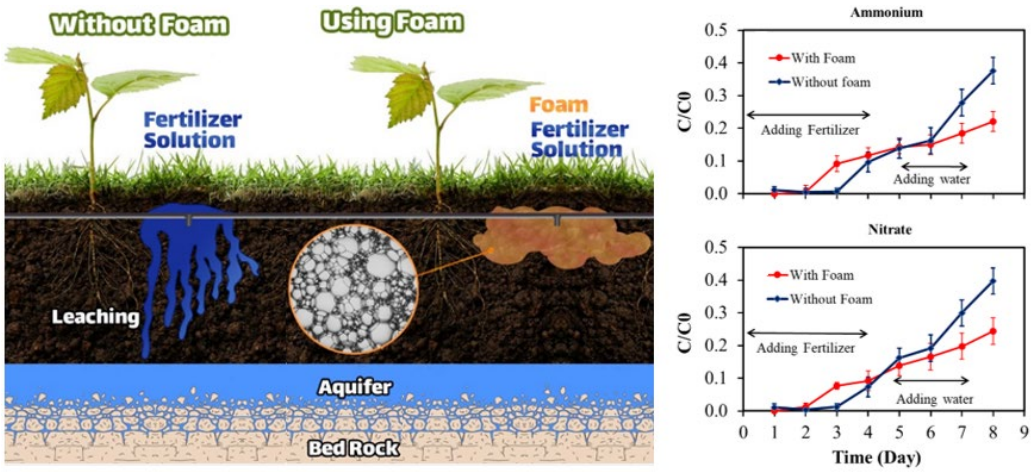

Figure 1. (left) Schematic representation of the foam-based fertilizer delivery technology; (right) preliminary results of ammonium and nitrate retention in soil highlighting the improvement of fertilizer delivery with foam application (adopted from Shojaei et al. [2022]).

Reference

Shojaei, M. J., Or, D. & Shokri, N. Localized Delivery of Liquid Fertilizer in Coarse-Textured Soils Using Foam as Carrier. Transp Porous Med 143, 787–795 (2022). https://doi.org/10.1007/s11242-022-01820-5