Eawag
Überlandstrasse 133
8600 Dübendorf
Switzerland
seminars@eawag.ch
www.eawag.ch

Eawag Seminar Invitation

Biodegradation of plastics in the open environment: fact, not fiction (?)!

Speakers **Dr Michael Sander, Institute of Biogeochemistry and Pollutant Dynamics, ETH Zürich, Switzerland**

When **April 8, 16.00 – 17.00, CET**

Where **Online via Zoom, contact seminars@eawag.ch for access details.**

Abstract Conventional plastics are designed to last and, if mismanaged after their use, they enter the open environment where they persist and thus accumulate over time. While considerable research efforts are (still) directed towards defining the scope of plastic pollution and identifying associated effects, the solution to plastic pollution is clear: reduce plastic use and reuse and recycle plastic whenever possible. However, for specific applications in which plastics are directly used in the open environment, an additional strategy to lower environmental plastic pollution is viable: the replacement of conventional with biodegradable plastics that are designed to undergo complete microbial metabolic utilization under formation of carbon dioxide (and methane under anoxic conditions) and microbial biomass. Among these specific applications are agricultural plastics that include plastic mulch foils used to cover soils to increase crop yields.

In this seminar talk, I will provide insights into our research on the biodegradation of synthetic agricultural polyesters in soils. The research addresses the three key steps in plastic biodegradation: the colonization of plastic surfaces by microbial degraders, the hydrolytic breakdown of the bulk polyester into smaller products by secreted extracellular microbial esterases, and the uptake and metabolic utilization of these breakdown products by soil microorganisms. I will highlight the unique advantages that result from using 13C-labeled polyesters in biodegradation studies, both in terms of being able to analytically track polyester carbon during the biodegradation as well as for obtaining a fundamental process understanding of plastic biodegradation. I will allude to pressing research questions on plastic biodegradation in soils and beyond and will outline our ongoing and future efforts towards addressing some of these questions. While biodegradable polymers are not the silver bullet to global plastic pollution, research on and the use of these materials is part of the solution to overcoming plastic pollution of the open environment.