**Leaching of biocides from polymer renders: Determine transport processes through the material during wet and dry cycles**

Ulla E. Bollmann1, Katarzyna Styszko2, Kai Bester1

1 Aarhus University, Dep. Environmental Science, Frederiksborgvej 399, 4000 Roskilde, Denmark, ueb@envs.au.dk

2 AGH University of Science and Technology, Dep. Coal Chem. & Env. Sciences, 30-059 Krakow Al. Mickiewicza 30, Poland

Polymeric resin based render and paints, which are often used as top coatings for thermal insulation systems, are very susceptible for microbial deterioration. Therefore, biocides are added in order to prevent algal, fungal, or bacterial growth on the façade of buildings. Previous studies have shown that biocides leach from the material with rain water and end up in surface waters, where they might have effects on different organisms.

Several processes for the transport of biocides from the deeper layers of the polymeric renders to the coating surface are discussed: (1) evaporative transport, i.e. the flow of water due to evaporation is transporting biocides towards the surface, (2) transport through the polymeric render matrix, and (3) transport through the water filled pores. In the present study the relevance of the three different processes for the transport of biocides to the surface was tested using wet and dry cycles with only short water contact times (3 s to 60 min). While some materials were kept soaked with water, other were left to dry between the contact with water.

The results showed that under experimental conditions evaporative transport was not relevant. The transport through constantly wetted material was considerably faster than by the other processes. Interestingly, not only the speed of leaching was influenced by the water content but also the equilibrium constants which were up to a factor of 10 higher for constantly soaked materials. A comparison of the emission rates at different contact times revealed that the emissions were highest when the render was in contact with fresh, unpolluted water. The different materials (acrylate and silicone render) showed significantly different leaching behavior concerning equilibria and mass flow dynamics, but for both the constantly wetted material leached most. However, these differences cannot only be explained by the differences in organic matter content in the materials.