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**The fate of biocides in stormwater pond sediments**

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Biocides are added to paints, wood preservatives, plasters, and other building

materials to protect them against fouling. Upon application, biocides also ensure

long shelf life of the product. However, biocides are slowly released, washed off

during rain, and enter the stormwater flow, resulting in concentrations that

routinely exceed quality standards set by the EC. Stormwater contains a range of

other pollutants which are perceived as problematic. To mitigate their impacts,

retention ponds are routinely used to treat the runoff prior to discharge into the

environment. The objective of this study is to assess how selected biocides are

sorbed and degraded in the organic-rich sediments of stormwater retention ponds.

No study has hitherto reported the fate of biocides in retention ponds, and only

few studies exists on pesticides in sediment from comparable systems. The

sorption capacity, sorption kinetics, and degradation of Cybutryn, Terbutryn,

Diuron and Carbendazim were investigated in microcosms simulating retention

ponds. Stormwater sediments were deposited at the bottom of microcosms, and

biocides were added. The removal of biocides from the liquid phase was

monitored. After 3 weeks of incubation the sediments were extracted and analyzed

for biocides. Parallel hereto sorption kinetics and stoichiometry was determined

on the same sediments kept in suspension, the latter based on the relevant OECD

standard. The total degradation of biocide was 10-30%, depending on biocide and

sediment type. The sorption determined by slurry-tests and the microcosm tests

did however not agree. The amount of biocide remaining in the liquid of the

microcosms after 3 weeks were up to 10 times higher than what was expected

based on the sorption capacities determined by the slurry tests. A fully dynamic

diffusion-sorption-degradation box-model was applied to analyze this

discrepancy. The simulations represented the measurements well and allowed

dynamic distinguishing between degradadation and sorption. The study showed

that all biocides underwent sorption and degradation in stormwater sediments to a

degree where these processes will affect the final amounts discharged from

retention ponds to receiving waters. It was furthermore observed that sorption

kinetics of biocides in deposited sediments differed significantly from those of

sediment slurries and that kinetics based on slurry experiments significantly

over-estimated the sorption to retention ponds sediments.