

Monitoring of Biocides in German Sewage Treatment Plant Effluents

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Background

Biocidal active substances are expected to be found in the environment due to widespread use of biocidal products (ca. 30.000 products registered in Germany¹). Biocides enter the environment through multiple emission pathways (Fig. 1). The main entry path in urban areas is through sewage treatment plants (STP). Projections show that there will be an increase of biocide entries in the environment, mainly in urban areas due to an increased use of e.g. disinfectants and especially masonry preservatives.

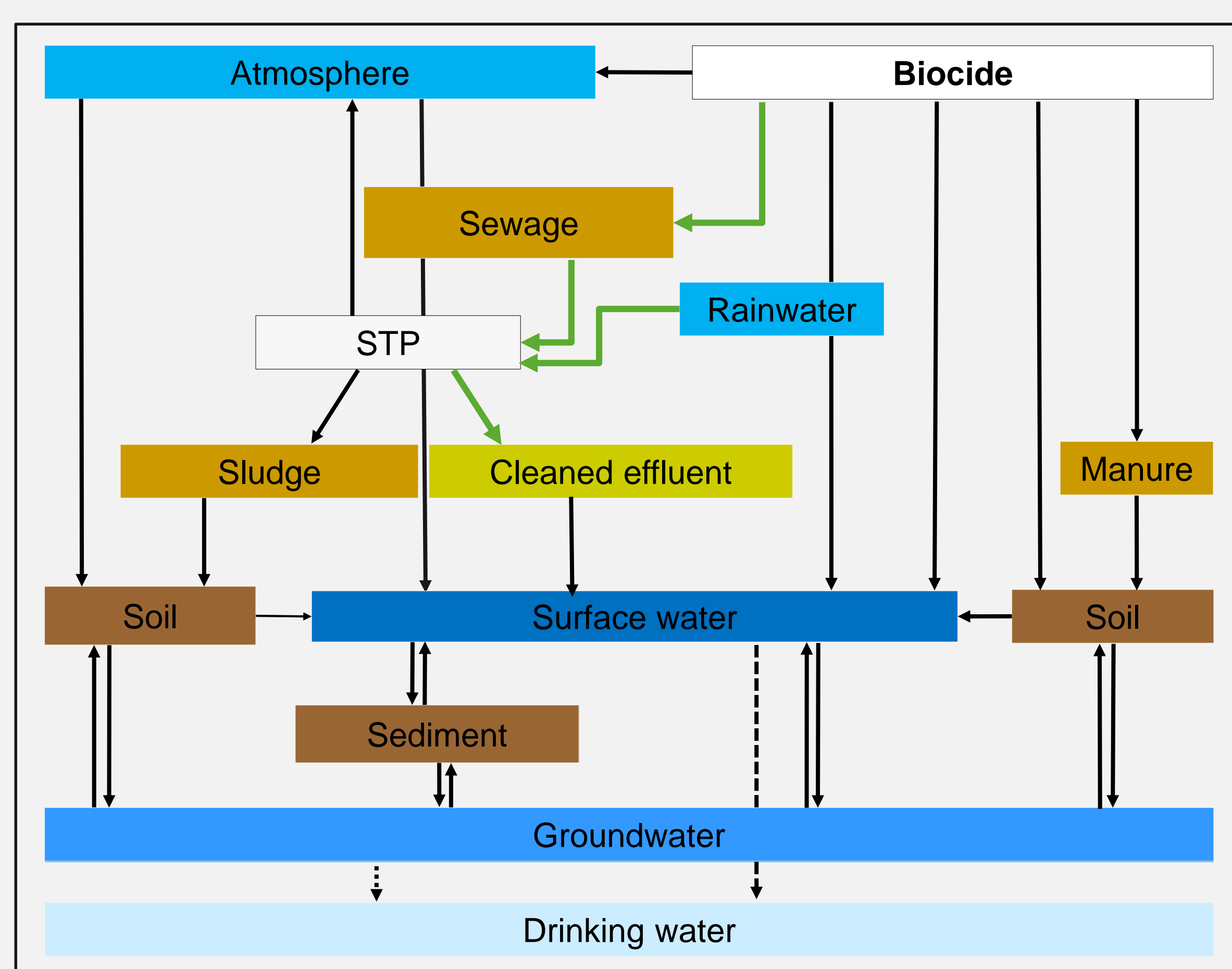


Figure 1: Entry paths of biocides into the environment. Entry path of the project: Biocide - STP - Cleaned Effluent

Investigation area

The German Environment Agency (UBA) initiated a project where the effluent of at least 30 STPs from all over Germany will be investigated over a period of one year, starting in September 2017. The STPs are selected from 49 STPs that are monitored for the inventory of priority substances in Germany (Fig. 2). Additionally, selected samples from influents, sewage sludges and rain overflow basins will be in the focus.

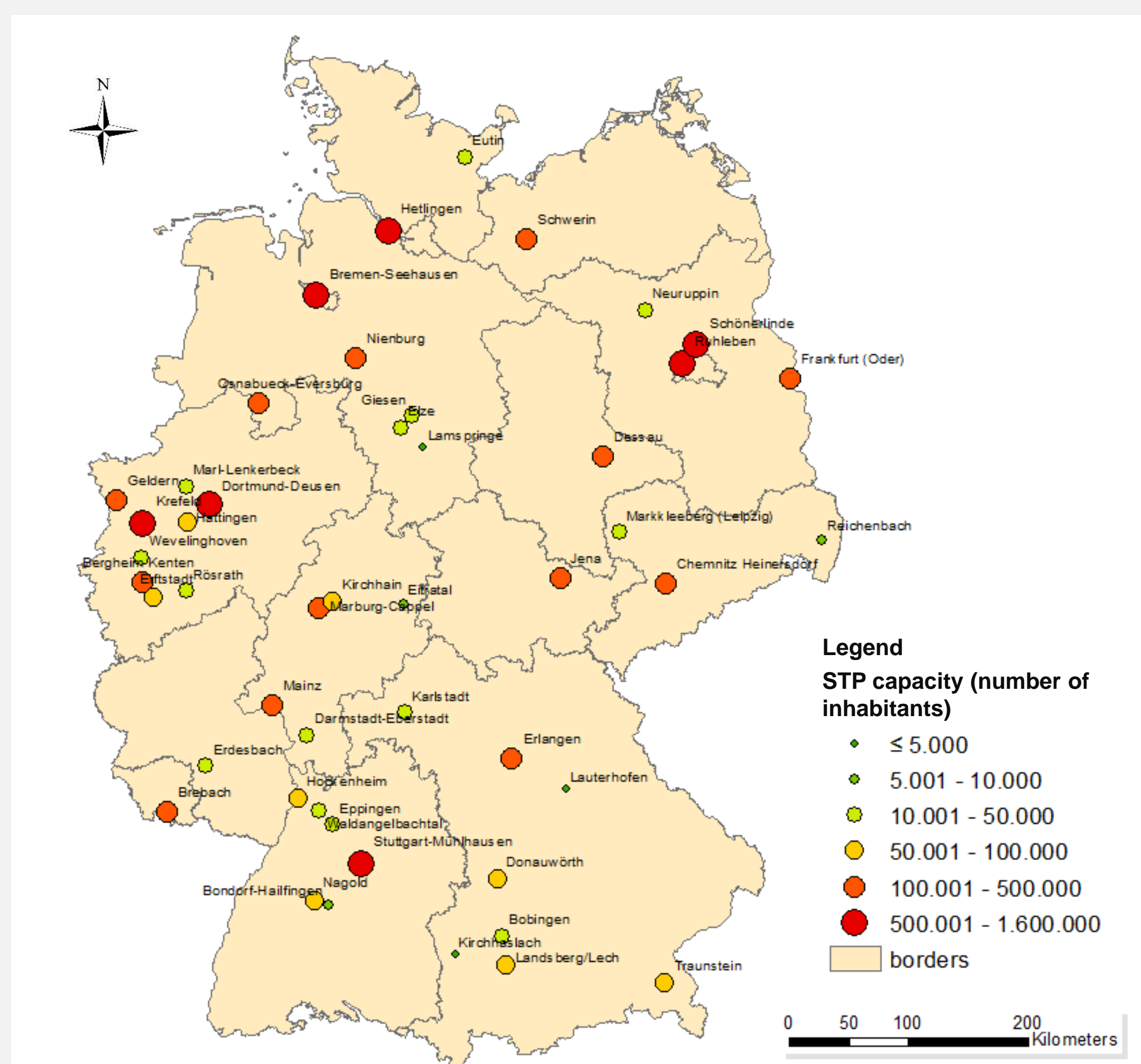


Figure 2: STPs selected for the inventory of priority substances.

Measurement parameters

Using an in-house prioritization concept for biocides, a list ranking substances that enter the environment through the STP-pathway was generated (Tab. 1). The list was judged by experts and finally more than 20 biocidal active substances or transformation products were chosen for analysis.

Prioritization criteria were emission volume, ecotoxicological effects, fate and persistence.

Prioritized substances



Disinfectants
Diclosan (DCPP)
Methyl-diclosan (TP of diclosan)
Triclosan
Methyl-triclosan (TP of triclosan)
Imazalil
Preservatives
2-Aminobenzimidazole (2-AB, TP of carbendazim)
1,2-Benzisothiazolin-3(2H)-one (BIT)
Carbendazim
Octhilinon (octylisothiazolinon, OIT)
Permethrin
Permethric acid (cis/trans, TP of pyrethroids, e.g. permethrin, cypermethrin, cyfluthrin)
Propiconazole
Tebuconazole
Thiabendazole
1,2,4-Triazole (TP of e.g. propiconazole)
Diuron
Isoproturon
Terbutryn
Pest control
Brodifacoum
Diethyltoluamide (DEET)
Difethialone
Imidacloprid
Prallethrin

Table 1: Biocides prioritized for STPs; TP=transformation product

Aim of the project

This project will provide better knowledge about the fate and behavior of biocides entering the environment through STPs. It will give us a time dependent picture of the environmental pollution by biocides in Germany through urban STPs and will also show possible fields of action for regulatory purposes.

Footnote: 1: BAuA directory of registered biocidal products (eBIOMELD)