



BIOCIDES IN COMBINED SEWER SYSTEMS: DRY AND WET WEATHER OCCURRENCE AND SOURCES

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Introduction

Biocides are used in building material to prevent growth of algae and fungi. It is known that the biocides are leached out of the material through contact with wind driven rain and, hence, are detectable in stormwater run-off¹.

Hypothesizing all biocides in urban waters derive from building material, biocides would only be present in combined sewage during rain events.

Objectives

1. Dry versus wet weather biocide concentrations and loads
2. Comparison of different WWTPs
3. Diurnal cycle of biocide emissions during dry and wet weather

Materials & Methods

- 24h and 2h flow-prop. composite and grab samples
- SPE-extraction, HPLC-MS/MS analysis

Full article:

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Studied WWTPs

Wastewater treatment plant	City, Country	Number of inhabitants
Bjergmarken	Roskilde, DK	74 000
Lynetten	Copenhagen, DK	531 000
Mølleåværket	Copenhagen, DK	130 000
Avedøre	Copenhagen, DK	235 000
Øresundsverket	Helsingborg, SE	130 000

Results

Fig. 1: Diurnal cycle of biocide emissions during wet and dry weather in WWTP Bjergmarken (Roskilde, Denmark).

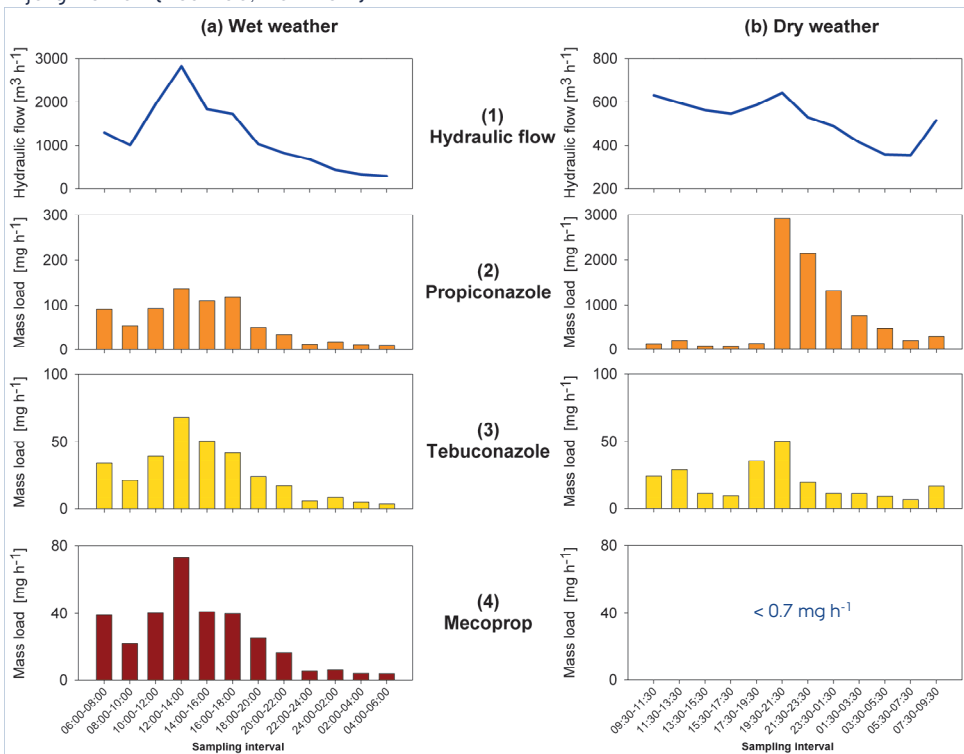


Fig. 2: Daily biocide load per inhabitant in the studied WWTPs during dry weather.

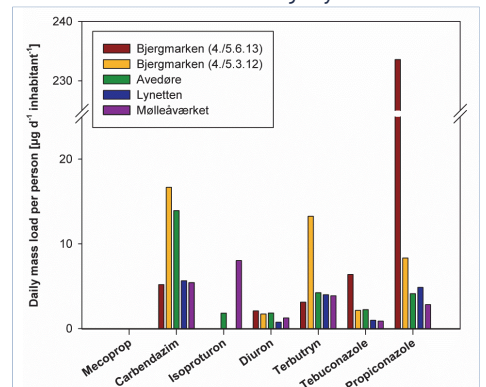
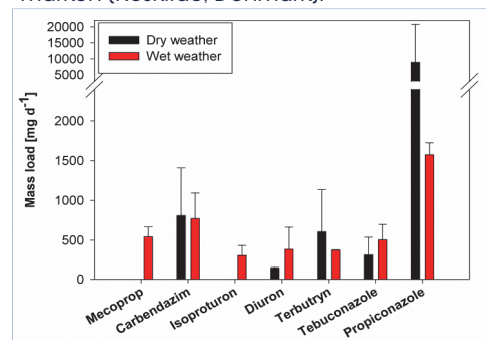


Fig. 3: Daily biocide load in WWTP Bjergmarken (Roskilde, Denmark).



Conclusions

1. Biocides cannot only be detected in combined sewage during wet weather periods but also during dry weather periods.
2. Higher dry weather emissions during day & evening than night: Emissions connected to human activities.
3. Disposal of paint & render or pesticide formulation (e.g. by cleaning equipment) might lead to detection in combined sewage during dry weather.

References

[1] Bollmann et al. Dynamics of biocide emissions from buildings in a suburban stormwater catchment - concentrations, mass loads and emission processes. Water Research 2014, 56, 66-76.

Acknowledgement

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