



AARHUS UNIVERSITY

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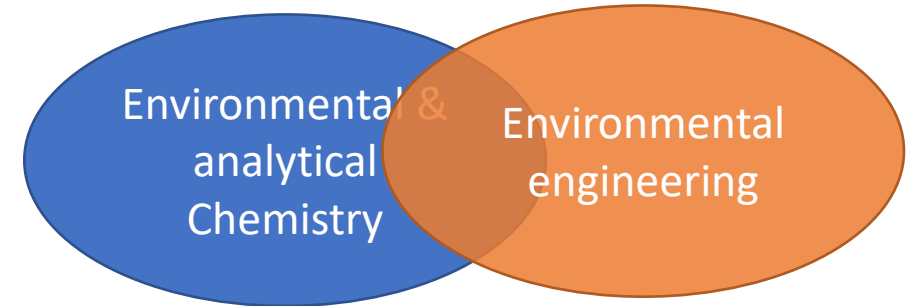
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AdvIQwater



Profile and contribution to AdvIQwater

- Biofilm systems,
- HPLC-MS/MS, UPLC-HRMS

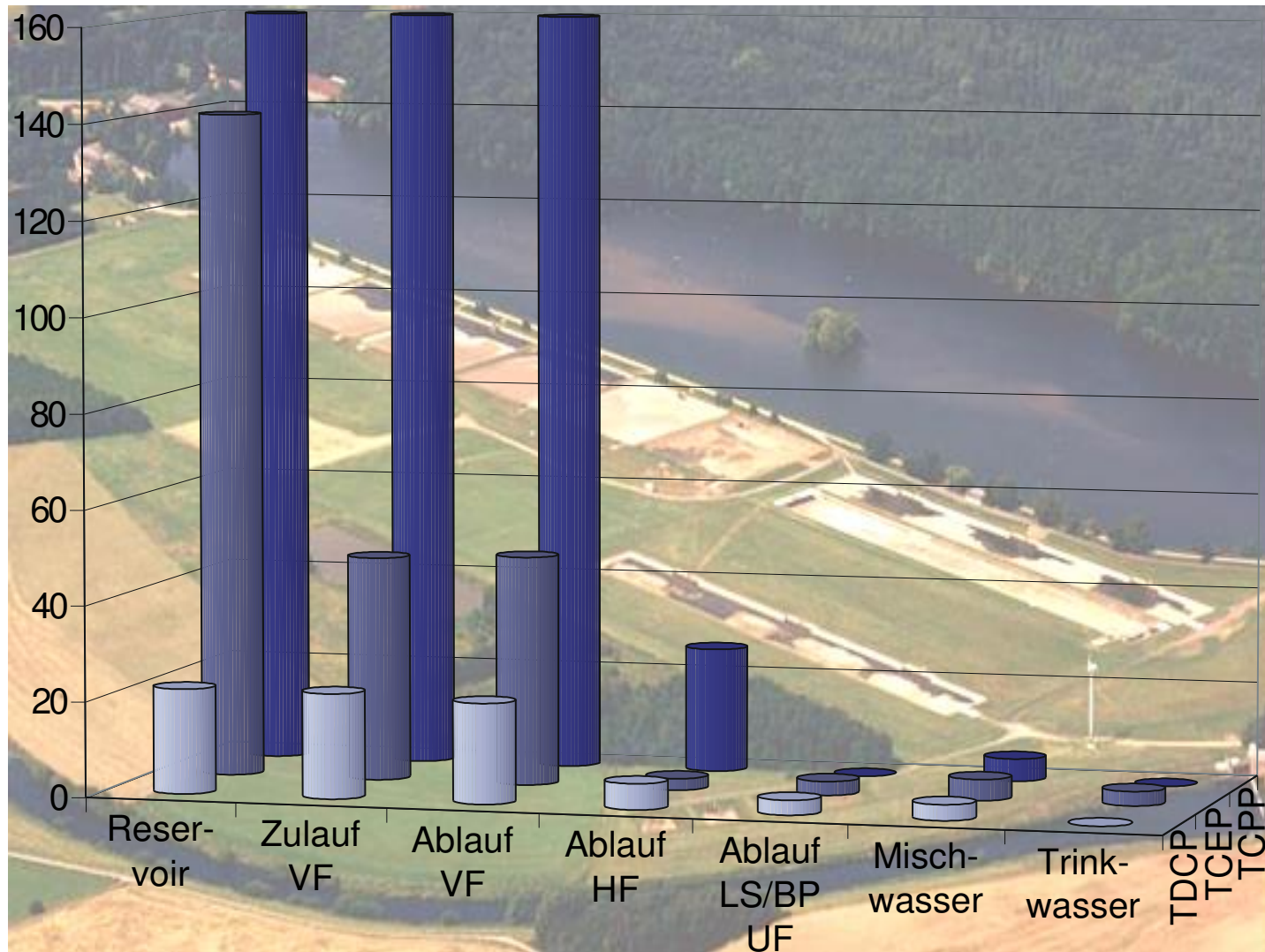


Why Biofilm?

Biofilms can degrade compounds sludge cannot degrade

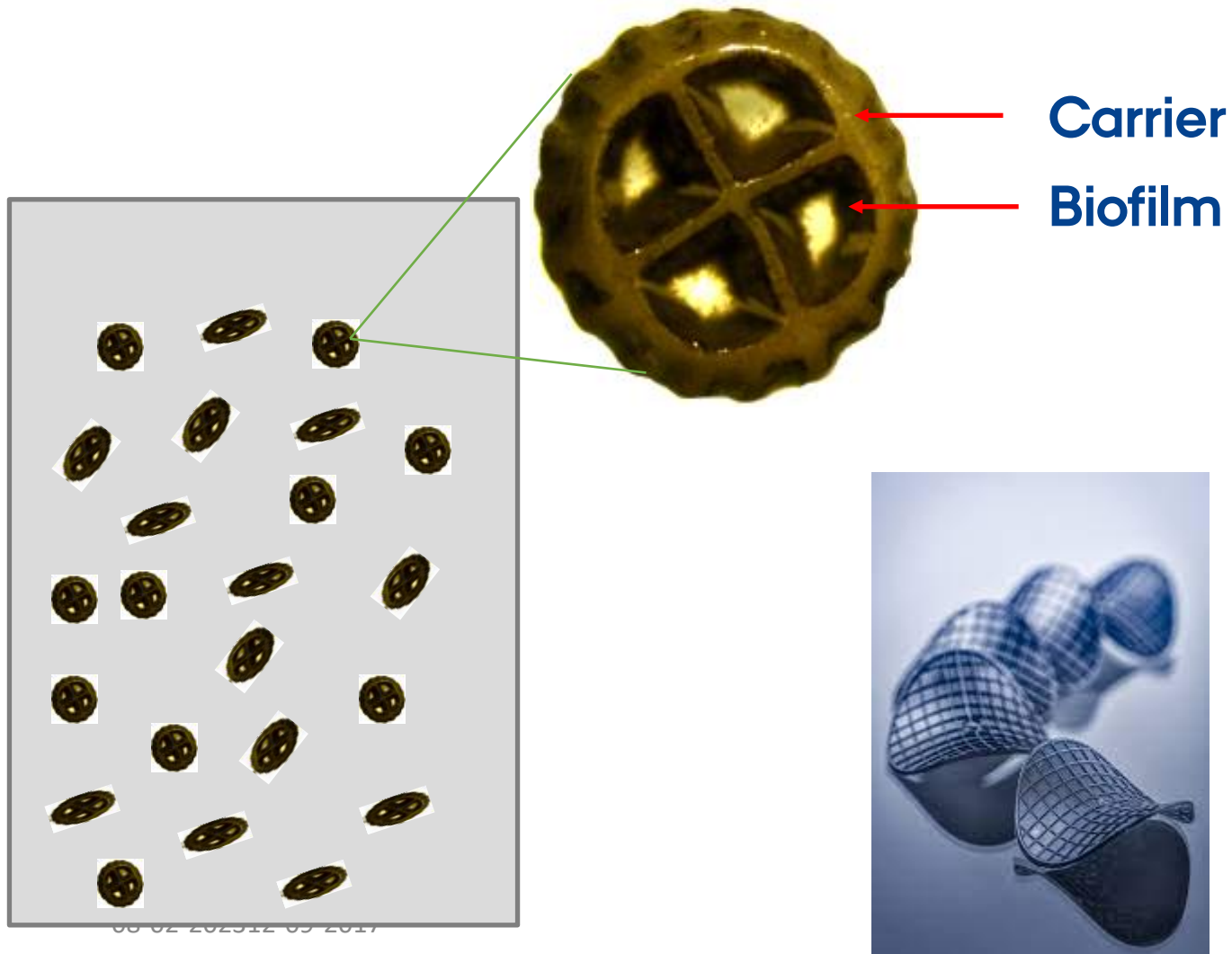
Carbamazepine, Organophosphorus flame retardants, Diclofenac,
iodinated x-ray contrast media

A lot of biofilm reactors are difficult to operate in wastewater contexts



- **Efficient removal of undegradable flame retardants**
- **The same installation is not able to remove caffeine efficiently**

Moving Bed Biofilm Reactors (MBBRs)



Carriers of one reactor have very similar communities

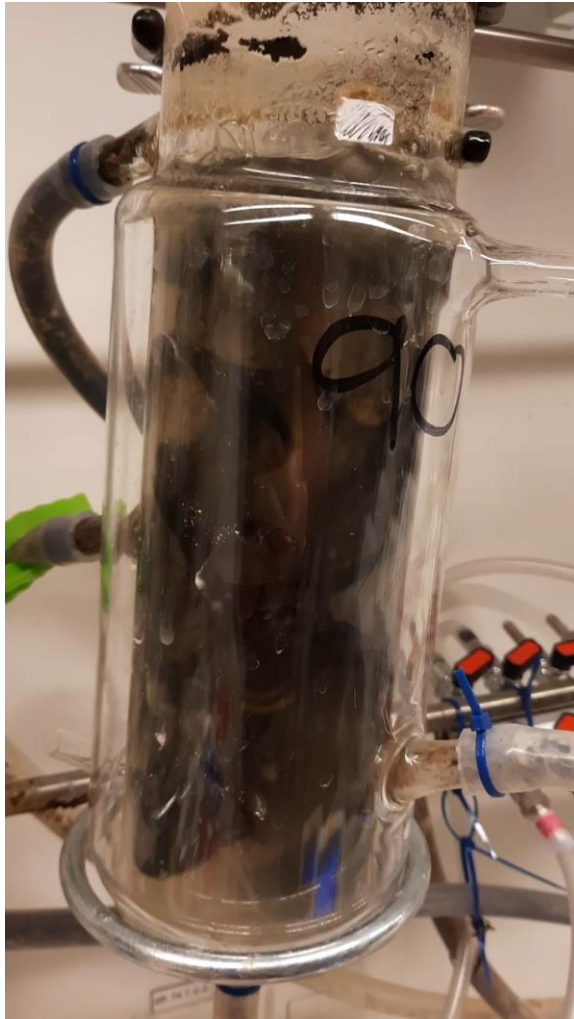
It is easy to run control, repeat experiments

Substrate distribution is homogenous

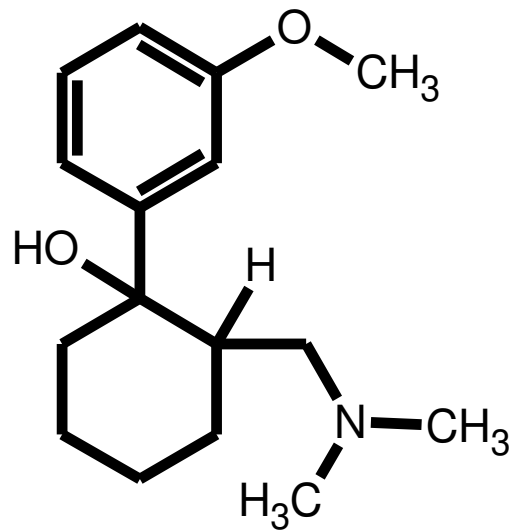
Film thickness can be controlled

-> supergood scientific toys

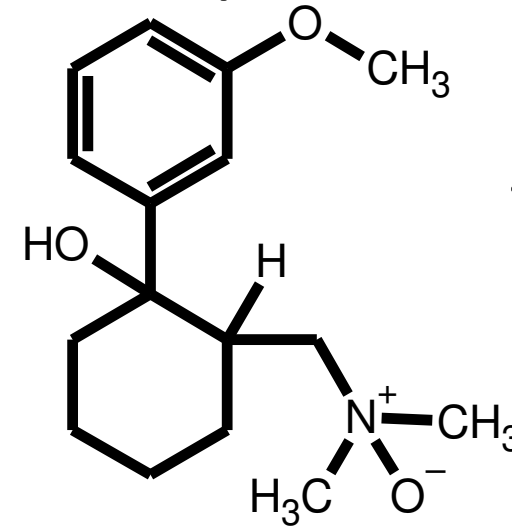
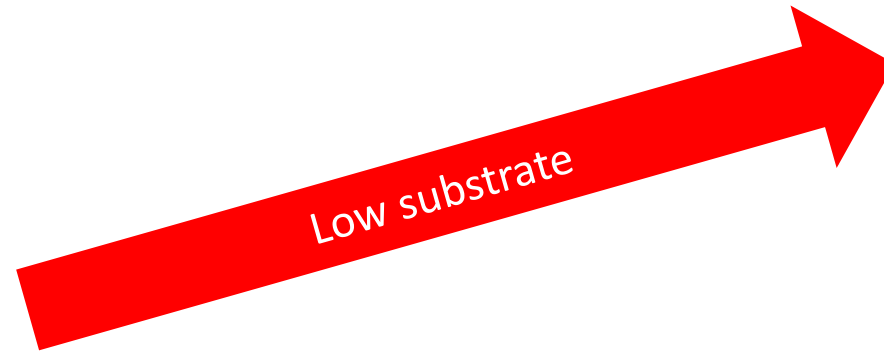
MBBR in the Lab



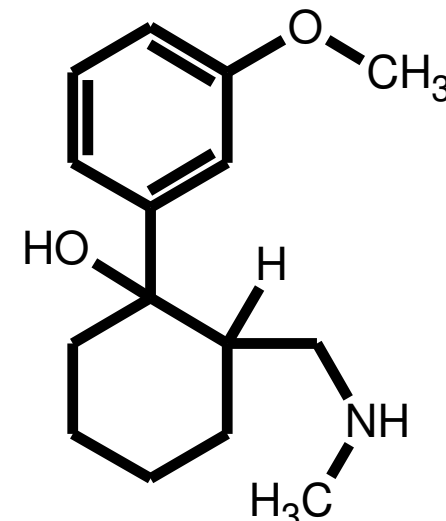
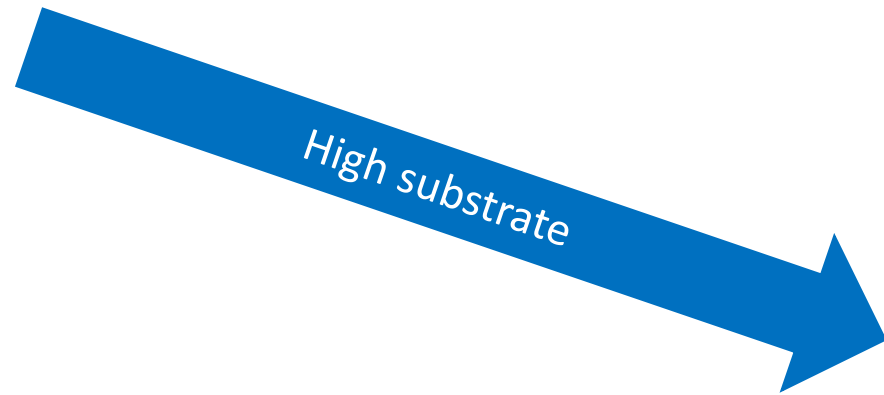
Dependency of preferred reaction pathway on C loading



tramadol



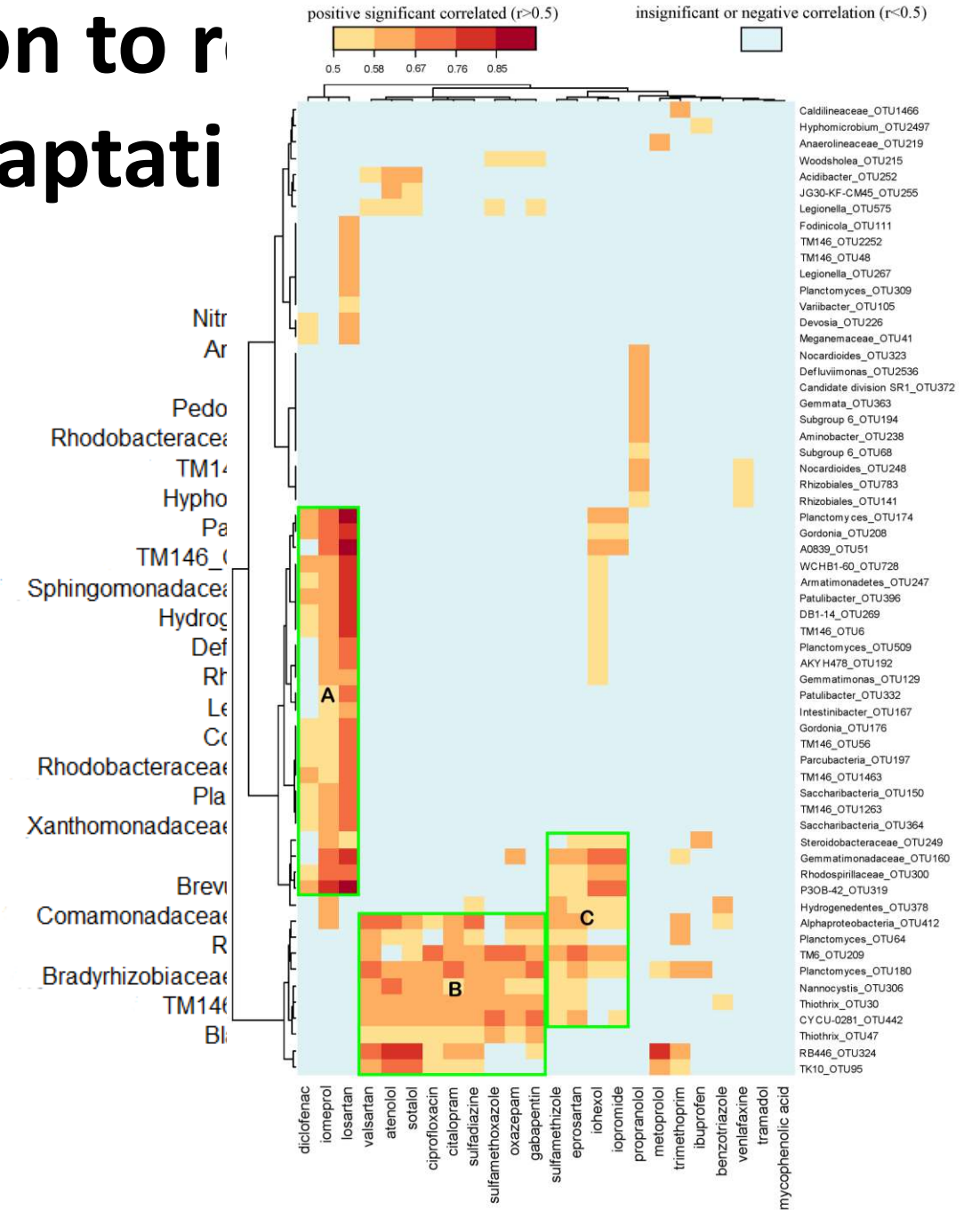
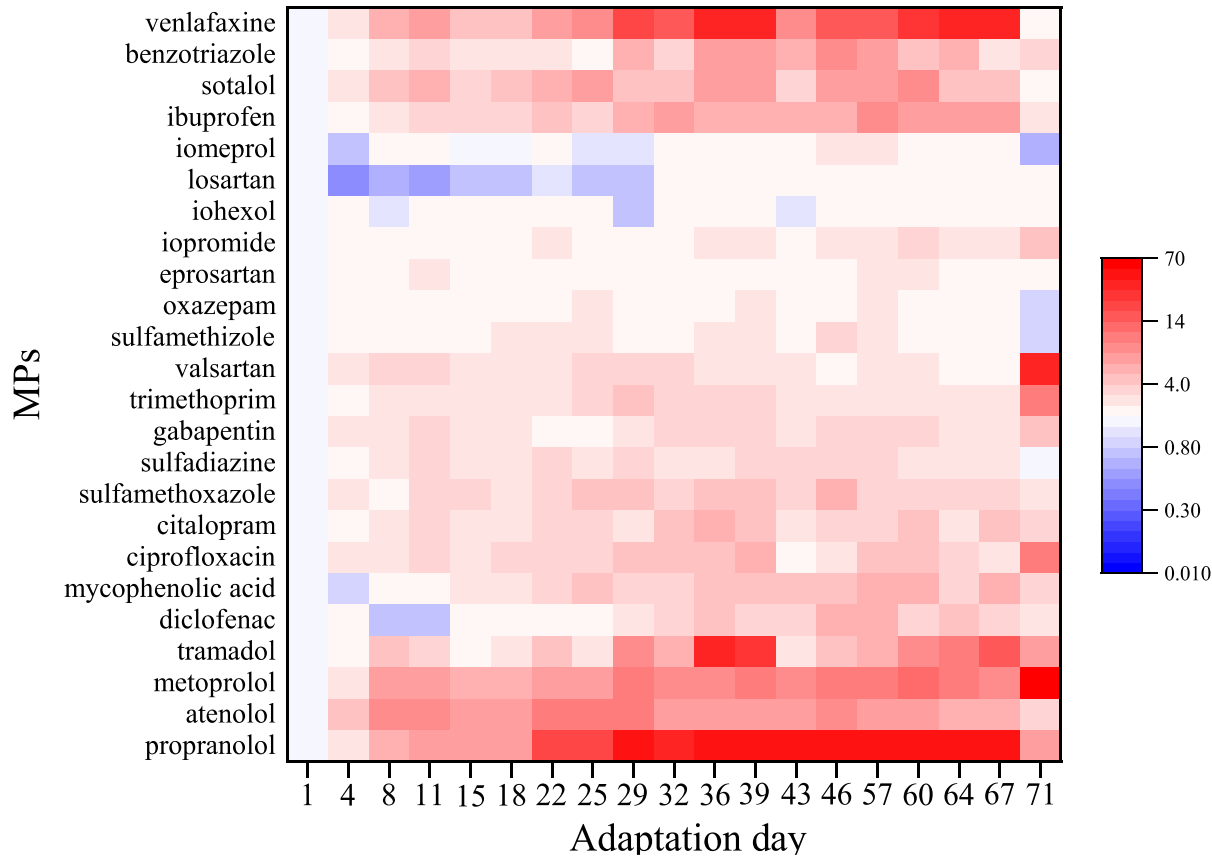
tramadol
N-oxide



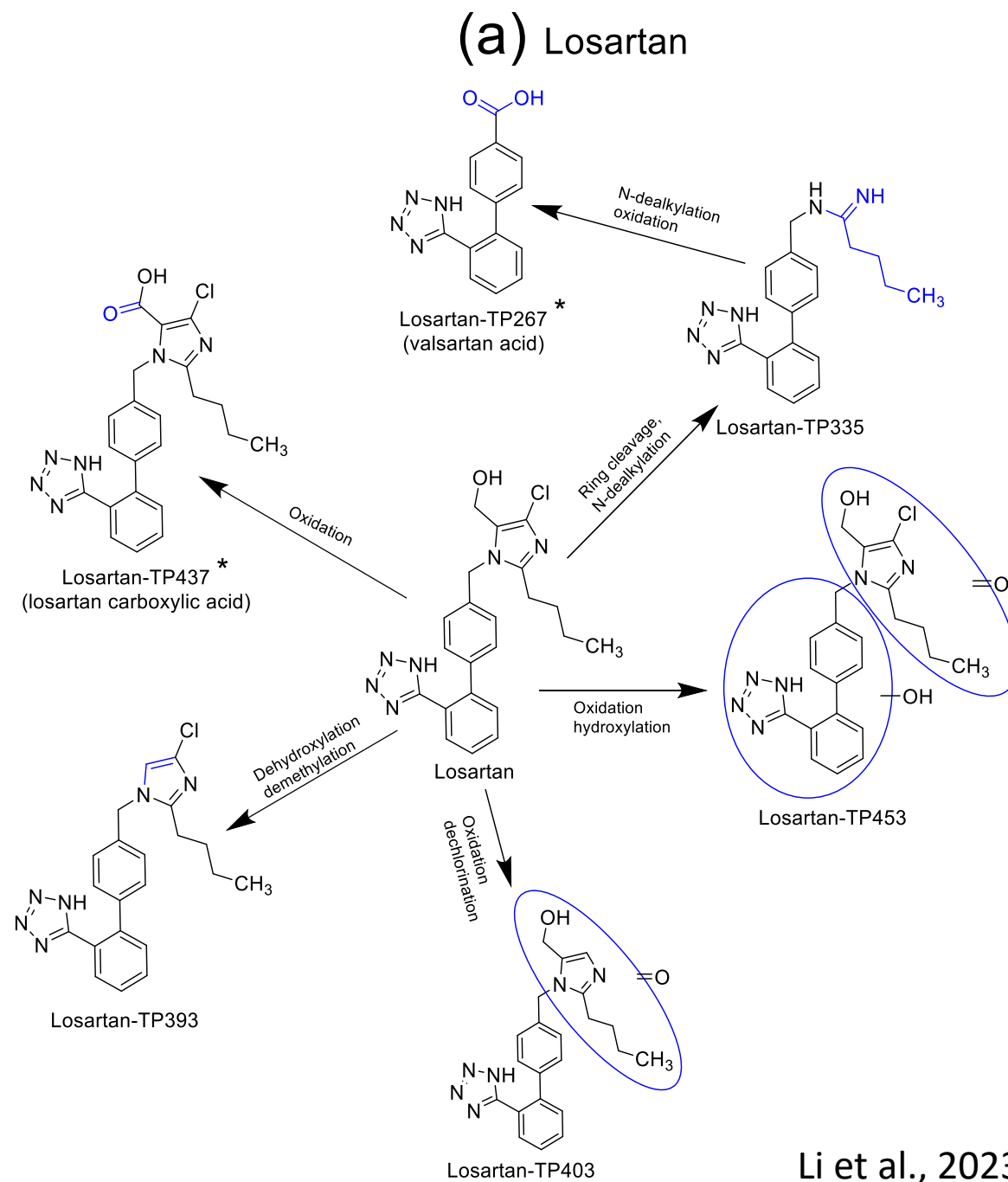
tramadol,
des *N*-methyl

Linking species composition to reactor during an adaptation

(a) Normalized k



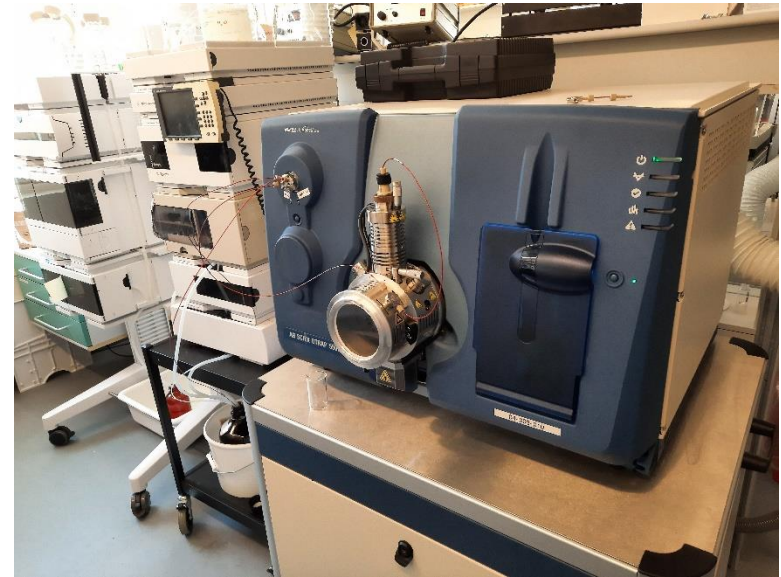
Resolving reaction products and -pathways



Analytical facilities at AU-ENVS

3 HPLC-MS/MS -

Quantification of hydrophilic compounds



6 GC MS Quantification of lipophilic compounds

2 HPLC-HR MS/MS –

Identification of compounds, non target analysis

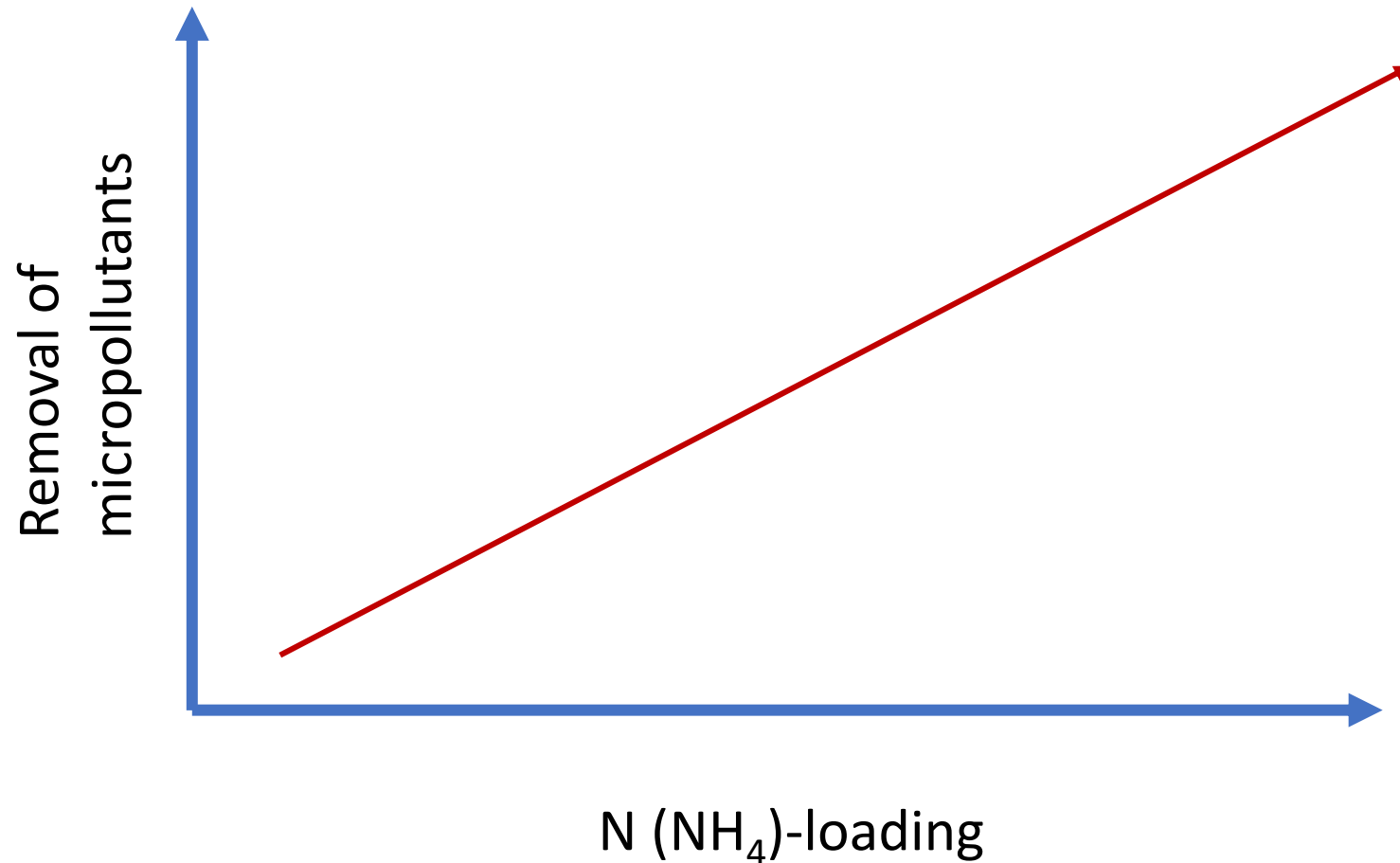


Research question I:

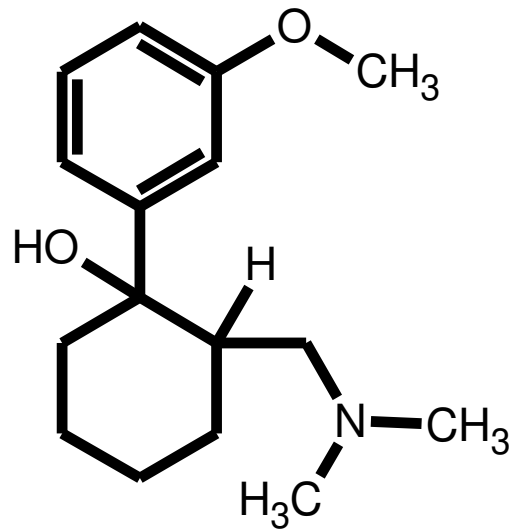
Is the removal of micropollutants in biofilm dependent on N loading?

Is MP removal linked to nitrification?

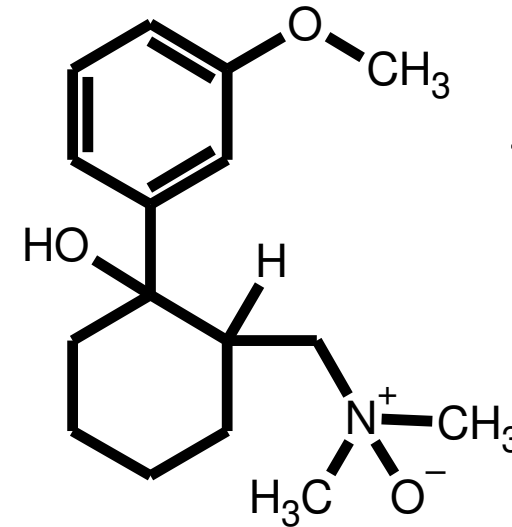
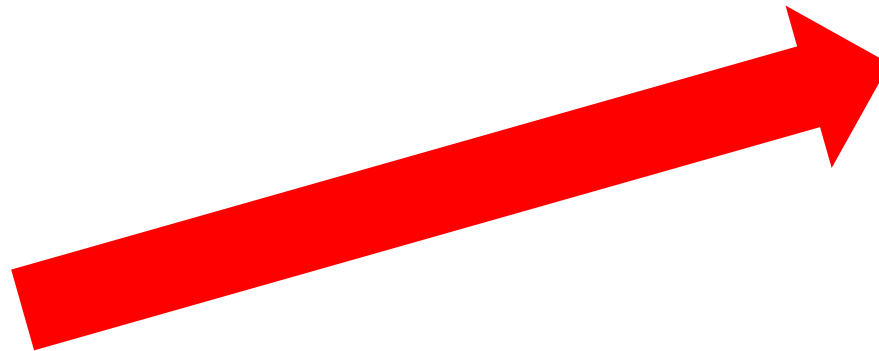
In AdvIQwater AU will explore the dependency of N loading on micropollutant removal



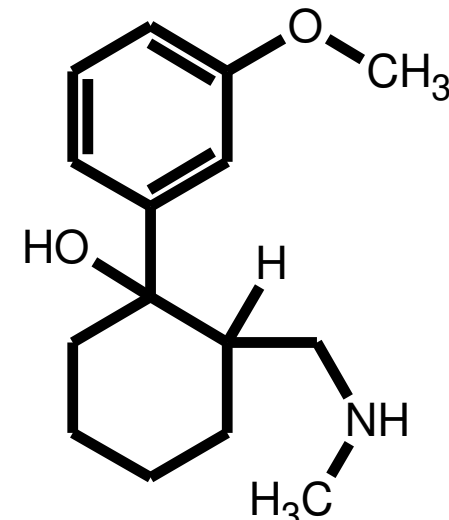
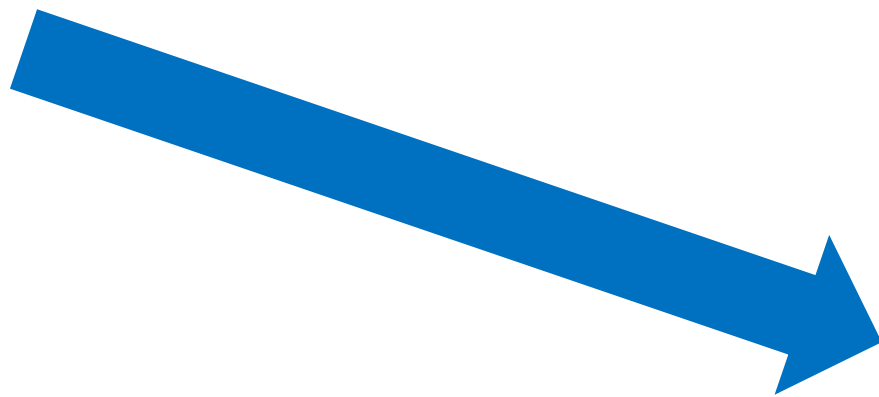
Question: are the ammonium oxidizing bacteria those that drive the micropollutant removals?



tramadol



tramadol
N-oxide

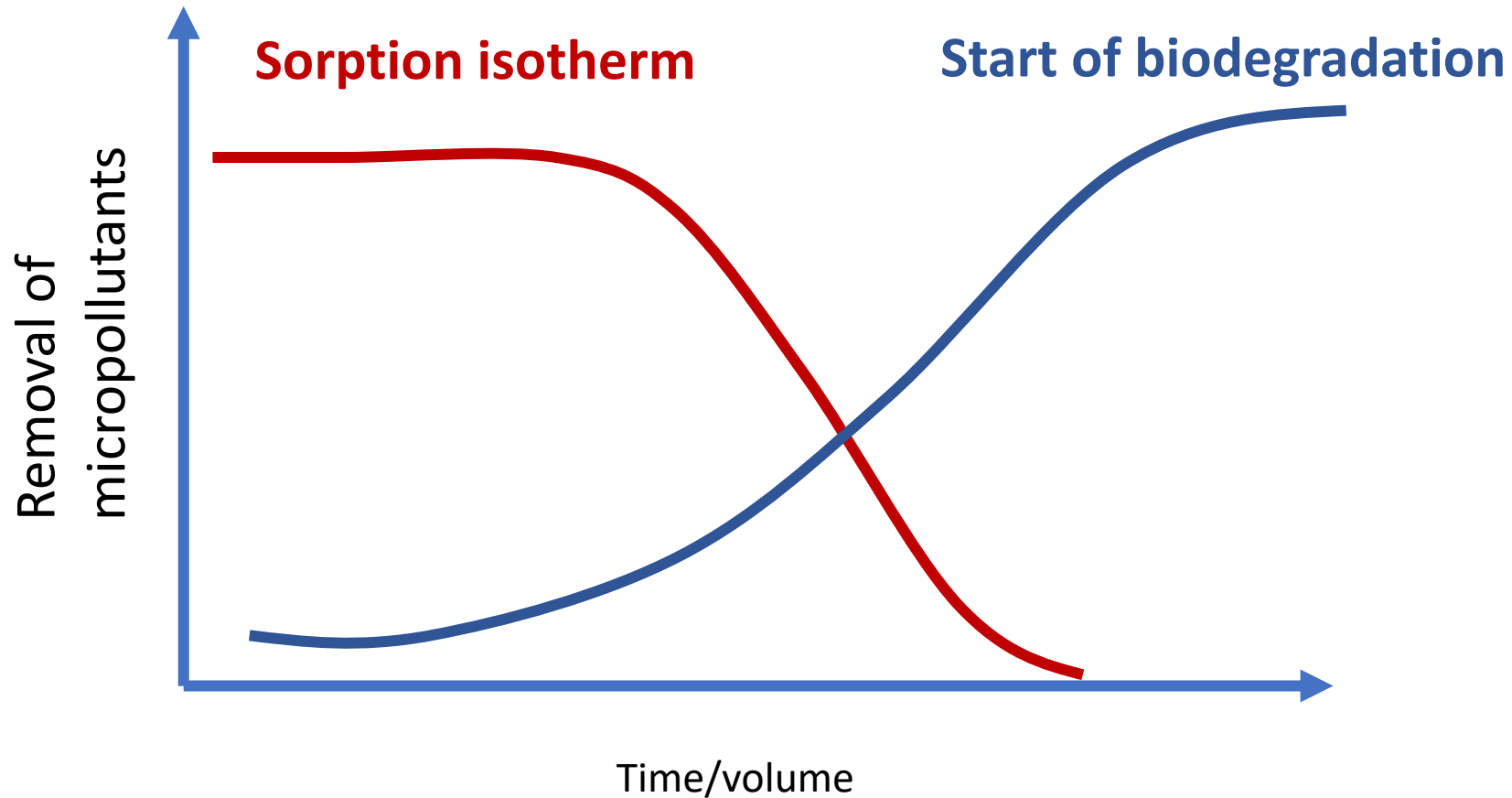


tramadol,
des *N*-methyl

Research question II:

When and how is the biofilm contributing to removal as experienced by GAC

GAC and BioGAC



Are metabolites formed?

-> target screening for known metabolites

-> non-target screening for unknown metabolites

In AdvIQwater AU will explore the effects of Biofilms on GAC



In labscale



In pilot

Looking forward to start this project together
with You

