My Dung JUSSELME

Microbial ecologist

Microbial ecology introduction

The case of the project proposal (MESO)

Microbial Ecotoxicology of aquatic ecosystem (in the case of Seine River) received urban water discharge treated with Oxidizing agent

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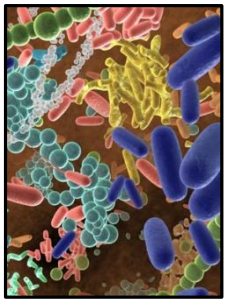
What is microbial ecology?

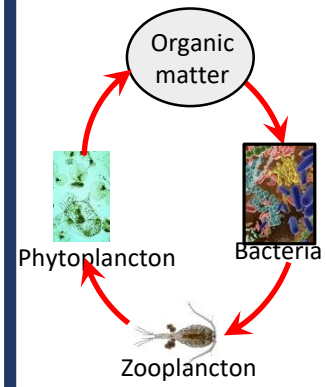
"Microbial ecology is the study of the interactions of microorganisms with their environment, each other, and plant and animal species. It includes the study of symbioses, biogeochemical cycles and the interaction of microbes with anthropogenic effects such as pollution and climate change".

(Source : Nature research)

Microbial ecology

MESO Project





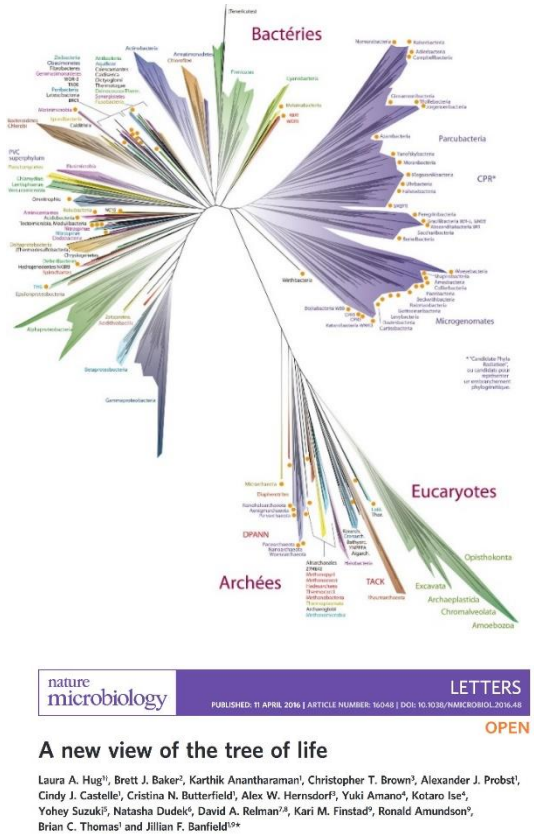
Temporal scale

Spatial scale

Microorganismes

Abundance, diversity and activity

Biogeochemical cycles



Laura A. Hug[1], Brett J. Baker[2], Karthik Anantharaman[1], Christopher T. Brown[3], Alexander J. Probst[1], Cindy J. Castelle[1], Cristina N. Butterfield[1], Alex W. Hernsdorf[3], Yuki Amano[4], Kotaro Ise[4], Yohey Suzuki[3], Natasha Dudek[4], David A. Relman[7,8], Kari M. Finstad[9], Ronald Amundson[5], Brian C. Thomas[1] and Jillian F. Banfield[10]*

Microbial ecology

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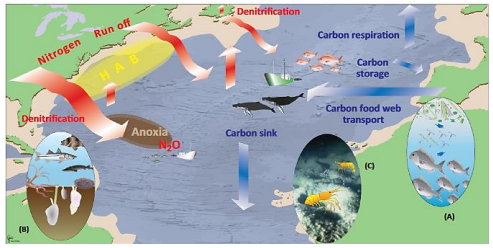

(Snelgrove et al., 2014 Trends in Ecology and Evolution)

Many ecosystem functions

- Habitat/Spp. diversity
- Productivity
- Decomposition
- Nutrient recycling
- Carbon sequestration
- Resilience
- Sediment stability

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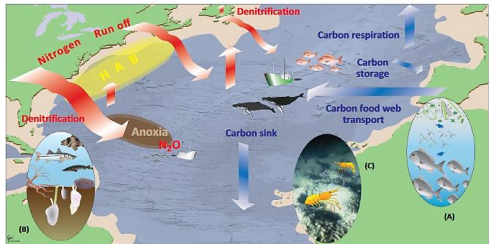

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Report

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D. U. Hooper, F. S. Chapin III, J. J. Ewel, A. Hector, P. Inchausti, S. Lavorel, J. H. Lawton, D. M. Lodge, M. Loreau, S. Naeem, B. Schmid, H. Setälä ... See all authors

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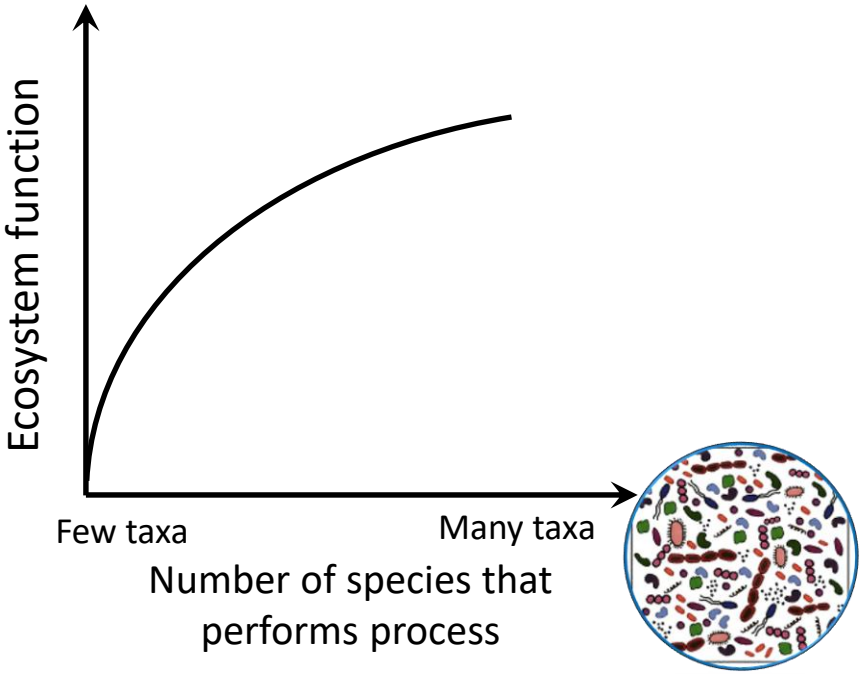

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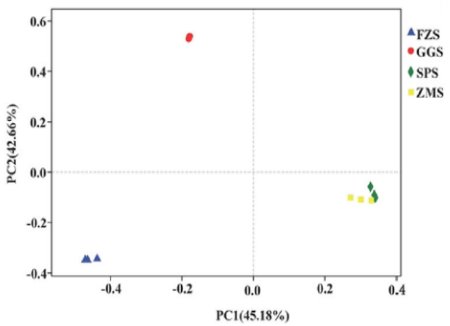

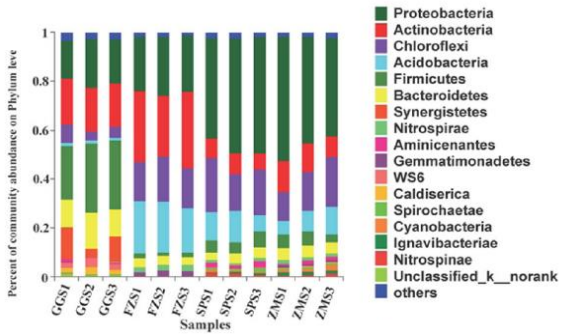

Genomic diversity

Source

Zhang *et al. BMC Microbiology* (2020) 20:254
https://doi.org/10.1186/s12866-020-01937-x

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Impact of long-term industrial contamination on the bacterial communities in urban river sediments

Lei Zhang[1*], Demei Tu[1], Xingchen Li[1], Wenxuan Lu[2] and Jing Li[2]

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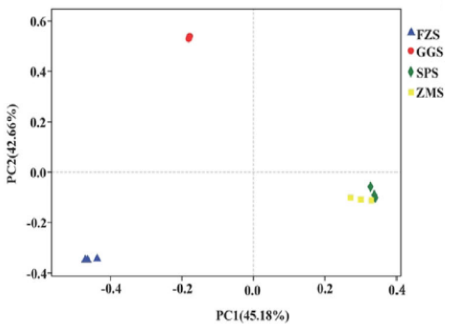
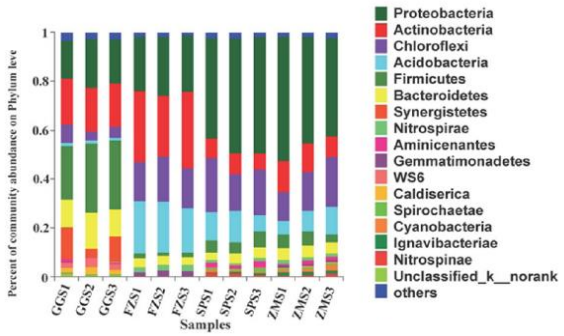
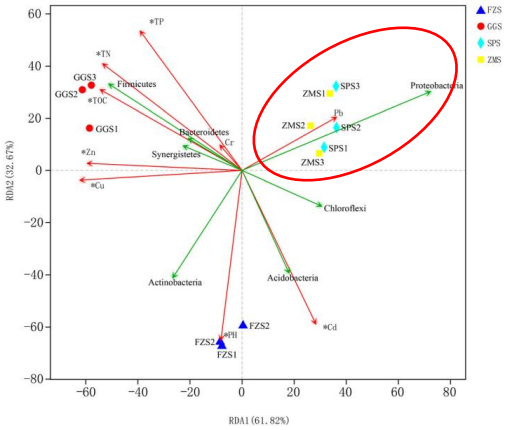




Genomic diversity

Diversity *vs* Environmental factors



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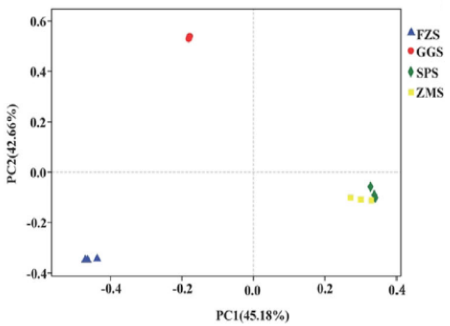

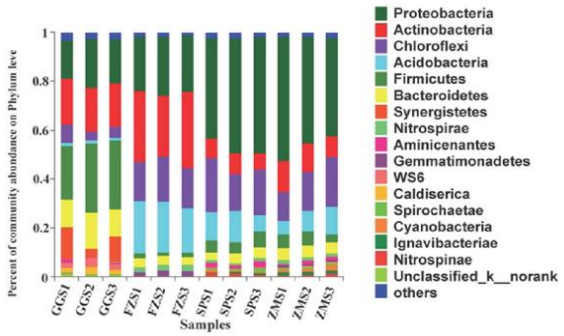

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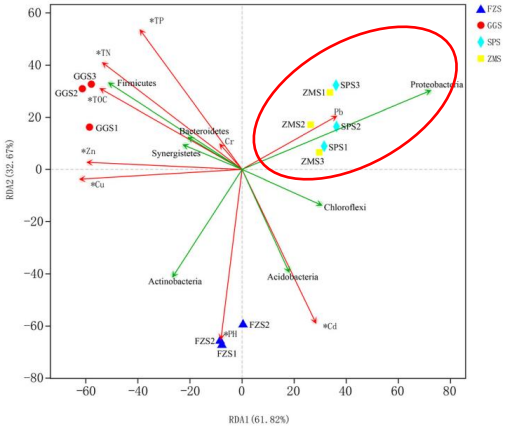
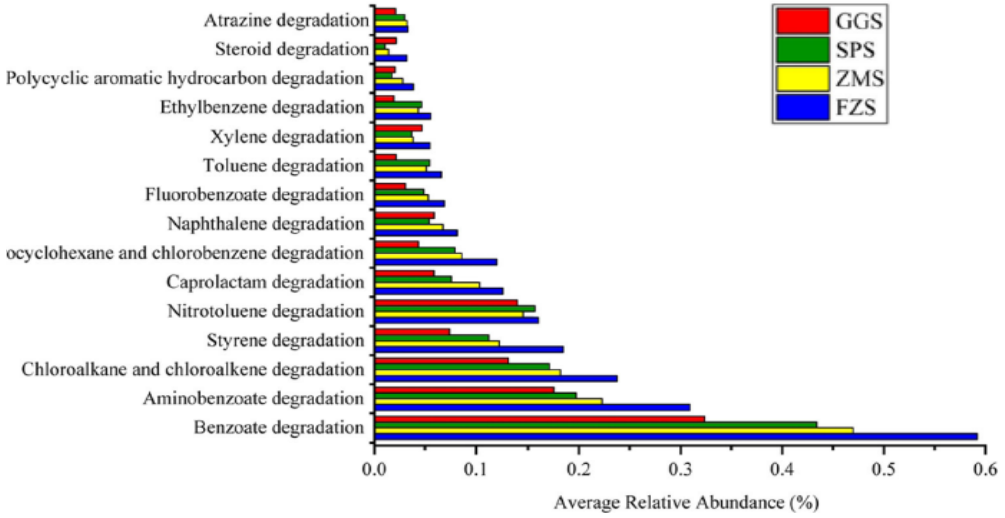


Functional predictive analysis



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*The project proposal (**MESO**):*

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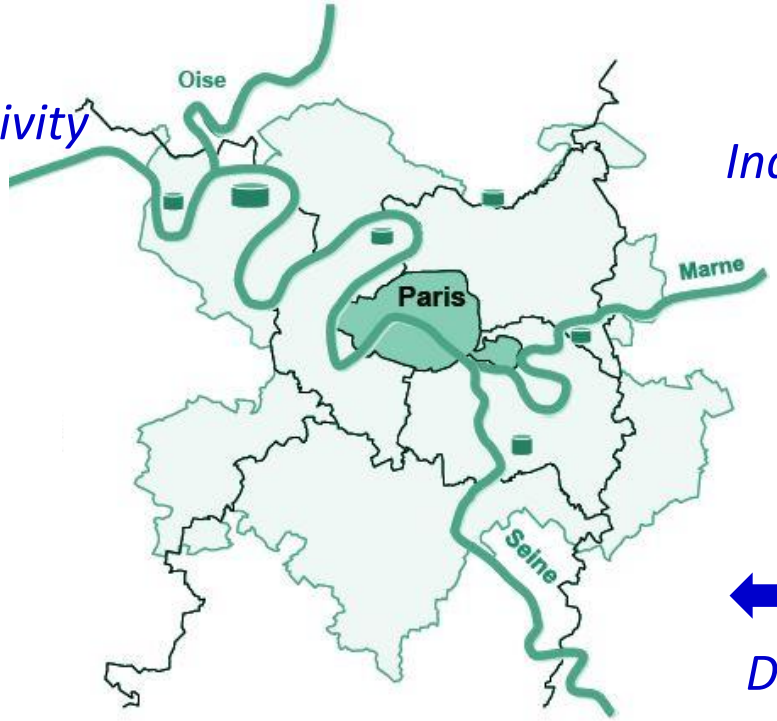
Intensive agricultural activity

Industrial activity



Urbanisation

Domestic waste

Seine water network

(Source : SIAAP)

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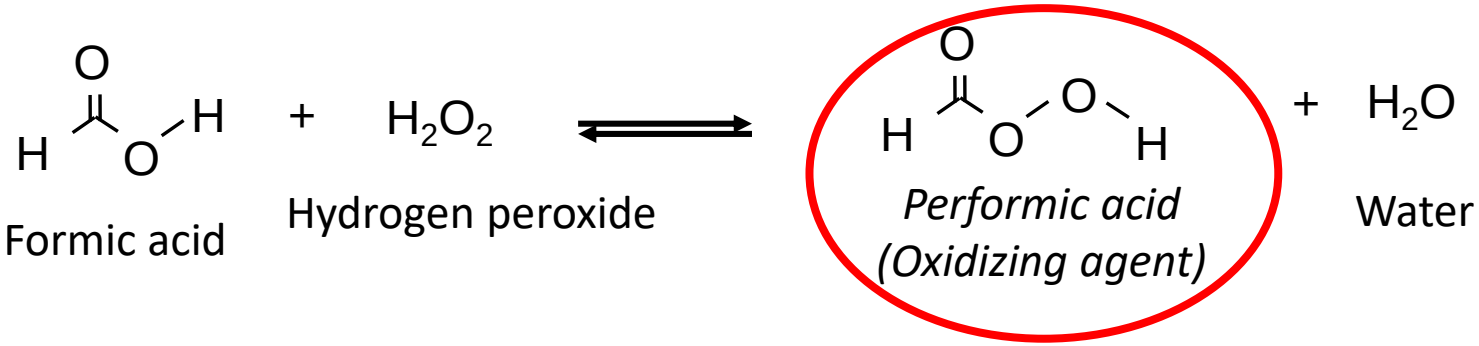
*Available from **Kemira**, under name **DesinFix** technology*



↺ ***Reaction with organic micropollutants ?***

↺ ***Risk to beneficial microorganisms and ecosystems ?***

Microbial ecology

MESO Project

Research objectives:

- **assess the disinfectant efficiency of PFA in wastewater treatment**
- **evaluate the microbial ecotoxicological effects**

Microbial ecology

MESO Project

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- ❖ **assess the disinfectant efficiency of PFA in wastewater treatment**
- ❖ **evaluate the microbial ecotoxicological effects**

- ➢ WP1/ Determining the PFA-disinfection effectiveness wastewater treatment processes (pathogens, antibiotic resistance genes)
- ➢ WP2/ Characterizing the reactivity of organic compounds with PFA and the formation of disinfection by-products (DBPs)
- ➢ WP3/ Evaluating long-term impact on the microbial ecotoxicology at spatial and temporal scales
- ➢ WP4/ Estimating the social acceptability

university of groningen

SIAAP
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