Ecosystem health and hazardous substances team
Marine Research Center
Finnish Environment Institute SYKE

Research area of interest

Systems: Baltic Sea sediments, Fe-Mn concretions, watercolumn and biota, bioremediation of contaminated soils and sediments

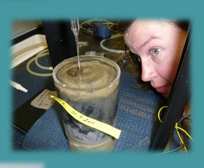
Processes: Degradation and impacts of hazardous compounds, iron and manganese geomicrobiological processes, impacts of hazardous compounds on biota

Organisms: Bacteria, petroleum hydrocarbon degradaing bacteria, PAH degraders, atrazine degraders, Fe reducers, Mn reducers, Fe oxidizers, Mn oxidizers, impacts on blue mussels and fish

Members of research group

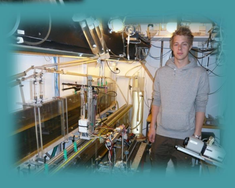
Kirsten S. Jørgensen, Docent, group leader

Aura Nousiainen, Ph.D. student (atrazine bioremediation)



Pirjo Yli-Hemminki, Ph.D. student (Fe/Mn concretions)

Anna Reunamo, Ph.D student, (Oil degraders in the Baltic Sea)



Miko Paajanen, Masters student (PAH degradation in Baltic Sea sediment)

The team has more members that are not directly involved in microbial ecology

Methods

- qPCR of functional genes
  atzA, *atzB*, *trzN*, PAH-RHDα (GN&GP), *xylE*, *bss*
- qPCR of specific taxonomic groups or species
  Geobacter, 16sDNA, fungal species
- Cloning of qPCR products
- DAPI
- DGGE
- Microbial diversity by cloning of community 16sDNA and sequencing
- Mineralization using ^{14}C labelled substrates
- Microbial respiration (CO_2 prod)
- Iron reduction (Fe^{2+} prod. by ferrozine)
- Biotraps (for microbes in groundwater wells)
- Use of inocula (bacteria and fungi, concretions) in soil and dredged sediment

Resources

Research vessels: RV Aranda, RV Muikku

Accredited laboratory: Access to chemical analysis of petroelum hydrocarbon and PAHs

Equipment for microbial ecology studies:

- Basic PCR, gel electrophoresis and documentation, DGGE
- qPCR
- Epifluorescence microscope
- Scintillation counter

Five key publications

Sagarkar, S., Mukherjee, S., Nousiainen, A., Björklöf , K., Purohit , H.J., Jørgensen, K.S., Kapley, A. 2013. Monitoring bioremediation of atrazine in soil microcosms using molecular tools. Environ. Pollut. 172: 108-115.

Reunamo, A., Riemann, L., Leskinen, P., Jørgensen K.S. Dominant petroleum hydrocarbon-degrading bacteria in the Archipelago Sea in the South-West Finland (Baltic Sea) belong to different taxonomic groups than hydrocarbon degraders in the oceans. Marine Pollution Bulletin, 2013. (In press)

Yli-Hemminki,P., Jørgensen, K.S. and Lehtoranta. J. 2012. Microbial communities and processes in iron-manganese concretions of the Gulf of Finland. Geological Survey of Finland, Guide 57, p 103.

Jørgensen, K.S., Salminen, J., and Björklöf, K. 2010. Monitored natural attenuation. In (ed.) S.P. Cummings. Bioremediation. Methods for Molecular Biology 599:217-233. Humana press.

Salminen, J.M., Tuomi, P.M. and Jørgensen, K.S. 2008. Functional gene abundances (nahAc, alkB, xylE) in the assessment of the efficacy of bioremediation. Appl. Biochem. Biotechnol. 151: 638–652.