

NERI

Sampling and Analysis of Pollutants



NERI has experience in the development of sampling and analytical techniques for trace measurements of organic and inorganic chemicals in air, soil, sediment, water and biota. NERI is involved in environmental fate and monitoring studies in Denmark and Greenland as well as national and international research projects. Specifically, NERI's expertise comprises:

- Analysis of organic and inorganic environmental pollutants
- Analysis of chemicals in consumer products
- Continuous measurement of particles and gasses
- Sampling and analysis of precipitation, gasses and particles
- CTD (salinity, temperature and depth) profiling and nutrients analysis in seawater

All sampling and analysis are carried out in our state-of-the-art laboratories according to a strict quality assurance programme. NERI is accredited according to ISO 17025 by DANAK (the Danish accrediting authority) to perform a series of analysis (organic and inorganic), seawater sampling, air pollution sampling and measurements. The methods for which NERI is accredited are listed on the home page of DANAK (www.danak.org - accreditation no. 411).

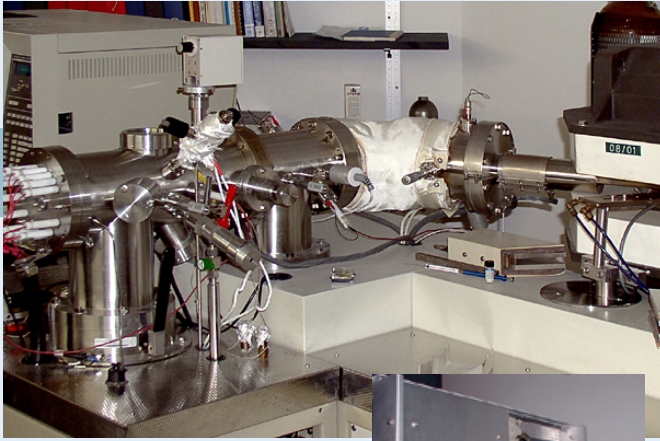
NERI is appointed National Analytical Reference Laboratory on organic environmental contaminants and Reference Laboratory for Air Pollution by the Danish Environmental Protection Agency. NERI coordinates the overall monitoring of nature and the environment in Denmark. NERI performs monitoring of the air, open marine waters as well as the terrestrial environment. NERI is responsible for reporting the Danish monitoring data to international organisations and conventions.

NERI collaborates closely with universities and technical schools. Through this collaboration, NERI is actively engaged in the training and education of scientists and technicians.

Analysis of organic and inorganic pollutants in environmental samples

Currently, NERI offers high quality measurements of the following compounds in various matrices:

- Pesticides in air, precipitation, water, biota, soil and sediment
- Polyaromatic hydrocarbons (PAH) in sediment, soil, sludge and water
- Polychlorinated biphenyls (PCB) and chlorinated pesticides in sediment, sludge and biota
- Plasticizers (e.g. phthalates) in sediment, soil, sludge, water and biota
- Flame retardant in sludge, sediment, water and biota
- Volatile organic compounds (VOC) incl. benzene, toluene and xylenes (BTX) in air
- Musk compounds in water, biota, sediment and sludge
- Persistent perfluoro-compounds (PFOS) in biota, water and sediment
- Persistent chloro-compounds (dioxin, furan) in air, water, biota, sediment and sludge
- Detergents in sediment, soil, sludge, water and biota
- Organic tin (TBT) compounds in sediment, soil, sludge, water and biota
- Metals in sediment, soil, sludge, water, biota and air
- Organo-metal compounds in sediment, water and biota
- Oil spills - including chemical characterisation of weathered oil samples and "forensic" advice on the oil type and its origin
- Nutrients in seawater, precipitation and dry deposition
- Acidifying components in precipitation
- Chlorophyll-*a* and algal pigments in seawater



Analysis of chemicals in consumer products and plant protection products

For more than a decade NERI has analysed consumer products (e.g. cosmetics, toys, textiles, detergents, paints) for content of chemicals that may cause skin rash/contact dermatitis, endocrine disruption and cancer. NERI also participate in the control of plant protection products. Chemicals that NERI has experience in measuring include:

- Plasticizers (phthalates and non-phthalates)
- Preservatives
- Heavy metals
- PCB's
- Organic solvents
- Fragrances
- Dyes
- Pesticides
- Additives (e.g. nonylphenol ethoxylates and octylphenol ethoxylates)

Sampling and analysis of precipitation

Two types of sampling can be performed: Bulk sampling, where the precipitation is sampled in open funnels, and wet-only sampling, where a lid covers the funnel during dry periods and opens during precipitation. Precipitation is typically sampled over a period of fourteen days. The resulting sample is analysed for the content of acidifying and eutrophying compounds and for a range of heavy metals.

Further information

For further information on the services provided by NERI, please contact:

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Sampling and analysis of particles and gasses

Particles and gasses are sampled onto filters mounted in series in a filter holder. One filter is used for sampling of particles while two impregnated filters are used for sampling of gasses. Air is sucked through all the filters by a pump. With this method it is possible to analyse for mass of total suspended particulate, TSP, the most important inorganic compounds bound to particles, and a number of acidifying and eutrophying gasses. The instrument used for sampling the particles and gasses can be placed outside. It comprises eight filter holders, and the sampling time is typically one day.

NO_2 , NH_3 and BTX may also be sampled on passive samplers (sampling without sucking air through the sampling material). The samplers are afterwards extracted and analysed. The sampling time is from hours to weeks depending on the concentration of the pollutant.

Continuous measurements of particles and gasses

The measurements are carried out with monitors which continuously measure SO_2 , NO , NO_2 , O_3 , CO or BTX. Additionally, a monitor is used for measurements of PM_{10} (mass of particles less than $10 \mu\text{m}$). The measurements can be performed in cities or background areas. The pollution data can be followed online.

Sampling and analysis of (sea)water

Sampling using NISKIN type samplers for nutrients or purpose built manual samplers in teflon for metals or stainless steel and glass for TBT, PAH and PCB analysis. The sampling can be guided by a CTD profiling probe to sample above and below the pycnocline, or at specified depths. In near-shore areas accredited sampling can be made from smaller vessels. For collection of mussels or sediment samples at the same sites, NERI has professional divers. Nutrient analysis include O_2 , NO_2 , NO_3 , NH_3 , total-nitrogen, PO_4 , total-phosphor, silicate, chlorophyll-*a* and pigments.

