

Available Methods and Equipment



1. In-vitro-methods

- *Saccharomyces cerevisiae*
 - YES – estrogen activity
 - YAS – androgen activity
 - YAES – anti-estrogen activity
 - YAAS – anti-androgen activity
 - YDS – dioxin-like activity
- *Salmonella typhimurium* (Ames fluctuation test = mutagenicity)
 - Ta 98 (Deletion GC = sensitive for frame-shift alterations)
 - Ta 100 (Substitution G46 = sensitive for gene mutations by base pair changes)
 - YG 7108 (Methylene transferase deficient strain = sensitive for oxidized water samples)
 - YG 1041 (Ta 98 with additional plasmid pYG233 nitro group reductase and acetyltransferase gene = sensitive for mutagens originating from nitro and aromatic hydrocarbon compounds)
 - YG 1042 (Ta 100 with additional plasmid pYG233 with nitro group reductase and acetyltransferase gene = sensitive for mutagens originating from nitro and aromatic hydrocarbon compounds)
- UmuC genotoxicity test with *Salmonella typhimurium* TA1535pSK1002
- *Allivibrio fischeri* (Microtox test) for basic toxicity
- Acetylcholinesterase inhibition test
- Inhibition test with *Cellulomonas uda* = Assessment and quantification of the natural self-cleaning power of freshwater habitats
- Growth inhibition test with *Bacillus subtilis* (a.o. presence detection of antibiotics in freshwater samples)
- Meln-Assay for determination of estrogenic activity (Meln-cells = estrogen sensitive human MCF7 breast cancer cell line with human estrogen receptor)
- ARE-Assay for detection of oxidative stress induction (AREc32 cells = Nrf2-based MCF7-reporter gene cell line including luciferase gene)
- T-screen for the detection of thyroid hormone system impairment (GH3-cells reflecting thyroid dependent cell proliferation)

2. Sediment assessment

- Grain size distribution
- Assessment of organic matter by ignition loss (DIN 38414 S 3)
- Assessment of biological degradation of organic matter by via BOD (Biochemical Oxygen Demand)

- Divers extraction methods for elution of sediment bound substances (Soxhlet extraction, batch extraction, aqueous elution)
- Measurement of total organic carbon in sediments

3. In-vivo-methods

- OECD 202 Acute toxicity test with *Daphnia magna*
- OECD 203 Fish-embryo toxicity test with *Danio rerio*
- OECD 219 Life-cycle toxicity test with *Chironomus riparius*
- OECD 211 Reproduction toxicity test with *Daphnia magna*
- OECD 221 *Lemna sp.* growth inhibition test
- OECD 225 Sediment/Water toxicity test with *Lumbriculus variegatus*
- OECD 235 Sediment toxicity test with *Chironomus riparius*
- OECD 242 *Potamopyrgus antipodarum/Lymnea stagnalis* reproduction toxicity test
- American Guideline 9-2017 Test of Survival, Growth and Reproduction in Sediment and Water of *Hyaella Azteca*
- *Caenorhabditis elegans* (ISO 10872) = detection of toxic effects resulting from water and sediment samples on growth, fertility and reproduction

4. Determination of water parameters

- Determination of pH, oxygen, conductivity via WTW/Hach measuring probe
- Vial tests Spectroquant Multi (Merck)
 - Nitrate = 2,2 – 110,7 mg/L NO₃
 - Nitrite = 0,03 – 2,3 mg/L NO₂
 - Ammonium = 0,01 – 2,38 mg/L NH₄
 - Phosphate = 0,2 – 15,3 mg/L PO₄³⁻
 - Sulphate = 5-250 mg/L SO₄
- Multicolor-Merck
 - Nitrite 0,005 – 0,1 mg/L NO₂
 - Ammonium = 0,2 – 8 mg/L NH₄
 - Phosphate = 0,046 – 0,43 mg/L PO₄³⁻
- Spectroquant droplet test
 - Nitrate = 2,2 – 110,7 mg/L NO₃
 - Chloride = 0,2 – 88,5 mg/L Cl⁻

5. Field investigations

- Secchi-disc
- Plankton sedimentation and counting chamber Utermoehl
- Soil penetrometer

6. Other methods

- PCR / genetic species determination
- Reserve substances (determination of carb-, lipid- and protein content in organisms, calculation of total energy content)
- ISO 7027 determination of turbidity (calibration for comparable use of bacteria, yeast, algae etc. in biotests)

7. Large appliances

- PCR, ThermoScientific PikoReal 96
- HPLC (Dionex) with fractionator (ThermoScientific Ultimate 3000)
- Freeze dryer Christ Alpha 1-4 LSC Plus
- Coulter Counter (particle and cell number counting, Beckmann Multisizer 3)
- Cryostat, Microm HM 500 O
- Microtom Microm HM 325
- Vibration mill Retsch MM 400
- Screening machine (grain size distribution assessment in sediments)
- PlateReader Tecan Spark 10 M (absorption, luminescence, fluorescence)
- PlateReader Thermo Multiscan Akzent (absorption)
- overhead shaker Heidolph

8. Image processing / camera

- JVC camera with discus-application
- Moticam 3.0 MP Motic
- Olympus Life Science Imaging Software cellSens Vers.2.2.
- Camera Canon EOS 300 D
- Sony DCR-DVD106E (video camera)