

Environmental Monitoring and Risk Assessment in Aquatic Systems

Synopsis

Regulatory policies for the protection of the aquatic environment. Environmental Risk Assessment (ERA). Ecotoxicological bioassays in ERA. Marine pollution biomonitoring. Biological effects assessment through biomarkers and biomarker indices. Environmental Specimen Banks.

Aims

- To develop the abilities that enable suitable study design of ecotoxicology in environmental risk assessment
- To provide the criteria useful for analysing and interpretation of toxicity and bioaccumulation data
- To develop the abilities that enable suitable study design of pollution biomonitoring programmes
- To provide the criteria useful for analysing and interpretation of ecologically relevant environmental levels of pollutants and their biological effects

Objectives

At the end of the Unit, you should:

1. Identify the main questions that can be addressed by the use of bioassays and biomarkers
2. Know the advanced methods for the determination of ecotoxicity of contaminated water and sediments
3. Understand the role of toxicity testing into an integrative risk assessment of the aquatic ecosystems
4. Know the advanced methods for biomonitoring pollution and its biological effects
5. Understand the role of biological endpoints into an integrative assessment of aquatic pollution, its biological effects and their ecological consequences.

Key Skills Acquired

At the end of the Unit, you should be able to:

1. Face problem analysis in an aquatic environment related to risk assessment
2. Face problem analysis in an aquatic environment related to pollution biomonitoring
3. Achieve clear expression (oral or written) of conclusions from results derived from bioassays

Programme

1. Introduction: Basic Concepts

2. Environmental monitoring. Chemical biomonitoring: baselines and long-term trends. Mussel Watch and Pollution Indices. Biological effects assessment: biological endpoints. Marine ecosystem health indices. Design of biomonitoring programmes and Environmental Specimen Banks (ESBs). Case studies.

3. Environmental risk assessment (ERA). Ecotoxicity bioassays in aquatic systems. ERA approaches: Effects-Directed-Analysis (EDA), Toxicity-Identification-Evaluation (TIE) and Weight-of-Evidence (WoE). Toxicity profiling. Case studies.

Practical session 1: Pollution Indices

Practical session 2: Ecosystem Health Indices

Practical session 3: Coastal biomonitoring - design and sampling

Practical session 4: ERA calculations (PNEC, WoE)

Practical session 5: Acute toxicity testing – laboratory assay

Learning & Teaching:

Lectures and Practicals: (40 hr)

Teaching Staff : I Marigomez (Coord.), U Izagirre

Semester: 2

Timetable slot: To be advised

ECTS: 4

Level : Optional

Bibliography: Delivered during the course

Assessment

- Written exam: 25% (definitions)
- Oral presentation (Poster Corner) + Practicals & Projects: 75%

Course Evaluation

By completion of University Unit Evaluation Questionnaire by students, annual assessment by Unit Coordinator.