

Soil and Sediment Contamination and Toxicology

Synopsis

The topics covered will allow getting knowledge in main aspects of soil and sediment ecotoxicology and bioremediation techniques.

Aims

- To understand the present research advances in the fields of soil and sediment ecotoxicology and remediation technologies

Objectives

At the end of the Unit, you should:

1. Understand the relationship among soil and sediment physicochemical properties, environmental variables and bioavailability and toxicity of chemical contaminants.
2. Understand the main standard and alternative toxicity assays in soil/sediment ecotoxicology and their meaning in environmental toxicology
3. Understand the applicability of exposure and effect biomarker approach using soil and sediment sentinel species
4. Understand the regulations the management bodies involved and related to the management of contaminated soils.
5. Understand the strategies for contaminated soil remediation including bioremediation and phytoremediation.

Key Skills Acquired

1. Presentation of written and oral scientific reports

Programme

1. Soil/sediment physicochemical features
2. Organic and inorganic contaminants in soils, sediments and underground waters
3. Bioavailability and bioaccumulation of contaminants
4. Toxicity assays and biomarker measurements using soil and sediment organisms
5. Phytoremediation and bioremediation
6. Soil health assessment
7. Management of contaminated soils and sediments

Learning & Teaching

- Lectures: 18hr
- Seminars: 4 hr
- Practical work: 18 hr

Teaching Staff

M Soto (Coord.), B Zaldibar, N García-Velasco, E. Urionabarrenetxea, L Epelde (NEIKER), A Gredilla, JM Becerril.

Semester: 3

Timetable slot: To be advised

ECTS: 4

Level: Optional

Bibliography

- Any PS, Haldeman DL. Bioremediation. CRC Lewis Publishers. New York. 1997
- Blume HP, Brümmer GW, Fleige H, Horn R, Kandeler E, Kögel-Knabner I, Kretzschmar R, Berndt-Michael Wilke KS. Scheffer/Schachtschabel. Soil Science. Springer. 2016.
- Duarte A, Cachada A, Rocha-Santos T. Soil Pollution. From Monitoring to Remediation. Elsevier. 2018.
- Hasegawa H, Rahman, IM, Rahman MA. Environmental Remediation Technologies for Metal-Contaminated Soils. Springer. 2016.
- Mirsal IA. Soil Pollution: Origin, Monitoring & Remediation. Springer. 2008.
- Naidu R. Chemical bioavailability in terrestrial environments. Elsevier. 2008.
- Nieder R, Dinesh KB, Reichl FX. Soil Components and Human Health. Springer. 2018.
- Raskin I, Book EB. Metal-accumulating Plants. John Wiley & Sons Inc. 2000
- Sparling DW. Ecotoxicology Essentials: Environmental Contaminants and Their Biological Effects on Animals and Plants. Elsevier. 2016.

Assessment

- Oral presentation of coursework (20%)
- Written report of the practicals (80 %)

Course Evaluation

By completion of University Unit Evaluation Questionnaire by students, annual assessment by Unit Co-ordinator