UNIVERSITÀ
DEGLI STUDI DI MILANO-BICOCCA

COURSE SYLLABUS

Ecotoxicology

2627-2-F7503Q012

Aims

The course gives the basis for the environmental risk analysis (ERA) of pollutants. Particularly, the course focus the attention on the available methods for evaluating both the exposure to pollutants in different environmental compartments and their effects at the different ecological scales.
the guidelines related to ERA, drawn up by the European agencies EMA and EFSA for obtaining the authorization to place on the market commercial products based on veterinary drugs and "pesticides" will also be analysed.

Contents

Environmental Risk Assessment of Chemical Substances

Detailed program

1. The concepts of risk assessment, risk management and the admissible loads of chemicals on the territory.

2. EU Directives on the environmental risk management of chemicals(the REACH program, 91/414/EEC Directive on placing in the market new Plant Protection Products).

3. Characterization of the effects: toxicological essays at different level of ecological hierarchical scale (laboratory, microcosms, mesocosms etc).

4. Field studies: bioindicators, biomarkers.

5. The use of QSAR models(Quantitative Structure Activity Relationships) for predicting the toxicity of chemicals.

6. The problem of the presence of chemical mixtures into the environment.

7. Quality criteria for toxic substances and the concept of PNEC (Predicted No Effect Concentration).

8. Bioconcentration, Bioaccumulation, Biomagnification.

9. The main classes of organic pollutants and their effects on the environment.

10. Characterization of the exposure: biogeochemical cycles of pollutants.

11. The mass balance concept in the characterization of the exposure.

12. The characterization of the environmental compartments for understanding the distribution and fate of pollutants.

13. Relevant physical chemical properties of pollutants and the concept of environmental persistence.

14. Persistent Organic Pollutants (POPs) and the global contamination problem.

15. Predictive models for the characterisation of the exposure of organic pollutants.

16. Environmental risk procedures according to the EU normative (TGD: Technical Guidance Documents and the Uniform Principles in 91/414/EEC Directives).

17. Risk characterization: toxicological/exposure ratio, risk indicators (example of application).

Prerequisites

Ecology, chemistry

Teaching form

The course includes 48 hours (6 CFU):
a) 22 two-hour lectures delivered in-person in a traditional (lecture-based) format,
b) 2 two-hour sessions conducted in-person in an interactive format.

Textbook and teaching resource

Vighi M. e Bacci E., 1998. Ecotossicologia. Collana di Farmacologia e Terapia, Vol. Ecotossicologia (Vighi M. e Bacci E. eds.) UTET, Torino;

Zaghi C., Gaggi C., Finizio A., 2007. Valutazione del rischio ambientale applicata ai prodotti chimici. Quaderni di tecniche di protezione ambientale n. 83 Ed. Pitagora, pp. 288.

slides

Semester

first semester

Assessment method

Oral examination at the end of the course. An in itinere, oral examination is possible, with the same criteria as the end-of-course examination listed below.
The evaluation criteria during the exam will consist in the verification of the acquisition of competences by the student of the topics treated by the teacher during the lectures (related to the program of ecotoxicology). The questions will aim to ascertain the acquisition of basic notions and to evaluate the understanding of the ecological concepts, the ability to link the different topics covered.

mark range 18-30/30

Office hours

by arrangement writing an email sara.villa@unimib.it

Sustainable Development Goals

ZERO HUNGER | GOOD HEALTH AND WELL-BEING | LIFE BELOW WATER | LIFE ON LAND