

Bioactive Molecules in Agroecology (I002468)

Due to Covid 19, the education and evaluation methods may vary from the information displayed in the schedules and course details. Any changes will be communicated on Ufora.

Course size	<i>(nominal values; actual values may depend on programme)</i>		
Credits 5.0	Study time 140 h	Contact hrs	70.0 h

Course offerings in academic year 2022-2023

A (semester 1)	English	Gent
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Lecturers in academic year 2022-2023

Fomsgaard, Inge	AARHUS01	lecturer-in-charge
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Offered in the following programmes in 2022-2023

	crdts	offering
International Master of Science in Soils and Global Change (main subject Physical Land Resources and Global Change)	5	A

Teaching languages

English

Keywords

Position of the course

Thousands of molecules influence the biological interactions in ecological systems. The overall objective of the course is that the students achieve understanding of the importance of bioactive molecules in agroecological interactions. The students get acquainted with bioactive plant defense compounds, phytochemicals, contaminants and pesticides and will obtain the qualifications for explaining how the structure of the compounds determines their uptake in neighbouring biological organisms or in mammal consumers, their possible beneficial or negative effects as well as their transformation in soil or biological organisms. Student qualifications will cover both theoretical understanding and experience in performing laboratory assays related to fate and effects of bioactive compounds.

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Contents

The course covers the bioactive compounds that play a role in the agroecological context – i.e. in the interaction between plants, animals, humans and the environment within agricultural systems. Theoretical lectures will give the fundament for practical lab-work on a) degradation, formation of metabolites and description of degradation kinetics b) effects of cattle's intake of medicine on insects living on cattle manure c) use of plant root systems for uptake of pharmaceutical residues in the environment d) uptake and excretion in urine of bioactive compounds from rye bread e) toxicology testing in cell cultures f) effect of dietary phytochemicals on pesticide degradation in honeybees .

Initial competences

Basic knowledge of chemistry

Final competences

On completion of the course the students have attained competence to:

Classify bioactive compounds of importance in agriculture on basis of their structure, physico-chemical properties and their origin.

Explain the degradation (aerobic and/or anaerobic) and sorption processes of small bioactive

molecules in soil, water, atmosphere and conclude on the factors that influence these processes.

Analyse the content of bioactive molecules and their degradation products in soil with LC-MSMS analytical equipment and model the kinetics for the process

Evaluate the applicability of the newest practical methods used in bioactive molecules research: quantitative measurements of residues in the environment and body fluids, toxicological cell tests, uptake and transformation in plants and mammals, effect of natural compounds fed to bees on the bees' capacity of transforming pesticides.

Explain the principles of Absorption, Distribution, Metabolism, Excretion (ADME) of bioactive molecules, including Phase 1 and Phase 2 metabolisation processes.

Report and discuss data from laboratory tests.

Conditions for credit contract

This course unit cannot be taken via a credit contract

Conditions for exam contract

This course unit cannot be taken via an exam contract

Teaching methods

Lecture, practicum, self-reliant study activities

Learning materials and price

Selected chapters from C.J. van Leeuwen and T.G Vermeire: Risk Assessment of chemicals: an introduction. 2nd edition, Springer 2007. Hand outs of articles and scientific reports

References

Course content-related study coaching

Evaluation methods

end-of-term evaluation and continuous assessment

Examination methods in case of periodic evaluation during the first examination period

Written examination

Examination methods in case of periodic evaluation during the second examination period

Written examination

Examination methods in case of permanent evaluation

Assignment

Possibilities of retake in case of permanent evaluation

examination during the second examination period is possible

Extra information on the examination methods

Reports based on the practical exercises will be compulsory. The reports are assessed based on the Danish 7point grading scale and has to be handed in no later than two weeks after the end of the study period. A minimum of 90 % presence at the theoretical and practical lessons is required to obtain the course diploma.

Calculation of the examination mark