BB2150 Industrial and Environmental Microbiology, Theory 7.5 credits

Industriell- och miljömikrobiologi, teori

This is a translation of the Swedish, legally binding, course syllabus.

Establishment

Course syllabus for BB2150 valid from Autumn 2007

Grading scale

A, B, C, D, E, FX, F

Education cycle

Second cycle

Main field of study

Biotechnology

Specific prerequisites

Language of instruction

The language of instruction is specified in the course offering information in the course catalogue.

Intended learning outcomes

The course gives theoretical knowledge about the metabolic foundation for usage of microorganisms in technical processes and for the understanding of the microbial activity in nature and microbial researched problems.

After passing the course, the student should be able to:

- describe those mechanisms which regulate the cell's metabolism in relationship to the changes in the environment
- explain how the cell's metabolism is affected by environmental changes and identify the consequences of this for the cell and for biotechnological production of recombinant proteins and cellular metabolites, and (in occurring cases) suggest measures to improve the production
- categorize the different types of microbial energy metabolism and describe the interaction between these in the biogeochemical cycles in nature, and identify relevant types of metabolism for a given biotechnological process
- describe the principles for soil sanitation and composting, discern possible problems and suggest measures to mitigate them
- describe the most common chemical reactions involved in decomposition of food and how the physiological-chemical environment affects microflora
- describe the most common food-controlled pathogens' properties, spreading and role in different types of food
- describe the different conservation and disinfection methods and their mechanisms
- describe the microbial and enzymatic reactions involved in the manufacturing of fermented food
- mention the most common microbiological analysis methods which are used in food control

Course contents

Metabolism and physiology in industrial microorganisms: the metabolic basis for bioprocesses. Physiological stress responses. Quorum sensing. Secondary metabolism. Environmental microbiology with applications: extremophile microorganisms. Composting and biological soil sanitation. Xenobiotics. Anaerobic metabolism. Microbial energy transformations: methane and ethanol. Environmental cycle. Food microbiology: fermented food. Methods to limit microbial activity through sterilization, conservation, and disinfection.

Course literature

Brock: Biology of Microorganisms;

S. -O. Enfors and L. Häggström: Bioprocess Technology. Fundamentals and Applications, KTH 2000;

S.-O. Enfors: Livsmedelsmikrobiologi (compendium).

Remaning literature will be announced at the course start.

Examination

- TEN2 - Examination, 1.5 credits, grading scale: P, F
- TEN1 - Examination, 6.0 credits, grading scale: A, B, C, D, E, FX, F

Based on recommendation from KTH's coordinator for disabilities, the examiner will decide how to adapt an examination for students with documented disability.

The examiner may apply another examination format when re-examining individual students.

If the course is discontinued, students may request to be examined during the following two academic years.

Other requirements for final grade

Written examination (TEN1, 6,0 credits, grading scale A-F) and home work (TEN2, 1,5 credits, grading scale Pass/Fail).

Ethical approach

- All members of a group are responsible for the group's work.
- In any assessment, every student shall honestly disclose any help received and sources used.
- In an oral assessment, every student shall be able to present and answer questions about the entire assignment and solution.