Course Specifications
Valid as from the academic year 2019-2020

Food Microbiology and Analysis (I000535)

Course size
Credits 7.0  Study time 175 h  Contact hrs 90.0 h

Course offerings and teaching methods in academic year 2019-2020
A (semester 1)  English  guided self-study 7.5 h  practicum 17.5 h  self-reliant study activities 3.75 h  PDE tutorial 7.5 h  lecture 53.75 h

Lecturers in academic year 2019-2020
Rajkovic, Andreja  LA23  lecturer-in-charge

Offered in the following programmes in 2019-2020

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<tr>
<th>Programme</th>
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<tr>
<td>Master of Science in Food Technology</td>
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<td>A</td>
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<tr>
<td>Exchange Programme in Bioscience Engineering: Food Science and Nutrition (master's level)</td>
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Teaching languages
English

Keywords
Food preservation, food contamination, micro-organisms, microbial food safety, hygiene, spoilage

Position of the course
The object is to obtain a basic understanding of the microbial phenomena occurring in food products. The theoretical part deals with the contamination of raw materials, the factors affecting the growth of micro-organisms, the study of preservation methods, the spoilage patterns of different food products and food poisoning. The course focuses on food spoilage as well as on microbial food safety aspects, both from the angle of microorganisms and from the food product (and production) perspectives. The practical part consists of an overview of microbiological analysis methods for food products. An insight into the composition of microbiological media is created and emphasis is laid on the interpretation of microbiological analysis. The students are trained in microbiological analysis in the laboratory.

Contents
Theory
1. Microbial contamination of raw material
1.1. Sources of contamination
1.2. Contamination of various foods
2. Growth of micro-organisms in foods
   Intrinsic, extrinsic and implicit factors
3. Microbial aspects of food preservation
   3.1. Lowering the degree of acidity
   3.2. Lowering the water activity
   3.3. Changing the redox potential
   3.4. Use of temperature
   3.5. Use of irradiation, chemical preservation
   3.6. Use of natural anti-microbial substances
4. Spoilage of foods
5. Food poisoning
   5.1. Food intoxications

(Approved)
5.2. Food infections
6. Examples from the food industry - real cases of food safety and food spoilage troubles and troubleshooting

Exercises
Introductory courses are given on the following aspects:
1. Sampling and sampling preparation
2. Culture media
3. Cultivation of micro-organisms
4. Dilution series
5. Membrane filtration
6. Determination of the number of micro-organisms in a food
7. General procedure for microbial determination in food
8. Microbiological criteria
9. Predictive microbiology

The students are practically trained in microbiological analysis by performing analysis on several food products for different microbial parameters. By means of the practical work, an insight is created in the factors influencing the microbial ecology of food products.

Initial competences
A basic knowledge of general microbiology is recommended

Final competences
1 - Understanding the behaviour of micro-organisms in food products and the factors influencing this behaviour
2 - Being able to adapt food processes to extend the shelf life and increase microbial safety through the obtained knowledge of the microbial aspects of food preservation
3 - Determining the microbial quality of food products through microbial analysis
4 - Interpretation of results from microbial analysis
5 - Analysing a problem related with preservation of foods (in developing countries) and being able to offer a solution for this problem
6 - Relating specific spoilage phenomena with specific (group of) microorganisms
7 - Situating a specific microbial analysis method of a food product into the broad spectrum of possible microbial analysis
8 - Correlating specific micro-organisms with specific food poisoning scenario

Conditions for credit contract
Access to this course unit via a credit contract is determined after successful competences assessment

Conditions for exam contract
This course unit cannot be taken via an exam contract

Teaching methods
Guided self-study, lecture, PDE tutorial, practicum, self-reliant study activities

Extra information on the teaching methods
Theory: lectures
Exercises: introduction courses (lectures + case studies) and practical work (practicum) in the laboratory

Learning materials and price
A book is available: Food microbiology and analysis by Prof. dr. Frank Devlieghere (ed.), Andreja Rajkovic, Simbarashe Samapundo, Mieke Uttendaele, An Vermeulen and Johan Debevere. Cost: 25 EUR
In addition there is a list of recommended standard books, all available in the Library of the Faculty or Library of the Laboratory.

References
Microorganisms in foods. Part 5. Microbiological specifications of food pathogens 1996. ICMSF. Springer

Course content-related study coaching
For the theory as well as for the theoretical exercises, the student has the possibility to ask extra information or explanation to the lecturer during contact hours or e-mail. Several assistants are involved in the practical exercises and can be contacted for extra information. Slides of the lectures are available via Minerva.

Evaluation methods
end-of-term evaluation and continuous assessment

(Approved)
Examination methods in case of periodic evaluation during the first examination period
Written examination, open book examination

Examination methods in case of periodic evaluation during the second examination period
Written examination, open book examination

Examination methods in case of permanent evaluation
Written examination with open questions, report

Possibilities of retake in case of permanent evaluation
examination during the second examination period is possible

Extra information on the examination methods
Examination takes place in the first examination period.
Theory: written examination (closed book) and case study: written preparation with oral
defence (open book).
Exercises: written examination (closed book), lab reports.

Calculation of the examination mark
Theory: period aligned evaluation (66%).
Exercises: period aligned (22%) and permanent (12%) evaluation.
De examinator kan de student die zich onttrekt aan periodegebonden en/of niet-
periodegebonden evaluaties voor dit opleidingsonderdeel niet-geslaagd verklaren.