Course guide
390321 - MICA - Food Microbiology

Unit in charge: Barcelona School of Agri-Food and Biosystems Engineering
Teaching unit: 745 - DEAB - Department of Agri-Food Engineering and Biotechnology.
Degree: BACHELOR’S DEGREE IN FOOD ENGINEERING (Syllabus 2009). (Compulsory subject).
Academic year: 2022 ECTS Credits: 6.0 Languages: Catalan

LECTURER
Coordinating lecturer: ROSA CARBÓ MOLINER

DEGREE COMPETENCES TO WHICH THE SUBJECT CONTRIBUTES
Specific:
1. Basic knowledge of general microbiology
2. Basic knowledge of food biochemistry and microbiology.

TEACHING METHODOLOGY
The matter learning consists of lectures (large group) in which the teacher makes a speech to introduce the learning objectives related to the basic concepts of the subject. These sessions incorporate spaces for participation and involvement of students through questions and exposure of some technical-scientific topic published in the press, etc. The students participation is required in lab also. In the practical sessions the students develop typical skills of a microbiology lab, such as learning microbiological techniques, and they improve the group work learning.

LEARNING OBJECTIVES OF THE SUBJECT
The students must acquire knowledge related to general and specific characteristics of the main microorganisms present in food. They must be able to differentiate the triple role that the microorganism can play in a food: a proper fermentation, a spoilage food, or can cause illness. Finally, the students should be able to deduce what are the expectable microorganisms that could be present in finished food considering raw material, the processing and the microbiological barriers.

STUDY LOAD

<table>
<thead>
<tr>
<th>Type</th>
<th>Hours</th>
<th>Percentage</th>
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<tbody>
<tr>
<td>Hours small group</td>
<td>20,0</td>
<td>13.33</td>
</tr>
<tr>
<td>Self study</td>
<td>90,0</td>
<td>60.00</td>
</tr>
<tr>
<td>Hours large group</td>
<td>40,0</td>
<td>26.67</td>
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</tbody>
</table>

Total learning time: 150 h
CONTENTS

SAFETY, QUALITY AND FOOD ACCEPTABILITY

Description:
- general principles based on safety, quality and acceptability of food
- control applied to the food industry: HACCP

Related activities:
Activity 1. Theory classes and individual written assessment
Activity 2. Practice classes
Activity 3. Bibliographic work

Full-or-part-time: 30h
Theory classes: 15h
Laboratory classes: 5h
Self study: 10h

MICROBIOLOGICAL STUDY OF DIFFERENT FOOD GROUPS

Description:
- Microbiology of free waters and bottled waters. Purification and disinfectants.
- Poultry: initial microbiota and microbiology of poultry products. Eggs and egg products.
- Fishery products: initial microbiota and microbiology of derivatives. Fish ferments.
- Food group of low Aw: sugar, cocoa, oil, mayonnaise, margarine, spices and other condiments.

Related activities:
Activity 1. Theory classes and individual written assessment
Activity 2. Practice classes
Activity 3. Bibliographic work

Full-or-part-time: 60h
Theory classes: 25h
Laboratory classes: 15h
Self study: 20h

ACTIVITIES

ACTIVITY 1: THEORETICAL CLASSES

Full-or-part-time: 96h
Theory classes: 40h
Self study: 56h

ACTIVITY 2: INDIVIDUAL EVALUATION TESTS

Full-or-part-time: 2h
Theory classes: 2h
**ACTIVITY 3: LABORATORY WORK**

**Description:**
Mandatory laboratory practice. The practice lasts 20 hours, divided into 4-hour sessions. In practice, the microbiological analysis of a food will be carried out, studying the main microbial biomarkers and their interpretation. Dehydrated culture media will be used that must be rehydrated and sterilized in an autoclave, as well as prepared material (laminocultures, etc.). MIC testing will also be performed to determine the inhibitory capacity of a disinfectant.

**Specific objectives:**
- Work in the microbiology laboratory following the guidelines of biosafety and environmental protection.
- Perform correctly the handling operations of material used in the microbiology laboratory.
- Evaluate the results obtained from the analysis of the food and the quality of the food.

**Material:**
All the material, culture media and reagents necessary to carry out the practices.

**Full-or-part-time:** 30h
Laboratory classes: 20h
Self study: 10h

**ACTIVITY 4: BIBLIOGRAPHICAL WORK**

**Description:**
Realization of a bibliographical work in groups of 3-4 students. The work will consist in the application of HACCP limited to one stage of processing a food. The necessary documentation to carry out the work will include information obtained from solvent sources (specialized books, articles, other documents prepared by prestigious entities recognized in the security system).

**Specific objectives:**
Evaluate the achievement of the learning objectives of the subject as well as the associated specific competences.

**Full-or-part-time:** 24h
Self study: 24h

**GRADING SYSTEM**

The final qualification, N_{final}, is the sum of the partial marks:
N1: two written tests
N2: practices
N3: bibliographic work
N_{final}: 0,75N1 + 0,15N2 + 0,10N3

**EXAMINATION RULES.**

Attendance at lab practices is mandatory. It must bring the material indicated in the script and to be on time to the practical sessions.
BIBLIOGRAPHY

Basic:

RESOURCES

Hyperlink:
- Normes microbiològiques per a aliments. http://cvu.rediris.es/pub/bscw.cgi/d311175/Normicro/Recopila/normicro.htm