390229 - FBM - Basics of Biochemistry and Microbiology

Coordinating unit: 390 - ESAB - Barcelona School of Agricultural Engineering
Teaching unit: 745 - DEAB - Department of Agri-Food Engineering and Biotechnology
Academic year: 2019
Degree: BACHELOR'S DEGREE IN FOOD ENGINEERING (Syllabus 2009). (Teaching unit Compulsory)
ECTS credits: 6
Teaching languages: Catalan, Spanish

Teaching staff
Coordinator: Pujolà Cunill, Montserrat
Others: Sepulcre Sánchez, Francisco Luis
Rosa Carbó Moliner

Degree competences to which the subject contributes

Specific:
CE-AL-30. Basic knowledge of general biochemistry and microbiology and 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 practices sessions in the biochemistry and microbiology labs allow developing basic skills through doing some of the more frequent analysis and evaluating the results obtained.
The lab work aims to motivate and engage students to participate actively in the learning of the matter. From here, the students should be convinced of the need to do autonomous learning activities. Students have docent materials available through Athena of all scheduled activities.

Learning objectives of the subject

The students must be able to know the main biomolecules, their structure and their function in living organisms and foods; and relate the molecular structure of these biomolecules with their physicochemical properties and knowledge of enzyme kinetics calculations. They also must be able to know the main microorganism groups in food and differentiate the three potential microorganism roles; in this way, they must differentiate between fermentation and transforming activity microorganisms from the disrupters and the ability to cause disease in food.

Study load

<table>
<thead>
<tr>
<th>Total learning time: 150h</th>
<th>Hours large group: 40h</th>
<th>26.67%</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Hours small group: 20h</td>
<td>13.33%</td>
</tr>
<tr>
<td></td>
<td>Self study: 90h</td>
<td>60.00%</td>
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</tbody>
</table>
# 390229 - FBM - Basics of Biochemistry and Microbiology

## Content

<table>
<thead>
<tr>
<th>GENERAL BIOCHEMISTRY: BIOMOLECULES</th>
<th>Learning time: 57h</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Theory classes: 15h</td>
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<tr>
<td></td>
<td>Laboratory classes: 8h</td>
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<tr>
<td></td>
<td>Self study : 34h</td>
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</tbody>
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**Description:**
- Water activity and its relevance in reactions
- Chemical properties and reactions of biomolecules of interest in food (proteins, lipids, carbohydrates, enzymes, vitamins ...)
- Physical properties of major biomolecules

**Related activities:**
- Activity 1. Theory classes
- Activity 2. Individual assessment test
- Activity 3. Laboratory work

<table>
<thead>
<tr>
<th>ENZYMATIC KINETICS AND MICROBIOLOGICAL GROWTH</th>
<th>Learning time: 33h</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Theory classes: 8h</td>
</tr>
<tr>
<td></td>
<td>Laboratory classes: 4h</td>
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<tr>
<td></td>
<td>Self study : 21h</td>
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</tbody>
</table>

**Description:**
- Kinetics of enzymatic reactions
- Growth of unicellular organisms and microbial populations. Growth Kinetics
- Continuous cultivation

**Related activities:**
- Activity 1. Theory classes
- Activity 2. Individual assessment test
- Activity 3. Laboratory work
The final qualification, Nfinal, is the sum of the partial marks
NC1: Note of the first test
NC2: Note of the second test
NPr: content of practices

Nfinal = 0,4 N1 + 0,4 N2 + 0,2 N3

**Qualification system**

**Related activities:**
- Activity 1. Theory classes
- Activity 2. Individual assessment test
- Activity 3. Laboratory work

**Microorganisms in Food and Growth Factors**

**Description:**
- Main groups of microorganisms in food
- Influence of growth factors: oxygen, temperature, pH, osmotic effects, relation between microorganisms
- Critical study of microbial markers in food: disrupter and pathogen microorganisms
- The main starter in food: oxidation and fermentation

**Learning time:** 58h
- Theory classes: 15h
- Laboratory classes: 8h
- Self study: 35h

**Qualification system**

The final qualification, Nfinal, is the sum of the partial marks
NC1: Note of the first test
NC2: Note of the second test
NPr: content of practices

Nfinal = 0,4 N1 + 0,4 N2 + 0,2 N3

**Regulations for carrying out activities**

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:**