ENG-436

# Food biotechnology

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| Cursus | Sem. | Type |
|---|---|---|
| Biotechnology minor | E | Opt. |
| Ing.-chim. | MA2, MA4 | Opt. |

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|---|---|
| Language of teaching | English |
| Credits | 2 |
| Session | Summer |
| Semester | Spring |
| Exam | Written |
| Workload | 60h |
| Weeks | 14 |
| **Hours** | **2 weekly** |
| Courses | 2 weekly |
| **Number of positions** | |


## Summary

The course will deliver basic knowledge on the principles of food fermentation and enzyme technology. Specific processes related to food raw materials and food bioprocessing will be described. The course will describe benefits that food biotechnology can bring during food manufactuing.


## Content

- History of fermentation
- Different types of food fermentation
- Practical examples and benefits generated
- Probiotic technology
- Enzyme technology (general)
- Protease
- Lipases
- Carbohydrases
- Food bioprocessing (laboratory visit to be confirmed)

## Keywords

Biotechnology, fermentation, food, enzyme, bioprocess

## Learning Prerequisites

### Required courses

Basic chemistry and biochemistry

### Recommended courses

It is recommended to also follow "Chemistry of food processes", since the following 2 courses will alternate every second week: "Food Biotechnology" by Carl Erik Hansen and "Chemistry of food processes" by Imre Blank.

### Important concepts to start the course

Combine knowledge related to chemistry, biology and food technology. Interest to learn how basic fermentation, enzyme technology and biochemistry is applied in food manufacturing to produce safe products with added benefits.

## Learning Outcomes

By the end of the course, the student must be able to:

- Describe basic principles of fermentation
- Describe selected fermentation systems
- Understand enzyme action and main classes of enzymes
- Understand factors related to probiotic technology
- Describe selected industrial food biotechnology processs
- Describe selected classical fermentation pocesses
- Describe how fermentation can deliver nutrition
- Describe basic safety aspects of fermentation

## Transversal skills

- Communicate effectively, being understood, including across different languages and cultures.
- Make an oral presentation.
- Manage priorities.

## Teaching methods

Lecture, short exercises, group or individual presentation on specific topic (the presentation will be individually if there are few students, or in group if there are more than 20 students). The presentation will count 20% of the final note.

## Expected student activities

Attend lectures. Each student will give a 15 minutes presentation during the semester. This presentation will be given alone or as a team, depending on the number of students. A potential visit to a Nestlé research facility will be decided during the semester.

## Assessment methods

The presentation will count 20% of the final note. The written exam will count 80% of the final note.

## Supervision

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| Office hours | No |
| Assistants | No |
| Forum | No |
| Others | Q&A during the lectures. Short exercises during the lectures. |

## Resources

### Bibliography

Optional: Pocket Guide to Biotechnology and Genetic Engineering. ed. Rolf Schmid, 2003. Wiley-VCH Verlag GmbH

### Ressources en bibliothèque

- Pocket guide to biotechnology and genetic engineering / Schmid

### Notes/Handbook

Electronic PDF Files: 1) Food Fermentation. 2) Food Enzyme Technology. 3) Cocoa Fermentation - An Example. 4) Industrial Processes - Examples. 5) Probiotic Technology. 6) Safety Aspects in food fermentation. 7) Deliver nutrition by fermentation. 8) Bioreactors

### Websites

- http://scgc.epfl.ch/telechargement_cours_chimie