

ENG-435

Chemistry of food processes

Blank Imre

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

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 processing and chemical changes occurring during food manufacturing. Specific thermal processes related to transformation of food raw materials will be described along with benefits and challenges to consider.

Content

- Major chemical reactions taking place in food processing (Maillard reaction, lipid oxidation, interactions with polyphenols)
- Physico-chemical changes influencing product quality (aroma, taste, colour, texture, nutritional value)
- The role of water in food processing & preservation (water activity, shelf-life)
- Selected processes used in food preparation & manufacturing, such as
 - Thermal processes & inactivation
 - Drying & water reduction
 - Extrusion
 - Separation processes
 - Dispersed systems

Keywords

food chemistry, food processing, food technology, consumer benefits

Learning Prerequisites**Required courses**

Basic chemistry, food chemistry

Recommended courses

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

It is also recommended to attend the course "Food chemistry" given by Bernhard Klein in French.

Important concepts to start the course

Combine knowledge related to chemistry, biochemistry and food technology. Interest to learn how chemistry and food processing 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 food processing
- Describe selected industrial food processes
- Understand chemical changes during food processing
- Understand factors governing food stability
- Describe classical drying processes in food technology
- Describe selected classical preservation methods
- Describe how thermal processes can deliver consumer benefits
- Describe basic safety aspects in food manufacturing

Teaching methods

Lecture, short exercises, group or individual presentation on a specific topic.

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

Written exam.

Supervision

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

Resources

Bibliography

- Food Chemistry, Belitz/Grosch/Schieberle, 4th ed., Springer, 2009
- Food Processing Handbook, J.G. Brennan & A.S. Grandison, 2nd ed., Wiley-HCH, 2011
- Food Processing Technology – Principles & Practice, P.J. Fellows, 3rd ed., CRC, 2009

Ressources en bibliothèque

- [Food Processing Technology / Fellows](#)
- [Food Processing Handbook / Brennan](#)
- [Food Chemistry / Belitz](#)

Notes/Handbook

Electronic PDF Files to be downloaded from the EPFL site.

Websites

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