ENG-435

Chemistry of food processes

Blank Imre

Cursus	Sem.	Type
Biotechnology minor	E	Opt.
Chimiste	MA2, MA4	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, glas transition, shelf-life)
- Selected processes used in food preparation & manufacturing, such as

- Thermal processes & inactivation
- Drying & water reduction
- Extrusion
- Separation processes
- Dispersed systems

- Specific food applications (coffee, chocolate, cereals, ice cream, ...)

Keywords

food chemistry, food processing, food technology, quality and safety

Learning Prerequisites

Required courses

Basic chemistry, food chemistry, bio-chemistry

Recommended courses

It is recommended to also follow "Food Biotechnology" by Wilbert Sybesma. Both courses will be given in the spring semester alternating on a 4h weekly basis.
It is also recommended to attend the course "Food chemistry" given by Bernhard Klein igiven n 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 such as nutrition, taste, and appearance.
- Learn how to select the best suitable technology to achieve the expected target.

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 at the end of each module
- Group or individual presentation on a specific topic (depending on circumstances),
- Exam preparation

Expected student activities

- Attending lectures is recommended, interactive approach is appreciated.
- Group work can be presented as a team during the semester.
- A potential visit to a Nestlé research facility will be arranged during the semester (depending on the circumstances).

Assessment methods

Written exam.

Supervision

Office hours	No
Assistant.e.s	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

- Find the references at the Library

Notes/Handbook

Electronic PDF Files to be downlowded from the EPFL site.

Moodle Link

- https://go.epfl.ch/ENG-435