GHENT UNIVERSITY

Course Specifications

Valid as from the academic year 2024-2025

Shelf Life of Packed Foods (I690008)

Course size *(nominal values; actual values may depend on programme)*

Credits 7.0 **Study time 210 h**

Course offerings and teaching methods in academic year 2024-2025

A (semester 1)	English	Kortrijk	independent work
			lecture

Lecturers in academic year 2024-2025

Devlieghere, Frank	LA23	lecturer-in-charge
De Meulenaer, Bruno	LA23	co-lecturer
Kuuliala, Lotta	TW56	co-lecturer

Offered in the following programmes in 2024-2025	**crdts**	**offering**
Master of Science in Sustainable Food Packaging	7	A

Teaching languages

English

Keywords

Food chemistry, food microbiology, food preservation, food spoilage, nutritional value, shelf life, packaging

Position of the course

In this course the various -microbiological, physiological, chemical, physical and sensory phenomena leading to deterioration of packed foods will be presented, with a special focus on the role of packaging. Topics include basic aspects of food microbiology (microbiological aspects of food preservation with a special focus on how packaging influences the microbial behaviour [spoilage micro-organisms as well as food pathogens]) and food chemistry (the study of the chemical, biochemical and physicochemical processes involved in agricultural raw materials and in foodstuffs, and during the transformation of agricultural raw materials into derived products).
Considering the main constituents of foods, a selection of chemical and physicochemical properties will be discussed relevant for packed foods. Special attention is given to the kinetics of shelf life determining factors. Students learn how to design shelf life studies, taking into account the factors determining the quality and safety of foods.

Contents

1. Introduction: food quality and safety as determinants for shelf life of packed foods

Part 1: Chemical-physical aspects
2. Water as determinant for shelf life of packed foods
3. Lipids as key compounds causing rancidity
4. Proteins as receptors for reactive carbonyls impact quality of packed foods
5. Enzymatic reactions relevant for packed foods
6. Pivotal minor substances in packed foods: vitamins and pigments (and aroma compounds?)

Part 2: Microbiological and physiological aspects
7. Microbial spoilage of packaged food products
8. Microbial safety aspects determining the shelf life of packaged products
9. Intrinsic and extrinsic factors influencing the microbial shelf life of packed foods
10. Atmosphere as determinant for microbial and physiological shelf life of packed foods

Part 3: Shelf life determination

11. Chemical shelf life determination and modelling
12. Microbiological shelf life determination and modelling
13. Sensory shelf life determination and modelling
14. Case studies

Initial competences

Basic general and organic chemistry, biochemistry, general microbiology, basic aspects of modelling.

Final competences

1 To identify the factors which determine the shelf life of foods.
2 To assess the parameters of the phenomena determining the shelf life of foods.
3 To assess the impact of the packaging system on the shelf life of foods.
4 To critically evaluate shelf life studies.
5 To discuss with knowledge a case study in a professional way

Conditions for credit contract

Access to this course unit via a credit contract is determined after successful competences assessment

Conditions for exam contract

This course unit cannot be taken via an exam contract

Teaching methods

Lecture, Independent work

Extra information on the teaching methods

Lectures: explanation of theoretical concepts, including plenary exercises on modelling of shelf life of packed food products.
Independent work: The student executes a case study individually. The objective of this case study is to critically evaluate an AI-generated report on the shelf life of a specific food product packed in a particular packaging concept, both in a written format and through an oral assessment. Students are required to critically analyse the report, identify its strengths and weaknesses, propose improvements, and suggest alternative approaches for enhancing the accuracy and reliability of the report. Additionally, students will present their findings orally, followed by a Q&A session to further explore their analysis and recommendations. In the framework of the case studies, the students should gather relevant information enabling them to identify and analyse the key processes and parameters determining the shelf life of the packed food.

Study material

Type: Syllabus

Name: Shelflife of packed foods- chemical aspects
Indicative price: Free or paid by faculty
Optional: no
Language : English
Number of Pages : 154
Available on Ufora : Yes

Type: Slides

Name: Shelf life of packed foods
Indicative price: Free or paid by faculty
Optional: no
Language : English
Available on Ufora : Yes

References

Modern Food Microbiology (J. Jay)
Microbiological guidelines - Support for interpretation of microbiological test results of foods (M Uyttendaele (Ed.), Die Keure, 2018)
Food Chemistry (Belitz)
Fennema's Food Chemistry (S. Damodaran, K. L. Parkin)
Food packaging and shelf life. A practical Guide (G.L. Robertson)

Course content-related study coaching

Before and after the lectures and exercises, the student can ask the teacher or assistant for additional information or explanation. The teacher and assistant can also be contacted by email. Designated Q&A sessions will be organised during the course.

Assessment moments

end-of-term and continuous assessment

Examination methods in case of periodic assessment during the first examination period

Oral assessment, Written assessment

Examination methods in case of periodic assessment during the second examination period

Oral assessment, Written assessment

Examination methods in case of permanent assessment

Assignment

Possibilities of retake in case of permanent assessment

examination during the second examination period is possible in modified form

Extra information on the examination methods

The period related evaluation consists of a written examination with open questions and an oral examination, with open book preparation.
The case studies will be evaluated via non-period aligned evaluation for which an assignment (written report) should be sumitted, combined with an oral assessment.
The plenary exercises are evaluated via a written report.

Calculation of the examination mark

Periodic evaluation: 60%:
- 50% written exam (closed book)
- 50% oral exam: written preparation (open book) with oral defence

Non-periodic evaluation: 40%:
- Written report on plenary exercises (25%)
- Written report on case study (assignment) (25%)
- Defence of case study (50%)

The student needs to participate in all assignments and exams that are part of the evaluation (period aligned and non-period aligned). Students who eschew period aligned and/or non-period aligned evaluations for this course unit, or students who obtain a score lower than 8/20 (not rounded up) on one of both parts (period aligned or nonperiod aligned evaluation), will fail for this course unit. In that case the end score is set to 9/20 even when the calculation indicates a point of 10/20 or more. Late submission of a report without legitimate reasons (e.g. illness, force majeur) will lead to a partial score of max. 9/20. Unjustified absence from the plenary exercise sessions gives rise to a total maximum mark (period aligned and non-period aligned) of 9/20, irrespective of the mark obtained for the other assignments and exams that are part of the evaluation (period aligned and non-period aligned).