# .- Innovation in Food Packaging

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***COURSE AIMS AND INTENDED LEARNING OUTCOMES***

 The course aims to teach students about traditional and more innovative packaging materials, as well as the technologies for preserving and packing agri-food products. The course will also cover current regulations governing the suitability of materials and objects for contact with food.

 At the end of the course, students will have acquired the procedural and methodological knowledge for identifying the analytical operations to perform to verify compliance with the technological, qualitative and regulatory requirements of materials intended for contact with food, with a focus on plastic materials and eco-design approach. They will also possess adequate knowledge for evaluating the shelf-life of foods according to the characteristics and needs of the product, as well as the packaging material properties and preservation conditions.

The skills acquired will enable students to make and direct suitable choices for meeting the qualitative and functional requirements of food product packaging, so guaranteeing and improving product shelf-life, consumer safety and environmental sustainability.

***COURSE CONTENT***

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|  | ECTS |
| **Food shelf-life**  |  |
| Definitions, problems, forecasting and simulation approaches, case studies | 3.0 |
| **Plastic materials for food packaging** |  |
| Purposes and characteristics. Chemical and physical properties. Rigid and flexible packaging. Sustainability in food packaging. Innovations and problems. | 1.5 |
| **Legislation & Quality Assurance** |  |
| Italian and EC regulations concerning materials in contact with food. Quality assurance in the manufacturing of food contact materials. | 1.5 |
| **Tutorials** | 2 |
| Group work, numerical exercises on shelf life forecasting and evaluation, seminars with company testimonials. |  |

***READING LIST***

G.L. Robertson, *“Food Packaging,* *Principles and Practices",* 2nd ed., CRC (Publ.), 2005.

D.S. Lee-K.L. Yam-L. Piergiovanni, *Food Packaging Science and Technology,* CRC Press, Inc., 2008.

L. Piergiovanni-S. Limbo, *Food Packaging. Materiali,* *Tecnologie e qualità degli alimenti*, Springer, 2010.

P. Calà-Sciullo, *Materiali destinati al contatto con gli alimenti,* Chiriotti Editori, Pinerolo (To), 2006.

Lecturer's notes.

Aids related to specific topics will be provided during the course.

***TEACHING METHOD***

1. Theoretical frontal and dialogue-based lectures aimed at presenting the key concepts of the subject.

2. Frontal tutorials involving the assisted solving of numerical problems related to calculation and prediction of food products shelf-life.

3. Assignment of working groups for the resolution of specific case-studies related to the course topics.

4. Classroom seminars with company testimonials.

5. A possible educational visit to a food packaging company.

***ASSESSMENT METHOD AND CRITERIA***

The exam will be divided into different parts. Students will be divided into groups (of maximum 5 students) and assigned a case study for evaluation of shelf-life of a specific food product. Based on the first part of the course dedicated to food shelf-life, the students will have to prepare a technical report showing how the shelf-life of the assigned food products can be assessed and which solutions could be proposed to improve it. In the second part, the same students’ group will have to prepare a technical report dedicated to the screening of different plastic materials in terms of their suitability for packing the assigned food product, including evaluation or design of innovative more eco-friendly plastic-based solutions.

In the last part, the same students’ group will have to select one of the considered plastic-based solutions for the packing of the assigned food product and prepare a last technical report to underline the legislative and quality assurance requisites for their commercialisation and final use by food operators.

Each report will be marked out of 30 and the final mark will be taken as a weighted arithmetic mean of the different obtained marks. Since the grading will be the same for all the students of the same working group, in the case a student wants to improve the final mark, it will be possible to plan an oral/written exam inegration on the whole course program. In the case of working students or students unable to participate in the group work, this must be communicated to the lecturer at the beginning of the course, to define alternative exams modalities.

***NOTES AND PREREQUISITES***

For the first part of the course on food shelf-life, basic knowledge of reaction kinetics, and of chemical-physical characteristics of food products can make it easier to follow it. If needed, the student can ask the teacher for additional materials to cover these topics.

***OFFICE HOURS FOR STUDENTS***

Prof. Giorgia Spigno, Gino Tansini and Elena Tramelli are available for the students after the lectures. In addition, there are available to receive students following specific appointment or through remote meetings. In any case, it is suggested to write an e-mail (giorgia.spigno@unicatt.it: gino.tansini@unicatt.it; elena.tramelli@unicatt.it) to agree on the day and time of reception.