

Course Unit	Analysis and control of chemical hazards		Field of study	Food industries	
Master in	Food Quality and Safety		School	School of Agriculture	
Academic Year	2020/2021	Year of study	1	Level	2-1
Type	Semestral	Semester	1	Code	6369-508-1102-00-20
ECTS credits	6.0				
Workload (hours)	162	Contact hours	T 30	TP -	PL 30
			TC -	S -	E -
			OT 4	O -	

T - Lectures; TP - Lectures and problem-solving; PL - Problem-solving, project or laboratory; TC - Fieldwork; S - Seminar; E - Placement; OT - Tutorial; O - Other

Name(s) of lecturer(s) Clementina Maria Moreira dos Santos, Maria Fátima Alves Pinto Lopes da Silva

Learning outcomes and competences

At the end of the course unit the learner is expected to be able to:

1. Identify and to know potential food chemical hazards
2. Relate technological processes and food preservation with the presence of certain chemical hazards
3. Know the classes of food additives allowed, risks that may entail and precautions to be taken into account
4. Identify potential toxicological risks associated to foodstuffs in order to minimize/eliminate these risks
5. Relate domestic, agricultural and industrial practices with the presence of residues in foodstuffs
6. Knowing the main routes of entry of toxic substances in the body and its metabolism

Prerequisites

Before the course unit the learner is expected to be able to:

Possess knowledge in the domains of general chemistry and general microbiology.

Course contents

Determinants for the food chemical safety: origin and classification of the chemical hazards, intrinsic and extrinsic. Hazards associated with the production, processing and preservation of foodstuffs. Hazards of natural origin, residues and contaminants. Means and routes of entry of toxic substances in the body; biotransformation of xenobiotics. Precautionary Principle.

Course contents (extended version)

1. Factors that determine chemical food safety
 - Concepts, origin and classification of chemical hazards (intrinsic and extrinsic)
 - Risk points in the food chain; chemical hazards incidence; importance of traceability
2. Hazards associated with the production, processing and preservation of foods
 - Chemical hazards on the production and storage of raw horticultural crops, fruits and mushrooms
 - Chemical hazards in foods of animal origin
 - Chemical hazards in food supplements
 - Other products resulting from technological processes
 - Presence of additives and allergens - control and legal requirements
3. Natural toxic substances in foods: lectins, fitats, saponins, others
4. Toxics with origin in technological operations: pesticides, PCBs, dioxines, PAHs, others
5. Toxic effects of other elements: solvents; antibiotics; radioactive elements, others
6. Heavy metals toxicity: cadmium, tin, arsenic, plumb, mercury
7. Substances migration from packaging
8. Ways of toxic entrance in human organism
9. Xenobiotics biotransformation. Fase I and II mechanisms
10. Integrated Control National Plan for foodstuffs and other official plans; RASFF system
11. Precautionary Principle. Exploitation of electronic sources of information on chemical hazards

Recommended reading

1. Páginas institucionais: www.dgv.min-agricultura.pt; www.asae.gov.pt; www.efsa.europa.eu
2. d'Mello, J. P. F. (Edi.) (2003). Food Safety: Contaminants and Toxins. CABI Publishing, London, UK, 472 pp.
3. Autoridade de Segurança Alimentar e Económica. (2012). Perfil de risco dos principais alimentos consumidos em Portugal. ASAE - Direcção de Avaliação e Comunicação dos Riscos.
4. Klaassen, Curtis D. ; Watkins, B. , John (2001). Toxicologia A Ciência Básica dos Tóxicos. De Casarett & Doull's. Mcgraw-Hill de Portugal, Lda. 5ª Edição.
5. Hodgson, E. (2010). A Textbook of Modern Toxicology, 4th Edition, John Wiley & Sons, New Jersey, USA (ISBN 978-0-470-46206-5)

Teaching and learning methods

Theoretical and practical lessons will use expositive, active (worksheets) and interrogative methods. Laboratorial lessons with demonstrative and active methods. Personal and/or tutorial study based in the reading of the recommended bibliography available in the Institute and in information supplied by e-learning and in institutional internet sites.

Assessment methods

- Alternative 1 - (Regular, Student Worker) (Final, Supplementary, Special)
- Final Written Exam - 100% (Final exam covering all theoretical and practical topics)

Language of instruction

Portuguese, with additional English support for foreign students.

Electronic validation

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07-11-2020	08-11-2020	08-11-2020	08-11-2020