Course Unit	Food Toxicology			Field of study	Biology and Biochemistry								
Bachelor in	Dietetics and Nutrition			School	School of Health								
Academic Year	2021/2022	Year of study	3	Level	1-3	ECTS credits	4.0						
Type	Semestral	Semester	2	Code	8149-501-3206-00-21								
Workload (hours)	108	Contact hours	T -	TP 30	PL 15	TC -	S -	E -	OT 5	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): Maria Eugénia Madureira Gouveia

Learning outcomes and competences

At the end of the course unit the learner is expected to be able to:
1. Understand fundamental toxicity concepts: toxicity evaluation, toxicity parameters, mechanisms of toxicity.
2. Understand toxicity parameters and toxicological studies.
3. Technical tools and methodological skills for risk assessment and risk characterization.

Prerequisites

Before the course unit the learner is expected to be able to:
Knowledge in Biochemistry and general Biology.

Course contents

General toxicity concepts. Mechanisms of toxicity and dose-response curves. Metabolism of xenobiotics. Toxicological parameters and toxicological studies. Methodologies for risk characterization and risk assessment for contaminants and residues in food.

Course contents (extended version)

1. General principles of toxicology
   - Dose-response curves and toxicologial parameters
   - Interpreting dose-response curve and dose-response data
   - Mode of contact and entry of xenobiotics - Respiratory, percutaneous and oral route.
   - Celular uptake
   - Distribution between plasma and tissue (Pharmacokinetics).
   - Storage of chemicals in the body
2. Mechanisms of acute toxicity and target organ toxicity
   - Neurotoxicity
   - Mechanisms of neural transmission
   - Agents that act on the synapse
   - Exposure to environmental neurotoxicants
3. Descriptive animal toxicology tests
   - Acute toxicology tests
   - Subchronic and chronic toxicity tests
   - Acute dermal and ocular toxicity tests
   - limitations and alternative methods
4. Alternative tests
   - Mutagenicity testing with procaryotic cell system
   - The Ames test
   - Mutagenicity testing with eukaryotic cell systems "in vitro"
5. Biotransformation
   - Biotransformation and toxicity
   - Primary biotransformation reactions (Phase I)
   - Secondary metabolism (Phase II reactions)
6. Risk assessment in toxicology
   - Principles o risk assessment Steps in risk assessment
   - Hazard identification and Hazard characterization Exposure assessment Risk characterization
   - Risk management and risk communication
7. Application of risk assessment to nutrients (Vitamins and minerals)
   - Special considerations for nutrients.
   - variability in the sensitivity of individuals to adverse effects, bioavailability,
   - steps in the development of the UL (Upper level),
8. Application of risk assessment to contaminants in food
9. Application of risk assessment to residues in food

Recommended reading

1. Claassen C. D. , Watkins, J. B. , (2001). Toxicologia. A Ciência Básica dos Tóxicos. De Casarett & Doull's (5ªed). Lisboa: Mcgraw-Hill.
2. Quintanilha, A. , Freire, A. , Halpen, M. (2008). Bioquímica . Organização molecular da vida. Lisboa: LIDEL
3. Scientific Opinion of the panel on contaminants in the food chain. Nitrate in vegetables. EFSA Journal, 2008, 689: 1-79.
4. Scientific Report of EFSA 2011. Results of Acrylamide levels in food from monitoring years 2007-2009 and exposure assessment. EFSA Journal, 20119 (4): 21-33

Teaching and learning methods

Lectures combined with practical and laboratorial classes. Bibliographic research and presentation of short seminars and written essays.

Assessment methods

1. Final assessment - (Regular, Student Worker) (Final)
   - Reports and Guides - 20%
   - Presentations - 20%
   - Final Written Exam - 60%
2. Type 2 - (Regular, Student Worker) (Supplementary, Special)
   - Final Written Exam - 100%

Language of instruction

Portuguese

Electronic validation

Maria Eugénia Madureira Gouveia	Juliana Almeida de Souza	Ana Maria Nunes Português Galvão	Adília Maria Pires da Silva Fernandes
15-04-2022	24-06-2022	25-06-2022	25-06-2022