



**MANAGEMENT &
VALORISATION OF
AGRICULTURAL BY-
PRODUCTS AND WASTES**

FENIKA

SCHOOL		AGRICULTURAL SCIENCES	
DEPARTMENT		FOOD SCIENCE & NUTRITION	
PROGRAMME		UNDERGRADUATE	
COURSE CODE		ME914	SEMESTER I
COURSE		MANAGEMENT & VALORISATION OF AGRICULTURAL BY-PRODUCTS AND WASTES RESPONSIBLE: D. MAKRIS	
TEACHING ACTIVITIES		TEACHING HOURS PER WEEK	CREDIT UNITS
LECTURES		3	5
LABORATORY		3	
COURSE TYPE		SCIENTIFIC AREA/SPECIFIC BACKGROUND/ SKILL DEVELOPMENT	
PREREQUISITES:		NO	
TEACHING AND EXAM LANGUAGE:		GREEK	
COURSE OFFERED TO ERASMUS STUDENTS		NO	
COURSE SITE (URL)			

LEARNING OUTCOME

Learning outcome



The objective of the course is the provision of knowledge pertaining to policies and scientific methods of management and valorisation of agri-food industry by-products and wastes. Particular emphasis is given in the avoidance of by-product/waste dumping generated during food processing and consumption, with the aim of reducing environmental aggravation. Furthermore, strategies and valorisation methodologies are also dealt with, to present routes of producing mainly high value-added products. Laboratory exercises intent to accustom students with practices related with agri-food by-product/waste valorisation as a strategy to produce high value-added products.

All the above are studied in depth with the necessary degree of specialization, and with the use of many case studies and practical applications, so that a student can resolve complex problems which may arise in industrial processing and valorization of agri-food by-products, and develop research and innovation (research and development of new products) in combination with knowledge from other courses (Chemistry, Food Biochemistry, Food Engineering, Food Biotechnology), in order to allow the production of new knowledge and the evolvement of by-product valorization technologies.

Upon successful completion of the course, students will be able to:

- *Have advanced knowledge related with circular economy and associated domestic and international strategies*
- *Have profound knowledge on of the nature of agri-food wastes*
- *Have deep knowledge on avoidance/recycling/reuse of agri-food wastes.*
- *Have specific knowledge on agri-food waste processing.*
- *Have advanced knowledge on on agri-food waste valorisation methods*

General skills

Upon completion of the course, the students will acquire the following skills:

- *Critical thinking and the link between theory and practical applications*
- *Search, analysis and combination of data and information with the use of cutting-edge technologies*
- *Decision making*
- *Self-sufficient working*
- *Team working*
- *Advancement of free, creative and inferential thinking*
- *Development of connotative and divergent thinking*
- *Critical awareness of issues pertaining to the specific field and the link to industrial practice*

Syllabus

- 1st week: Waste management and sustainability in the food industry
- 2nd week: Biorefining – basic principles
- 3rd week: Valorisation of food processing wastes
- 4th week: Enzymes, proteins and peptides
- 5th week: Polysaccharides
- 6th week: Lipid-soluble pigments and antioxidants
- 7th week: Water-soluble pigments and antioxidants
- 8th week: Fermentation technology
- 9th week: Production of alcohols and organic acids
- 10th week: Production of microbial lipids
- 11th week: Citrus processing wastes
- 12th week: Winemaking wastes
- 13th week: Olive oil production and cereal processing wastes

Laboratory course: 1. Introduction 2. Determination of sugar content in grape must residues with the phenol-sulfuric acid method. Calculation of potential alcoholic strength 3. Determination of total polyphenols in olive leaves (Folin-Ciocalteu) – Effect of solvent extraction. 4. Estimation of the reducing power of extracts (FRAP method) 5. Anthocyanin determination in fruit processing by-products. 6. Determination of total carotenoids in tomato processing by-products 7. Determination of total proteins in whey (Bradford method). 8. Overview – summary



TEACHING AND LEARNING METHODS - EVALUATION

TEACHING MODE	On campus. In laboratory courses, following a short demonstration by the teaching staff, students carry out the experiment. Furthermore, students get accustomed to writing of scientific reports, in which the experimental data are appropriately given and discussed.		
USE OF COMPUTER SERVICES	Lectures are delivered by power point presentations and other audio media		
TEACHING ORGANISATION	Activity	Semester workload	
	Lecture course	39	
	Laboratory course	39	
	Study	47	
	Sum	125	
STUDENT EVALUATION	The language of evaluation is Greek. The final grade is 50% the grade of the lecture course and 50% of the laboratory course. The exams of the lecture course include multiple choice questions. The exams of the laboratory course include exercises (50%) and reports (50%).		

RECOMMENDED BIBLIOGRAPHY

Gekas B., Balta-Brouma K.P. (2005). Food Industry & Environment. Tziola Eds. [ISBN: 960-418-057-6]