SUBJECT PROGRAMME IN VEGETABLE PRODUCTS INDUSTRIES

Academic course: 2018-2019

Identification and characteristics of the subject					
Code	501254			Créditos ECTS	6
Denomination (Spanish)	**Industrias de Procesos de Materias Primas Vegetales**				
(English)	Vegetable Products Industries				
Degree	Food Science and Technology Degree				
Center	Agricultural Engineering School				
Semester	Second (6º)	Character	Compulsory		

Professor/s			
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Field of knowledge	Food Technology
Departament	Animal Production and Food Science
Coordinator (in case the is more than one professor)	**María Jesús Petrón Testón**

Lessons and contents

Short description of the content

The content included in this subject is related to fruit and vegetable processing industry and its by-products. Including, as a part, horticulture industry, fats and oils industry, cereals industry, sugar industry, coffee, cacao or tea industries, spices and condiment industries.

Syllabus (Big Group activities)

Section 1: ***Fruits and vegetables industries***

Lesson 1.1. **Vegetables preservation.** Raw vegetables. Causes of vegetable spoilage. Methods of preserving vegetables.

Lesson 1.2. **Fresh and frozen fruits and vegetables.** Preliminary steps. Fresh fruits and vegetables. Frozen fruits and vegetables.

Lesson 1.3. **Modified atmosphere packaging in fruit and vegetables.** Definition, characteristic and processing of IV Gama.

Lesson 1.4. **Dried and lyophilized fruits and vegetables.** Dried fruits and vegetables. Freeze dried fruits and vegetables.

Lesson 1.5. **Fruit & vegetable juice processing.** Definitions and types of juices. Preliminary steps. Juice processing and aseptic packaging.

Lesson 1.6. **Jam & jelly processing.** Theoretical fundamentals. Raw material and preliminary steps. Jam processing.

Developed skills: CETE1, CETE2 , CT1, CG10, CG12, CG7,CG6, CG8, CG9, CB2, CB4, CB5
Learning results: RA137, RA138, RA139, RA140, RA141, RA142

Section 2: ***Fats and oils Industry***

Lesson 2.1. **Olive oil production.** Geographical distribution. Olives and Olive Oils. Olive oil culture.

Lesson 2.2. **Olive oil extraction.** Process flow chart. Preliminary steps. Olive paste preparation. Extraction. Storage.

Lesson 2.3. **Filtration and packaging.** Filtration and types of filter. Packaging and types of containers

Lesson 2.4. **Getting olive oil by-products.** Getting pomace oil. Vegetable waters treament.

Lesson 2.5. **Olive oil quality.** Classification of olive oil. Effect of processing on Olive Oil Quality

Lesson 2.6. **Seed oil and refining process.** Seed oil extraction. Refining techniques. Hydrogenation. Winterization.

Developed skills: CETE1, CETE2 , CT1, CT2, CG10, CG12, CG7,CG6, CG8, CG9, CB2, CB4, CB5
Learning results: RA137, RA138, RA139, RA140, RA141, RA142

Section 3. ***Industry of cereals and derivatives***

Lesson 3.1.- **Structure and composition of cereals.** Structure of cereals. Starch and gluten. Storage of cereals.

Lesson 3.2.- **The flour milling industry.** Objectives of dry milling. Preliminary steps: cleaning and preparation. Dry milling.

Lesson 3.3. **Starch production.** Wet milling. Getting starch and gluten. Applications on food industry.

Lesson 3.4. **Breakfast cereals.** Expanded and flaked cereals.

Lesson 3.5. **Bread and confectionery Industry.** Bread processing. Confectionery processing.

Tema 3.6. **Pasta industry.** Pasta processing.

Tema 3.7. **Rice industry.** Types of rice. White Rice processing. Parboiled rice.

Developed skills: CETE1, CETE2 , CT1, CG10, CG12, CG6, CG7, CG8, CG9, CB2, CB4, CB5
Learning results: RA137, RA138, RA139, RA140, RA141, RA142

Section 4: ***Other vegetable industries***

Lesson 4.1. **Sugar industry.** Sugar beet industry. Beet composition. Sugar beet processing. Types of sugar. Getting sugar by-products.

Lesson 4.2. **Coffee and tea Industries.** Definition and types. Coffee processing. Torrefacto, soluble and decaffeinated process. Tea processing.

Tema 4.3. **Cacao and chocolate processing.** Raw material and manufactured products. Cacao processing. Chocolate processing.

Tema 4.4. S**pices and condiment industries.** Types of spices and processing.

Developed skills: CETE1, CETE2 , CT1, CG10, CG12, CG6, CG7, CG8, CG9, CB2, CB4, CB5
Learning results: RA137, RA138, RA139, RA140, RA141, RA142

PRACTICAL SYLLABUS

Section 1: **Laboratory and Pilot plant tour and safe work practices.**

Standar precautions when using a lab or a pilot plant: minor advises in the use of facilities, equiptments, materials and reactives, both individual and team use.

Developed skills: CB2, CB5

Learning results: RA140, RA141, RA142

Section 2: **Vegetables preservation**

Making jails. Dried fruits and vetetables.

Developed skills: CETE1, CETE2, CB2, CB5, CG12

Learning results: RA137, RA140, RA141, RA142

Section 3: **Virgin olive oil processing.**

Making olive oil by ABENCOR processing. Effect of processing in the quality of oil.

Developed skills: CETE1, CETE2, CB2, CB5, CG12, CT2

Learning results: RA137, RA138, RA139, RA140, RA141, RA142

Section 4: **Processing of cereal based food products**

Making bread and pasta. Effect of processing in the quality of products.

Developed skills: CETE1, CETE2, CB2, CB5, CG12

Learning results: RA137, RA138, RA139, RA140, RA141, RA142

Section 5: **Innovative food products**

Development of new food products. Research and development of a new food product using facilities and equiptments of EIA. Search for information and make an oral presentation working in team.

Developed skills: CETE1, CETE2, CB2, CB5, CG10, CG12, CG6, CT2

Learning results: RA137, RA138, RA139, RA140, RA141, RA142

Activities

Student work hours by subject		**PresenTial**		**Monitoring activity**	**No presenTial**
Lesson	**Total**	**GG**	**SL**	**TP**	**EP**
1	10	10		1	9
2	9	9		1	9
3	9	9		1	9
4	7,5	7,5		1	9
LABORATORY/PILOT PLANT					
1	6		5	1	9
2	6		5	1	9
3	6		5	1	9
4	4,5		5	0,5	9
SEMINAR					
5	2,5		2,5		10,5
Evaluation	2	2			
Total	**150**	**37,5**	**22,5**	**7,5**	**82,5**

GG: Large Group (100 students).
SL: Seminar / Laboratory (hospital clinical practices = 7 students, laboratory or field practices = 15, room computer or language laboratory practices = 30, classes problems or seminars or practical cases = 40).

Teaching Methodologies

1. Lectures and discussion of theoretical contents
2. Development and presentation of seminars
3. Use of the virtual classroom
3. Laboratory practices, pilot plants and field
4. Study of the subject
5. Search and management of scientific literature
6. Exams

Evaluation

A) CONTINUOUS EVALUATION

1. Final exam (70%): theoretical knowledge acquired during the course delivery by a written final exam consisting of quiz questions and short questions. Test-type questions will only have a true answer; Those questions answered incorrectly will subtract ½ from the value of the question, that is, two wrong answers cancel a successful one. The short questions will be scored, if correctly answered, as a test question. To pass the theoretical part it is necessary to obtain a grade of 5 points or higher in this exam. Evaluated skills: CETE1, CETE2, CG6, CG7, CG8, CG9, CG10, CG12, CB2, CB4, CB5

2. Continuous evaluation (20%): practical skills and ability to integrate with theoretical knowledge. Participation in the classes through direct questions and discussion of results. Preparation of an individual written work for each practical section. Evaluated skills: CETE1, CETE2 , CG8, CG9, CG10,CG12

3. **Attendance with academic achievement (10%):** Innovation, creativity and resource consultation in solving activities during the lessons. Evaluated skills: CT1, CT2, CB2,CB4, CB5, CG8,CG9,CG10,CG12

B) ALTERNATIVE SYTEM WITH A GLOBAL EXAM

1. Final exam (100%).
In the first three weeks of the semester, the student who accepts this type of evaluation must notify the subject coordinator in writing of the intention to take part in this type of evaluation.
Evaluated skills: CETE1, CETE2, CG6, CG7, CG8, CG9, CG10, CG12, CG8, CG9, CB2, CB4, CB5, CT1, CT2

Bibliography and other resources

Basic

- APARICIO, R. y HARWOOD, J. (2003). Manual del aceite de oliva. Ediciones Mundi-Prensa.
- ARTHEY, D y ASHURST, P.R. (1997). Procesado de frutas. Editorial Acribia, S.A. Zaragoza.
- ARTHEY, D. y DENNIS, C. (1992). Procesado de Hortalizas. Ed. Acribia S.A. Zaragoza.
- CABELLOS, P.J, GARCÍA, M., MARTÍNEZ, M., HERNÁNDEZ, B., GARCÍA A. (2005). Manual de aplicación del Sistema APPCC en industrias de aceites vegetales comestibles de Castilla-La Mancha.
- DENDY, D. A.V. (2004). Cereales y productos derivados : química y tecnología. Ed. Acribia, Zaragoza.
- GUÍA DE MEJORES TÉCNICAS DISPONIBLES EN ESPAÑA DEL SECTOR AZUCARERO (2005). Ministerio de Agricultura, Pesca y Alimentación.
- JUNTA DE EXTREMADURA. (2007). De verde y oro. Guía del aceite de oliva virgen extra y la aceituna en Extremadura. Ediciones Junta de Extremadura (Consejería de Economía y Trabajo).
- RAUCH, G. (1986). Fabricación de mermelada. Editorial Acribia, S.A.

• WILEY, C. (1997). Frutas y hortalizas mínimamente procesadas y refrigeradas. Editorial Acribia, S.A.

Complementary

A. General

- ALEIXANDRE, J.L. y GARCÍA, M.J. (1999). Industrias agroalimentarias. Servicio de publicaciones de la Universidad Politécnica de Valencia, Valencia.
- ALEIXANDRE, J.L. y GARCÍA, M.J. (1999). Prácticas de procesos de elaboración y conservación de alimentos. Servicio de publicaciones de la Universidad Politécnica de Valencia, Valencia.
- BARBOSA, G.V., POTHAKAMURY, U.R., PALOU, E. y SWANSON, B.G. (1999).Conservación no térmica de alimentos. Acribia, Zaragoza.
- CALLES, J.A. (1999). Ingeniería de la industria alimentaria. Ed. Síntesis. Madrid.
- CASP A. y ABRIL J. (1999). Procesos de conservación de alimentos. A. Madrid Vicente y Mundi-Prensa, Madrid.
- FELLOWS, P. (2006). Los alimentos: su elaboración y transformación. Organización de las Naciones Unidas para la Agricultura y la Alimentación, Roma. [Recurso electrónico].
- FENNEMA, O. (2000). Introducción a la ciencia de los alimentos. 2ª edición. Editorial Reverté, S.A. Barcelona.
- GOBANTES, I. (2002). Aspectos técnicos del envasado a vacío y bajo atmósfera protectora". Alimentación, Equipos y Tecnología. p, 75-80.
- INSTITUTO NACIONAL DE INVESTIGACIONES AGRARIAS (España) (2008). Actividades I+D+I del INIA 2006. Instituto Nacional de Investigación y Tecnología Agraria y Alimentaria, D.L. Madrid.
- POTTER, N.N. y HOTCHKISS, J.H. (1999). Ciencia de los Alimentos. Acribia, Zaragoza.
- RAVENTÓS SANTAMARÍA, M. (2005). Industria alimentaria, tecnologías emergentes. Edicions UPC. Barcelona.
- SUBDIRECCIÓN GENERAL DE INDUSTRIAS, COMERCIALIZACIÓN Y DISTRIBUCIÓN AGROALIMENTARIA. (2005). Las industrias alimentarias, agrarias y forestales en España. Ministerio de Agricultura, Pesca y Navegación. Madrid.

B. Fruit and vegetable industries

- ARTÉS, F. (2004). Reducción de daños por el frío en la refrigeración hortofrutícola. Alimentación, Equipos y Tecnología. p. 56-64.
- MADRID, A. (2003). Refrigeración, congelación y envasado de los alimentos. A.
- PASTOR, C., VARGAS, M. GONZÁLEZ-MARTÍNEZ, C. (2005). Recubrimientos comestibles: aplicación a frutas y hortalizas. Alimentación, Equipos y Tecnología. p, 130-135.
- PÉREZ, L. (2003). Calidad de frutas mínimamente procesadas (I). Pardeamiento no enzimático. Alimentación, Equipos y Tecnología. p, 81-84.

- PORTU, J. (2000). La importancia de la operación de enfriado tras la esterilización en las conservas vegetales". Alimentación, Equipos y Tecnología. p, 69-73.
- REID, D.S. (2006). Factores que influyen en el proceso de congelación: nuevas perspectivas". Alimentación, Equipos y Tecnología. P, 63-68.
- SÁNCHEZ, M.C. (2001). Aplicación de atmósferas modificadas y/o controladas a la conservación de vegetales. Alimentación, Equipos y Tecnología. P, 51-58.
- SÁNCHEZ PINEDA, M.T. (2001). Tratamientos térmicos de escaldado y congelación. Alimentación, Equipos y Tecnología. P, 51-58.
- THOMPSON. A.K. (2003). Almacenamiento en atmósferas controladas de frutas y hortalizas. Editorial Acribia, S.A.
- VINIEGRA, V. (2001). Minimización de la contaminación y del consumo de agua en el proceso de fabricación del tomate en conserva". Alimentación, Equipos y Tecnología. p, 117-123.

C. Fat and Oil Industries

- KIRITSAKIS, A.K. (1992). El Aceite de Oliva. Mundi-Prensa. Madrid.
- LAWSON, H. (1995). Food Oils and Fats. Technology, Utilization and Nutrition. Chapman&Hall. New York.
- MADRID, A.; CENZANO, I. y J.M. VICENTE (1994). Manual de Aceites y Grasas Comestibles. AMV Ediciones Madrid.
- MURILLO RAMOS, R. (1992). El Aceite de Oliva Virgen. Aceite de Oliva. Actas de las Jornadas “Fronteras de la Ciencia”. Mundi-Prensa. Madrid.
- TYMAN, J.H.P. y M.H. GORDON (1994). Development in the Analysis of Lipids. Royal Society of Chemistry. Cambridge.

D. Cereal based food Industry

- CALLEJO GONZÁLEZ, M. J. (2002). Industrias de cereales y derivados. Ed. Madrid Vicente: Mundi-Prensa, Madrid.
- CALAVERAS, J. (1995). Tratado de Panificación y Bollería. AMV Ediciones. Madrid.
- FAST, R.B. y E.F. CALDWELL (1990). Breakfast Cereals and How they are Made. AACC. St. Paul.
- KENT, N.L. (1994). Technology of Cereals: An Introduction for Students of food Science and Agriculture. 4 ed. Pergamon Press. Oxford.
- MADRID, A. (1999). Confitería y Pastelería: Manual de Formación. Mundi-Prensa AMV Ediciones. Madrid.

E. Other industries

- BILHEUX, R. (1997). Petits fours, chocolate, frozen desserts, sugar work. Díaz de Santos, Madrid.
- DEBRY, G. (1993). Le café et le santé. Jhon Libbey.

- EDWARDS, W.P. (2000). The science of sugar confectionery. Díaz de Santos, Madrid.
- JACKSOM, E.B. (1995). Sugar confectionery manufacture. Díaz de Santos, Madrid.
- TAINTER, D.R. y A.T. GREINS (1995). Especies y Aromatizantes Alimentarios. Acribia. Zaragoza.

Other complementary resources and teaching materials

Prior to the explanation of the lesson It will be provided with a summary of the lesson in which the main content to be taught is included. For your disposal will be deposited within each thematic block in the moodle. For this purpose, extension material, both bibliographical and other documentation (eg web pages) may be used to develop other transverse or specific degree qualifications. All this on the moodle virtual campus platform.
Virtual classroom of the subject in the virtual campus of the Uex.
(http://campusvirtual.unex.es/portal/)

Tutorials

Scheduled Tutorials: The days when indicated by the teacher on the school website. http://www.unex.es/conoce-la-uex/centros/eia/centro/profesores

Tutorials of free access: the days in which this is indicated by the teacher in the web of the school. http://www.unex.es/conoce-la-uex/centros/eia/centro/profesores

Recomendations

The general recommendations for a better use of the subject by the students are:
- Attend and participate in the classroom and practical classes of the subject.
- Frequently use the virtual classroom and other web resources (forums, blogs, etc.)
- Attend tutoring sessions scheduled by the teacher to follow the course.
- Use the bibliography recommended by the teacher.