



(*)Facultade de Química

Presentation

The studies of Chemistry have a large tradition at the University of Vigo, where it has been taught during more than 30 years. The establishment of the University System of Galicia in the 90s and the current process of implantation of the European Space of Higher Education (EEES) modified the offer of degrees, but not the pioneering spirit of the chemists in research or in the quest for a better service to the society.



Degrees given in the Faculty

Degree in Chemistry

- Masters And Doctorates:
 - Industry and Chemical Research and Industrial Chemistry
 - Theoretical chemistry and Computational Modelling
- Master:
 - Science and Technology of Conservation of Fishing Products

Web page

Information about the Faculty of Chemistry:

<http://quimica.uvigo.es>

(*)Máster Universitario en Ciencia e Tecnoloxía de Conservación de Produtos da Pesca

Subjects

Year 2nd

Code	Name	Quadmester	Total Cr.
V11M085V01301	Physical and Chemical Treatments	1st	3
V11M085V01302	Quality of Fishery and Aquaculture Products	1st	6
V11M085V01401	Food Safety in Fishery and Aquacultural Products	1st	6
V11M085V01402	Product Innovation and Process	2nd	3

V11M085V01403	The Final Master Degree Work	2nd	6
V11M085V01404	Practicals in Business	2nd	6

IDENTIFYING DATA				
Physical and Chemical Treatments				
Subject	Physical and Chemical Treatments			
Code	V11M085V01301			
Study programme	(*)Máster Universitario en Ciencia e Tecnoloxía de Conservación de Produtos da Pesca			
Descriptors	ECTS Credits	Choose	Year	Quadmester
	3	Mandatory	2nd	1st
Teaching language	Spanish			
Department				
Coordinator	Canosa Saa, Jose Manuel			
Lecturers	Barros Velázquez, Jorge Canosa Saa, Jose Manuel Catala Moragrega, Ramón García Cabado, Ana Loureiro Perez, Manuel R. Teira González, Francisco José			
E-mail	jcanosa@uvigo.es			
Web	http://webs.uvigo.es/pesca_master/			
General description	In this area, the different physical and chemical procedures used to prolong the useful life of fishery and aquaculture products are addressed, starting with the more traditional methods, to the more innovative ones. It will focus on the use of traditional methods that have been superseded from a technological point of view but which are organoleptically important and offer diversification for the consumer and, at the other extreme, the use of advanced technologies to supply Products and lengthen the useful life and considerations necessary to choose the appropriate packaging depending on the type of food, technological process and storage conditions.			

Competencies	
Code	
B1	
B2	
B3	(*)Que os estudantes desenvolvan as habilidades para realizar traballos experimentais, manexo de elementos materiais e biolóxicos e programas relacionados.
B4	(*)Que os estudantes desenvolvan as capacidades de traballo en equipo, enriquecidas pola pluridisciplinariedade.
B5	(*)Que os estudantes desenvolvan a habilidade de elaboración, presentación e defensa de traballos ou informes.
B6	
B7	
B8	(*)Que os estudantes posúan as habilidades de aprendizaxe que lles permitan continuar estudando dun modo que haberá de ser en gran medida autodirigido ou autónomo.
C8	(*)Coñecer as operacións e tecnoloxías básicas utilizadas na conservación e transformación de produtos do mar por frío, por calor ou por outros métodos físico químicos: refrixeración, conxelación, esterilización, pasteurización, semiconservas.
C9	(*)Estudar as diversas formas de elaboración e sistemas de envasado para produtos do mar tratados por frío, por calor ou mediante outros métodos, tanto de forma tradicional como as novas orientacións tecnolóxicas: produtos reestruturados, pratos preparados, atmosferas modificadas, altas presións, etc.
C10	(*)Entender a organización da produción na industria de produtos da pesca e da acuicultura tratados por frío, por calor e por outros procedementos. Métodos de produción e a súa loxística.

Learning outcomes	
Expected results from this subject	Training and Learning Results
Understand the phase diagram in the traditional products processing.	B1
	B2
	B3
	B4
	B5
	B6
	B7
	B8
	C8

To study the processes involved in the production of products at the industrial level.	B1 B2 B3 B4 B5 B6 B7 B8 C8 C9
Acquire knowledge about packaging and its types, for this range of products. Know the process of Closing of the products.	B1 B2 B3 B4 B5 B6 B7 B8 C8 C9 C10
Understand the different aspects and importance of traditional treatments in this range of products. Understand production methods and logistics.	B1 B2 B3 B4 B5 B6 B7 B8 C8 C9 C10

Contents

Topic	
SUBJECT 1. General considerations on Manufacturing processes of semi-preserves.	- Process of production of anchovy in salting and fillets of anchovy, codfish In salting, etc.
SUBJECT 2. Manufacture of smoked products. Technological variables.	- Production of smoked salmon, herring, etc. - Technological variables of the process and its incident in the characteristics Of the final product. - Controls applicable in industrial processing.
SUBJECT 3. Specific packaging processes.	- Packaging in modified atmospheres and controlled atmospheres. - Additives and technological adjuvants, bacteriocins. - Novel procedures: high pressures, electrical pulses, Microwave, ohmic heating. - Active and intelligent packaging.
SUBJECT 4. Biotechnological methods of Conservation of fishery products.	- Bioconservation. Protective cultures. Bacteriocins. Probiotics. - Other methods * Natural conservation of wool products Fishing: Essential oils, spices, other additives. - Production of wool additives wool fishing industries. - Trends in Functional Foods.

Planning

	Class hours	Hours outside the classroom	Total hours
Master Session	25	35	60
Group tutoring	3	0	3
Outdoor study / field practices	5	0	5
Multiple choice tests	2	5	7

*The information in the planning table is for guidance only and does not take into account the heterogeneity of the students.

Methodologies

	Description
Master Session	Exposition by the teacher of the contents on the subject of study. Bases Theoretical and / or exercise or projects to be developed by the student.

Group tutoring	Resolution of doubts and consultations in group or individual regarding the follow-up and study of lectures
Outdoor study / field practices	Visits will be made to industries in the canning industry of seafood and related industries. The objective will be to know all the modules and aspects of a plant, involved in the production process.

Personalized attention

Methodologies Description

Group tutoring	The student will be guided in the acquisition of basic skills and related problem solving With the subject matter of study. Student progress will be tracked.
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Assessment

	Description	Qualification	Training and Learning Results
Master Session	The resolution of problems and practical chaos will be evaluated, As well as the student's autonomous work.	30	B1 C8 B2 C9 B7 C10 B8
Outdoor study / field practices	Assistance will be assessed to field practices (visits to Industries) and the implementation of a report on the Visits.	10	B3 B4 B5 B6 B7 B8
Multiple choice tests	Test of test type The theoretical knowledge acquired in this test will be evaluated. Subject through an exercise with test questions.	60	B1 C8 B2 C9 B7 C10 B8

Other comments on the Evaluation

Sources of information

Basic Bibliography

VV. AA., **Elaborador de conservas de productos de la pesca**, Editorial Ideas Propias,
Jean Pierre Nicolle et Camille Knockaert, **Les conserves del produits de la mer**, IFREMER,
Dong Sun Lee, Kit L. Yam y Piergiorgio L, **Food Packaging Science and Technology**, CRC Press,
Philip Richardson, **In-pack processed foods**, Woodhead Publishing Ltd,
Ana G. Cabado y Juan M. Vieites, **Quality Parameters in Canned Seafoods**, Nova Science Publishers, Inc.,
Joseph Kerry, **Smart Packaging Technologies**, John Willey & Sons Ltd,

Complementary Bibliography

C. Piñeiro, J. Barros-Velázquez, and S. P. Aubourg, **Effects of newer slurry ice systems on the quality of aquatic food products: a comparative review versus flake-ice chilling methods**, Trends in Food Science and Technology,
C. Campos, O. Rodríguez, P. Calo-Mata, M. Prado and J. Barros-Velázquez, **Preliminary characterization of bacteriocins from Lactococcus lactis, Enterococcus faecium and Enterococcus mundtii strains isolated from turbot (Psetta maxima)**, Food Research International,
P. Calo, S. Arlindo, K. Boehme, T. de Miguel, A. Pascoal and J. Barros-Velázquez, **Current applications and future trends of lactic acid bacteria and their bacteriocins for the biopreservation of aquatic food products**, Food and Bioprocess Technology,
S. Arlindo, P. Calo, C. Franco, M. Prado, A. Cepeda and J. Barros-Velázquez, **Single nucleotide polymorphism analysis of the enterocin P structural gene in Enterococcus faecium strains isolated from nonfermented animal foods**, Molecular Nutrition and Food Research,
S.V. Hosseini, S. Arlindo, K. Böhme, I. Fernández-No, P. Calo-Mata and J. Barros-Velázquez, **Genetic and probiotic profiling of bacteriocin-producing Enterococcus faecium strains isolated from non-fermented animal foods**, Journal of Applied Microbiology,
Minia Sanjuás-Rey, Bibiana García-Soto, Jorge Barros-Velázquez, José R. Fuertes-Gamundi & Santia, **Effect of a two-step natural organic acid treatment on microbial activity and lipid damage during blue whiting (Micromesistius poutassou) chilling.**, International Journal of Food Science & Techno,
Bibiana García-Soto, Minia Sanjuás, Jorge Barros-Velázquez, José R. Fuertes-Gamundi and Santiago P., **Preservative effect of an organic acid-icing system on chilled fish lipids.**, European Journal of Lipid Science and Technology,

Recommendations

IDENTIFYING DATA				
Quality of Fishery and Aquaculture Products				
Subject	Quality of Fishery and Aquaculture Products			
Code	V11M085V01302			
Study programme	(*)Máster Universitario en Ciencia e Tecnoloxía de Conservación de Produtos da Pesca			
Descriptors	ECTS Credits	Choose	Year	Quadmester
	6	Mandatory	2nd	1st
Teaching language	Spanish			
Department				
Coordinator	Tovar Rodríguez, Clara Asunción			
Lecturers	Barros Velázquez, Jorge García Cabado, Ana Losada Iglesias, Vanesa Sotelo Sesto, Pablo Tovar Rodríguez, Clara Asunción			
E-mail	tovar@uvigo.es			
Web	http://webs.uvigo.es/pesca_master/			
General description	In this area, the modifications of the organoleptic characters that occur after the capture of the fish and the effects of the refrigeration and freezing on the loss of freshness of the fishery products, as well as the methods of determining freshness exist. Methods for recognizing food alterations during storage and for detecting biochemical changes subsequent to capture and during storage shall be studied. Microbiological criteria and procedures for analyzing fish quality and related legislation will also be addressed. In addition, rapid recognition tests and specific techniques for the alterations of frozen and preserved foods in the frozen state will be studied.			

Competencies	
Code	
B1	
B2	
B3	(*)Que os estudantes desenvolvan as habilidades para realizar traballos experimentais, manexo de elementos materiais e biolóxicos e programas relacionados.
B4	(*)Que os estudantes desenvolvan as capacidades de traballo en equipo, enriquecidas pola pluridisciplinariedade.
B5	(*)Que os estudantes desenvolvan a habilidade de elaboración, presentación e defensa de traballos ou informes.
B6	
B7	
B8	(*)Que os estudantes posúan as habilidades de aprendizaxe que lles permitan continuar estudando dun modo que haberá de ser en gran medida autodirigido ou autónomo.
C11	(*)Determinar os criterios e procedementos para o control da calidade dos produtos da pesca e dos envases e embalaxe utilizados no seu circuíto comercial. Coñecer os procedementos para o seu control analítico e detección de defectos.
C12	(*)Aproximación ao control de calidade de cada unha das liñas de produción dos produtos pesqueiros. Coñecementos básicos da xestión da calidade de produto.

Learning outcomes	
Expected results from this subject	Training and Learning Results
To know the basic aspects of the quality control of fishery and aquaculture products (PPAs)	B1
	B2
	B3
	B4
	B5
	B6
	B7
	B8
	C11
	C12

Know the general aspects of quality control: packaging and packaging.

B1
B2
B3
B4
B5
B6
B7
B8
C11
C12

Know the specific and operational aspects of quality control.

B1
B2
B3
B4
B5
B6
B7
B8
C11
C12

Contents

Topic

SUBJECT 1. Basic aspects of the control of Quality of fishery products and the Aquaculture (PPAs)	- organoleptic and biochemical changes subsequent to capture. - Effects of refrigeration on loss of freshness. - Modifications of the constituents of fish during the Processing and storage. - Abiotic pollutants
SUBJECT 2. Microbiological aspects related With the conservation of the fish.	- Marine biotoxins. - Legislative progress and alternative methods.
SUBJECT 3. Physical Methods of quality control of Fishery products	Rheology of gels for the determination of physical properties: 1) Oscillatory methods (test in tension sweeps and sweep of frequency; 2) Static methods (load-recovery test, temperatura Constant: determination of gel strength, exponent of relaxation and relax time.
SUBJECT 4. Quality control in packaging. Defects. More common in packaged products.	- Know the methods of recognition of defects. - Know the guidelines of action in the daily practice of the industry.
SUBJECT 5. Practical classes	- Determination of sensory, chemical and microbiological parameters of the quality. - Nutritional composition, presence of additives and contaminants.

Planning

	Class hours	Hours outside the classroom	Total hours
Master Session	32	56	88
Group tutoring	3	2	5
Laboratory practises	25	25	50
Multiple choice tests	2	5	7

*The information in the planning table is for guidance only and does not take into account the heterogeneity of the students.

Methodologies

	Description
Master Session	Exposition by the teacher of the contents on the subject of study. bases. Theoretical and exercises of projects to be developed by the student.
Group tutoring	Resolution of doubts and queries, both in the individual level and in small group.
Laboratory practises	Determination of sensory, chemical and microbiological parameters of the quality, composition. Nutritional, presence of additives, contaminants

Personalized attention

Methodologies Description

Group tutoring	The student will be guided in the acquisition of basic skills and related problem solving With the subject matter of study. The student's progress will be tracked.
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Assessment

Description	Qualification	Training and Learning Results
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Master Session	Master session Problem solving and case studies will be evaluated. So Like, the autonomous work of him student.	20	B1 B2 B7 B8	C11 C12
Laboratory practises	The performance and results of the Practice memory.	20	B3 B4 B5 B7 B8	C11 C12
Multiple choice tests	Test of test type The theoretical knowledge acquired in this subject will be evaluated, Through a test with test questions.	60	B1 B2 B7 B8	C11 C12

Other comments on the Evaluation

Sources of information

Basic Bibliography

A. O. A. C., **Official Methods of Analysis (14th edn). Association of Official Analytical Chemist**, Arlington, USA,
 FAO/DANIDA, **El pescado fresco: su calidad y cambios de calidad**,
 FARBER J., DODOS K., **Principles of modified-atmosphere and sous vide product packaging.**, A technopnic Publishing Company Inc,
 HEBARD, D. E., Flick G. J. , Martin R. E., **Occurrence and significance of trimethylamine oxide and its derivates in fish and shellfish. Chemistry and biochemistry of marine food products**, Avi Publishing Co. Conneticut,
 GOULD, **New methods of preservation P.**, Blackie Academic and Professional,
 Jae W. Park, **Surimi and surimi sea food**, 2nd edition,

Complementary Bibliography

BEATTY S. A.; N. E. GIBBONS, **The measurement of spoilage of fish**, J. Fish Res. Bd. Can 3 (1): 79-9 1.,
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 CASTELL, C. H.; B. SMITH Y N. NEAL., **Production of dimethylamine in muscle of several species of gadoid fish during frozen storage, especially in relation to presence of dark muscle**, J. Res. Bd Can., 28 (1): 1-5,
 CASTELL, C. H.; SMITH B. Y DYER, W. J., **Simultaneous measurements of trimethylamine and diniethyiarnine in fish, and their use for estimating quality of frozen storage gadoid fish.**, Fish Res. Bc/. Can., 31: 383-389,
 COLLINS y. K., **Studies of fish spoilage. VIII: Volatile acid of cod muscle pressjuice**, J. Fish. Res. Bd. Can., 5 (3): 197-202,
 DYER W. J., **Ainines in fish muscle. 1 .Colorimetric determiriation of trimethylainine as the picrate salt.**, 1 Fish res. Bd. Can., 6 (5): 351,
 DYER W. J., **Amines in fish Muscle. VI. Trimethyiamine Oxide Content of Fish and Marine Invertebrates**, J. Fish. Res Rd. Can., 8 (5).,
 GIILL, T. A.; THOMPSON, J. W., **Rapid, automated analysis of amines in seafood by ion-moderated position I-IPLC.**, 1. Food Sci., 49: 603-606.,

Recommendations

IDENTIFYING DATA				
Food Safety in Fishery and Aquacultural Products				
Subject	Food Safety in Fishery and Aquacultural Products			
Code	V11M085V01401			
Study programme	(*)Máster Universitario en Ciencia e Tecnoloxía de Conservación de Produtos da Pesca			
Descriptors	ECTS Credits	Choose	Year	Quadmester
	6	Mandatory	2nd	1st
Teaching language	Spanish			
Department				
Coordinator	Canosa Saa, Jose Manuel			
Lecturers	Avendaño Garcia, Jose M ^a Canosa Saa, Jose Manuel Martínez Fernández, Ana Moreno Carbajo, Vanesa Ruiz Blanco, Carlos S. Viñuela Rodríguez, José Ángel			
E-mail	jcanosa@uvigo.es			
Web	http://webs.uvigo.es/pesca_master/			
General description	In this matter will be approached Autocontrol in the food chain, production control, logistics and assurance, quality management and quality certification.			

Competencies	
Code	
B1	
B2	
B3	(*)Que os estudantes desenvolvan as habilidades para realizar traballos experimentais, manexo de elementos materiais e biolóxicos e programas relacionados.
B4	(*)Que os estudantes desenvolvan as capacidades de traballo en equipo, enriquecidas pola pluridisciplinariadad.
B5	(*)Que os estudantes desenvolvan a habilidade de elaboración, presentación e defensa de traballos ou informes.
B6	
B7	
B8	(*)Que os estudantes posúan as habilidades de aprendizaxe que lles permitan continuar estudando dun modo que habrá de ser en gran medida autodirigido ou autónomo.
C13	(*)Adquirir os coñecementos básicos e interpretar a lexislación aplicable ás instalacións onde se realiza a manipulación e o tratamento dos produtos da pesca ao longo da cadea comercial: hixiene, etiquetaxe, seguridade alimentaria, autocontrol en planta (APPCC), etc.
C14	(*)Valorar a importancia do control e certificación da calidade dos produtos pesqueiros como arma comercial e de cara á trazabilidade e seguridade alimentaria.
C15	(*)Coñecer os procedementos de xestión de alertas alimentarias pola autoridade competente e os responsables da cadea alimentaria
C16	(*)Coñecer as actuacións dos laboratorios de control oficial dos produtos pesqueiros.

Learning outcomes	
Expected results from this subject	Training and Learning Results
Interpreting legislation in the self-control of fishery products, legislation on hygiene, Labeling and food safety.	B1
	B2
	B3
	B4
	B5
	B6
	B7
	B8
	C13

Practically apply hazard analysis and critical control points (HACCP), with the Peculiarities of each type of process.	B1 B2 B3 B4 B5 B6 B7 B8 C13 C14
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To value the importance of the control and certification of the quality of marine food products As a commercial weapon and traceability and food safety.	B1 B2 B3 B4 B5 B6 B7 B8 C14
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To know the procedures for the management of food alerts by competent authorities and those responsible for the food chain.	B1 B2 B3 B4 B5 B6 B7 B8 C15
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To know the actions of the Laboratories of Official Control of the products of the fishing and the aquaculture.	B1 B2 B3 B4 B5 B6 B7 B8 C16
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Contents

Topic

SUBJECT 1. Self-control in the chain of feeding.	- Traceability. - HACCP. - Study of deviations. - Aspects of practical implementation
SUBJECT 2. Food-packaging interactions	(*)
SUBJECT 3. ESO 9000 standards.	- Application to the processes of elaboration of fishery products.
SUBJECT 4. Official control of fishery products Third countries.	(*)
SUBJECT 5. Laboratories of official control of Fishery products.	(*)
SUBJECT 6. Official Control of Fishery Products In the EU.	(*)

Planning

	Class hours	Hours outside the classroom	Total hours
Master Session	32	56	88
Group tutoring	3	2	5
Outdoor study / field practices	25	25	50
Multiple choice tests	2	5	7

*The information in the planning table is for guidance only and does not take into account the heterogeneity of the students.

Methodologies

Description

Master Session	Exposition by the teacher of the contents of the subject matter of study, theoretical bases and exercises in projects to be developed by the student. Slate and audiovisual means of transparency exposition will be used.
Group tutoring	Resolution of doubts and consultations either individually or in a small group regarding the follow-up and study of the lessons of the subject.
Outdoor study / field practices	Visits to industries of the canning industry of seafood and related industries. The objective is to know all the modules and aspects of a plant, involved in the production process with the support of specialists and plant technicians.

Personalized attention

Methodologies Description

Group tutoring	The student will be guided in the acquisition of basic skills and related problem solving With the subject matter of study. The student's progress will be tracked.
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Assessment

	Description	Qualification	Training and Learning Results
Master Session	It will evaluate the resolution of problems and practical cases, As well as the autonomous work of the student.	30	B1 C13 B2 C14 B7 C15 B8 C16
Outdoor study / field practices	Assistance will be assessed to field practices (visits to The industries) and the realization of a memory of the visits	10	B3 C13 B4 C14 B5 C15 C16
Multiple choice tests	There will be an exercise with test questions that Assess the acquired theoretical and practical knowledge In the subject.	60	B1 C13 B2 C14 B7 C15 B8 C16

Other comments on the Evaluation

Sources of information

Basic Bibliography

FAO., **El Pescado Fresco: su calidad y cambios en su calidad**,

FAO., **Sistemas de Calidad e Inocuidad de los alimentos. Manual de Capacitación sobre higiene de los alimentos y sobre el sistema de análisis de Peligros y de Puntos de Control Críticos**,

FAO, **Food safety risk analysis**,

A. Ruiter, **El pescado y los productos derivados de la pesca. Composición, propiedades nutritivas y estabilidad**, Editorial Acribia,

WHO, **Training Considerations for the Application of the Hazard Analysis Critical Control Point System to Food Processing and Manufacturing**,

Gobierno Vasco, **Estándar de referencia de los sistemas de autocontrol de empresas alimentarias basados en el APPCC/HACCP**,

James G. Brennan., **Manual del procesado de los alimentos**, Editorial Acribia,

Complementary Bibliography

Jean-Yves Leveau y Marielle Bouix., **Manual Técnico de Higiene, Limpieza y Desinfección**,

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Codex Alimentarius, **Código de Prácticas para el pescado y los productos pesqueros**,

FDA., **Fish and Fisheries Products Hazards and Controls Guidance**,

Alianza Nacional HACCP para pescados y mariscos, **HACCP: Programa de capacitación en Análisis de Peligros y Puntos Críticos de Control**,

FAO/WHO, **Guidance to governments on the application of HACCP**,

Mortimore, S., Wallace, C, **HACCP. Enfoque práctico**, Editorial Acribia, S.A. Zaragoza,

J. Puig-Durán, **Ingeniería, Autocontrol y Auditoría de la Higiene en la Industria Alimentaria**,

Couto Lorenzo, Luis, **Auditoría del Sistema APPCC**,

Generalitat de Cataluña. Agencia Catalana de Seguritat Alimentaria, **El autocontrol en los establecimientos alimentarios. Guía para la aplicación del autocontrol basado en el Sistema de Análisis de Peligros y Control de Puntos Críticos**,

Cheftel, Jean-Claude and Heri, **Introducción a la bioquímica y tecnología de los alimentos. Editorial Acribia. Volumen I y II**,

Zdzislaw E. Sikorski, **Tecnología de los productos del mar. Recursos, composición nutritiva y conservación**, Editorial Acribia,

M.E.Stansby, **Tecnología de la Industria Pesquera**, Editorial Acribia,

G.H.O. Burgess, C.L. Cutting, J.A.Lovern, J.J. Waterman, **El pescado y las industrias derivadas de la pesca**, Editorial Acribia,

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Canadian Food Inspection Agency, **METAL CAN DEFECTS Identification and lassification Manual**,

Stumbo, C. R., J.R. Murphy, and J. Cochran, **Nature of Thermal death time curves for P.A. 3679 and Clostridium botulinum**, FOOD TECHNOLOGY, 4. 321.,

Frazier, W.C., Westhoff, D.C., **Microbiología de los Alimentos.**, 3ª edición. Editorial Acribia, S.A. Zaragoza,

Banwart, G.J., **Basic Food Microbiology**, 2nd Edition. Van Nostrand Reinhold. New York.,

Holdsworth D., Simpson R, **Thermal Processing of Packaged Foods**, Second Edition. Ed. Springer,

Shafiur Rahman M, **Handbook of Food Preservation**, Second Edition. CRC Press.,

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<http://www.mapa.es/es/pesca/pags/calidad/calidad.htm>,

- http://www.fao.org/index_es.htm,

Recommendations

IDENTIFYING DATA				
Product Innovation and Process				
Subject	Product Innovation and Process			
Code	V11M085V01402			
Study programme	(*)Máster Universitario en Ciencia e Tecnoloxía de Conservación de Produtos da Pesca			
Descriptors	ECTS Credits	Choose	Year	Quadmester
	3	Mandatory	2nd	2nd
Teaching language	Spanish			
Department				
Coordinator	Canosa Saa, Jose Manuel			
Lecturers	Canosa Saa, Jose Manuel Larsson , Olof Christian Loureiro Perez, Manuel R. Sartal Rodríguez, Antonio Vázquez Pérez, Xosé Ramón			
E-mail	jcanosa@uvigo.es			
Web	http://webs.uvigo.es/pesca_master/			
General description	This course will cover aspects such as the description of the process of launching a new product, Approach and development of life studies, Methodologies for the development of new products, Innovation in process, Future prospects in fishery products and Aquaculture, Methodologies for estimating production costs, Map of R & D & I aid and the environment of public aid to innovation.			

Competencies	
Code	
B1	
B2	
B3	(*)Que os estudantes desenvolvan as habilidades para realizar traballos experimentais, manexo de elementos materiais e biolóxicos e programas relacionados.
B4	(*)Que os estudantes desenvolvan as capacidades de traballo en equipo, enriquecidas pola pluridisciplinariedade.
B5	(*)Que os estudantes desenvolvan a habilidade de elaboración, presentación e defensa de traballos ou informes.
B6	
B7	
B8	(*)Que os estudantes posúan as habilidades de aprendizaxe que lles permitan continuar estudando dun modo que habrá de ser en gran medida autodirigido ou autónomo.
C17	(*)Coñecer as variables críticas que determinan a viabilidade dun produto ou procesos novos. Utilizar ferramentas para obter información crítica para a viabilidade.
C18	(*)Coñecer as especies sobreexplotadas ou en vías de extinción e valorar a importancia da sustentabilidade na explotación dos produtos da pesca.

Learning outcomes	
Expected results from this subject	Training and Learning Results
Know the critical variables that determine the viability of a product in the novel processes.	B1
	B2
	B3
	B4
	B5
	B6
	B7
	B8
	C17

Use tools to obtain critical information to ensure viability.

B1
B2
B3
B4
B5
B6
B7
B8
C17

To know and apply the analytical procedures in microbiology to assure the safety during the Life of the product.

B1
B2
B3
B4
B5
B6
B7
B8
C17
C18

Contents

Topic

SUBJECT 1. Processing and conservation of sea products.	- Managing innovation for the development of new and new processes Products successfully.
SUBJECT 2. Elaboration of new products.	- Methodologies for the development of novel products
SUBJECT 3. Creative processes applied to the innovation.	- Future prospects for fishery and aquaculture products.
SUBJECT 4. Innovation in packaging.	- Generations - Use of polymers.
SUBJECT 5. subsidies to I+D+i	Map of aids - The environment of public support for innovation

Planning

	Class hours	Hours outside the classroom	Total hours
Master Session	22	38	60
Outdoor study / field practices	5	0	5
Group tutoring	3	0	3
Multiple choice tests	2	5	7

*The information in the planning table is for guidance only and does not take into account the heterogeneity of the students.

Methodologies

	Description
Master Session	Lecture by the professor of the contents on the subject of study, theoretical bases and approach of exercises to be developed by the student.
Outdoor study / field practices	Visits to industries of the canning industry of seafood and related industries. The objective is to know all the modules and aspects of a plant, involved in the production process. Support of specialists and plant technicians.
Group tutoring	Resolution of doubts and consultations, both in group and individual, regarding the follow-up and study of the classes of the subject of study.

Personalized attention

Methodologies Description

Group tutoring	The student will be guided in the acquisition of basic skills and problem solving related to the subject under study. The student's progress will be tracked.
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Assessment

	Description	Qualification	Training and Learning Results
Master Session	It will evaluate the resolution of problems and practical cases, As well as the autonomous work of the student.	30	B1 B2 B7 B8 C17 C18

Outdoor study / field practices	Assistance will be assessed for field practices and /or Visits to industries and the realization of a report of the Visits.	10	B3 B4 B5	C17 C18
Multiple choice tests	There will be an exercise with test questions that Assess the theoretical and practical knowledge acquired In the subject.	60	B1 B2 B7 B8	C17 C18

Other comments on the Evaluation

Sources of information

Basic Bibliography

Benavides C.A, **Tecnología, innovación y empresa**, Ed. Ediciones Pirámide.,
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Complementary Bibliography

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Alan West, **Estrategia de Innovación**,
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Robert G. Cooper, **The seven principles of the latest Stage-Gate® method add up to a streamlined**,
Plan Nacional de I+D+i, **Programa de Trabajo 2011**,
PTEPA, **Mapa de ayudas en el sector pesquero y acuicola**,
PTEPA, **Competencias en I+D+i pesquera y acuicola**,
A. G. Gaonkar., **Food Processing: Recent developments**, Elsevier Science & Technology Books,
T. Ohlsson y N. Bengtsson., **Minimal processing technologies in the food industry**, Cambridge, England. Woodhead Publishing Limited,
G.V. Barbosa-Cánovas, M.M. Góngora Nieto, U.R. Pothakamury and B.G. Swanson., **Preservation of foods with pulsed electric fields**, San Diego, USA. Academic Press.,
M. Shafiur Rahman., **Handbook of food preservation**, Boca Raton, USA. CRC Press LLC.,
Da-Wen Sun., **Emerging technologies for food processing**, Food science and Technology, International Series. Elsevier Academic Press,
www.micinn.es,
www.cdti.es,
www.cordis.europe.eu,
www.cotec.es,

Recommendations

IDENTIFYING DATA				
The Final Master Degree Work				
Subject	The Final Master Degree Work			
Code	V11M085V01403			
Study programme	(*)Máster Universitario en Ciencia e Tecnoloxía de Conservación de Produtos da Pesca			
Descriptors	ECTS Credits	Choose	Year	Quadmester
	6	Mandatory	2nd	2nd
Teaching language	Spanish			
Department				
Coordinator	Canosa Saa, Jose Manuel			
Lecturers	Canosa Saa, Jose Manuel Ojea Rodríguez, Gonzalo			
E-mail	jcanosa@uvigo.es			
Web	http://webs.uvigo.es/pesca_master/			
General description	Development by the student of a work of theoretical and / or experimental content related to the industry of conservation of fishery products. The work will be individual in nature, supervised by a teacher of the master and oriented to evaluate the competences associated with the master.			

Competencies	
Code	
B1	
B2	
B3	(*)Que os estudantes desenvolvan as habilidades para realizar traballos experimentais, manexo de elementos materiais e biolóxicos e programas relacionados.
B4	(*)Que os estudantes desenvolvan as capacidades de traballo en equipo, enriquecidas pola pluridisciplinariedade.
B5	(*)Que os estudantes desenvolvan a habilidade de elaboración, presentación e defensa de traballos ou informes.
B6	
B7	
B8	(*)Que os estudantes posúan as habilidades de aprendizaxe que lles permitan continuar estudando dun modo que haberá de ser en gran medida autodirigido ou autónomo.
C1	(*)Coñecer e diferenciar as principais especies pesqueiras e acuícolas de interese comercial no noso país, coas súas principais características biolóxicas.
C2	(*)Coñecer os parámetros de seguridade e caracterización da calidade dos produtos da pesca, así como os seus posibles riscos toxicolóxicos, e a lexislación aplicable aos devanditos produtos
C3	(*)Adquirir os coñecementos básicos sobre o control analítico en laboratorio dos produtos da pesca, incluíndo os contaminantes bióticos e abióticos potencialmente presentes neles.
C4	(*)Coñecer os principais aspectos ambientais que afectan ao procesamento e conservación dos produtos do mar: control e tratamento de efluentes líquidos, lodos, chans e emisións atmosféricas. Lexislación aplicable.
C5	(*)Manexar a Normativa sobre Xestión Ambiental.
C6	(*)Adquirir os coñecementos sobre xestión empresarial en industrias do sector.
C7	(*)Adquirir coñecementos sobre comercialización e mercadotecnia para produtos da pesca e a acuicultura.
C8	(*)Coñecer as operacións e tecnoloxías básicas utilizadas na conservación e transformación de produtos do mar por frío, por calor ou por outros métodos físico químicos: refrixeración, conxelación, esterilización, pasteurización, semiconservas.
C9	(*)Estudar as diversas formas de elaboración e sistemas de envasado para produtos do mar tratados por frío, por calor ou mediante outros métodos, tanto de forma tradicional como as novas orientacións tecnolóxicas: produtos reestruturados, pratos preparados, atmosferas modificadas, altas presións, etc.
C10	(*)Entender a organización da produción na industria de produtos da pesca e da acuicultura tratados por frío, por calor e por outros procedementos. Métodos de produción e a súa loxística.
C11	(*)Determinar os criterios e procedementos para o control da calidade dos produtos da pesca e dos envases e embalaxe utilizados no seu circuíto comercial. Coñecer os procedementos para o seu control analítico e detección de defectos.
C12	(*)Aproximación ao control de calidade de cada unha das liñas de produción dos produtos pesqueiros. Coñecementos básicos da xestión da calidade de produto.
C13	(*)Adquirir os coñecementos básicos e interpretar a lexislación aplicable ás instalacións onde se realiza a manipulación e o tratamento dos produtos da pesca ao longo da cadea comercial: hixiene, etiquetaxe, seguridade alimentaria, autocontrol en planta (APPCC), etc.
C14	(*)Valorar a importancia do control e certificación da calidade dos produtos pesqueiros como arma comercial e de cara á trazabilidade e seguridade alimentaria.

C15	(*)Coñecer os procedementos de xestión de alertas alimentarias pola autoridade competente e os responsables da cadea alimentaria
C16	(*)Coñecer as actuacións dos laboratorios de control oficial dos produtos pesqueiros.
C17	(*)Coñecer as variables críticas que determinan a viabilidade dun produto ou procesos novos. Utilizar ferramentas para obter información crítica para a viabilidade.
C18	(*)Coñecer as especies sobreexplotadas ou en vías de extinción e valorar a importancia da sustentabilidade na explotación dos produtos da pesca.

Learning outcomes

Expected results from this subject	Training and Learning Results
Selection of the study topic.	B1 B2 B3
Search for detailed information on the selected topic.	B2
Consultation and Selection of bibliographic sources	B3 B8
Work development.	B2
Laboratory work, pilot plant and / or information in industries of the sector.	B3 B4 B7 B8 C1 C2 C3 C4 C5 C6 C7 C8 C9 C10 C11 C12 C13 C14 C15 C16 C17 C18
Preparation of a final report	B1 B5 B6 B7
Defense and Exhibition of the work.	B1 B6 B8

Contents

Topic

REALIZATION OF A MASTER END PROJECT	- Selection of the topic of study. - Consultation and Selection of bibliographic sources - Laboratory work, pilot plant or training in industries of the sector. - Advice with coordinators and tutors of work and staff of the industry. - Preparation of reports. - Defense and Exhibition of work.
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Planning

	Class hours	Hours outside the classroom	Total hours
Projects	6	115	121
Presentations / exhibitions	5	12	17
Jobs and projects	4	8	12

*The information in the planning table is for guidance only and does not take into account the heterogeneity of the students.

Methodologies	
	Description
Projects	Elaboration of a written document where it is reflected: content of the document, Depth of the subject, adequate planning and sequencing, management of bibliographic sources, as well as presentation of results, conclusions and personalized opinions. Ideas for improvement and future perspectives of the theme.
Presentations / exhibitions	Individualized presentation by the students, before a court of the master, on a project elaborated from the contents of the masters and the obtained results.

Personalized attention

Methodologies	Description
Projects	The student will be guided in the acquisition of basic skills and problem solving related to the subject under study. The student's progress will be tracked.

Assessment				
	Description	Qualification	Training and Learning Results	
Presentations / exhibitions	Individualized presentation by the students, before A court of master, on a proxecto elaborated to From the contents of the Title and of the results obtained.	30	B1 B2 B3 B4 B5 B6 B7 B8	C1 C2 C3 C4 C5 C6 C7 C8 C9 C10 C11 C12 C13 C14 C15 C16 C17 C18
Jobs and projects	Preparation of a written document wherever. Reflected: content of the document, Depth of the topic, Adequate planning and sequencing, Bibliographic sources, as well as presentation of Results, conclusions and opinions. Ideas for improvement and future perspectives of the theme.	70	B2 B3 B7 B8	C1 C2 C3 C4 C5 C6 C7 C8 C9 C10 C11 C12 C13 C14 C15 C16 C17 C18

Other comments on the Evaluation

Sources of information

Basic Bibliography

Complementary Bibliography

Recommendations

IDENTIFYING DATA				
Practicals in Business				
Subject	Practicals in Business			
Code	V11M085V01404			
Study programme	(*)Máster Universitario en Ciencia e Tecnoloxía de Conservación de Produtos da Pesca			
Descriptors	ECTS Credits	Choose	Year	Quadmester
	6	Mandatory	2nd	2nd
Teaching language	Spanish			
Department				
Coordinator	Canosa Saa, Jose Manuel			
Lecturers	Canosa Saa, Jose Manuel Ojea Rodríguez, Gonzalo			
E-mail	jcanosa@uvigo.es			
Web	http://webs.uvigo.es/pesca_master/			
General description	To carry out a stay in a company of conservation of products of the sea, with the purpose of approaching practical practical tasks that, on the basis of the acquired knowledge, allow a better knowledge of the productive environment of the Sector in a global context. The student will participate in the activities that are programmed by the tutor of the student, the coordinator of the Master and the staff of the company. These activities will be framed within the processes Existing in-house related to the conservation of fishery products.			

Competencies	
Code	
B1	
B2	
B3	(*)Que os estudantes desenvolvan as habilidades para realizar traballos experimentais, manexo de elementos materiais e biolóxicos e programas relacionados.
B4	(*)Que os estudantes desenvolvan as capacidades de traballo en equipo, enriquecidas pola pluridisciplinaria.
B5	(*)Que os estudantes desenvolvan a habilidade de elaboración, presentación e defensa de traballos ou informes.
B6	
B7	
B8	(*)Que os estudantes posúan as habilidades de aprendizaxe que lles permitan continuar estudando dun modo que habrá de ser en gran medida autodirigido ou autónomo.
C1	(*)Coñecer e diferenciar as principais especies pesqueiras e acuícolas de interese comercial no noso país, coas súas principais características biolóxicas.
C2	(*)Coñecer os parámetros de seguridade e caracterización da calidade dos produtos da pesca, así como os seus posibles riscos toxicolóxicos, e a lexislación aplicable aos devanditos produtos
C3	(*)Adquirir os coñecementos básicos sobre o control analítico en laboratorio dos produtos da pesca, incluíndo os contaminantes bióticos e abióticos potencialmente presentes neles.
C4	(*)Coñecer os principais aspectos ambientais que afectan ao procesamento e conservación dos produtos do mar: control e tratamento de efluentes líquidos, lodos, chans e emisións atmosféricas. Lexislación aplicable.
C5	(*)Manexar a Normativa sobre Xestión Ambiental.
C6	(*)Adquirir os coñecementos sobre xestión empresarial en industrias do sector.
C7	(*)Adquirir coñecementos sobre comercialización e mercadotecnia para produtos da pesca e a acuicultura.
C8	(*)Coñecer as operacións e tecnoloxías básicas utilizadas na conservación e transformación de produtos do mar por frío, por calor ou por outros métodos físico químicos: refrixeración, conxelación, esterilización, pasteurización, semiconservas.
C9	(*)Estudar as diversas formas de elaboración e sistemas de envasado para produtos do mar tratados por frío, por calor ou mediante outros métodos, tanto de forma tradicional como as novas orientacións tecnolóxicas: produtos reestruturados, pratos preparados, atmosferas modificadas, altas presións, etc.
C10	(*)Entender a organización da produción na industria de produtos da pesca e da acuicultura tratados por frío, por calor e por outros procedementos. Métodos de produción e a súa loxística.
C11	(*)Determinar os criterios e procedementos para o control da calidade dos produtos da pesca e dos envases e embalaxe utilizados no seu circuíto comercial. Coñecer os procedementos para o seu control analítico e detección de defectos.
C12	(*)Aproximación ao control de calidade de cada unha das liñas de produción dos produtos pesqueiros. Coñecementos básicos da xestión da calidade de produto.

- C13 (*)Adquirir os coñecementos básicos e interpretar a lexislación aplicable ás instalacións onde se realiza a manipulación e o tratamento dos produtos da pesca ao longo da cadea comercial: hixiene, etiquetaxe, seguridade alimentaria, autocontrol en planta (APPCC), etc.
- C14 (*)Valorar a importancia do control e certificación da calidade dos produtos pesqueiros como arma comercial e de cara á trazabilidade e seguridade alimentaria.
- C15 (*)Coñecer os procedementos de xestión de alertas alimentarias pola autoridade competente e os responsables da cadea alimentaria
- C16 (*)Coñecer as actuacións dos laboratorios de control oficial dos produtos pesqueiros.
- C17 (*)Coñecer as variables críticas que determinan a viabilidade dun produto ou procesos novos. Utilizar ferramentas para obter información crítica para a viabilidade.
- C18 (*)Coñecer as especies sobreexplotadas ou en vías de extinción e valorar a importancia da sustentabilidade na explotación dos produtos da pesca.

Learning outcomes

Expected results from this subject	Training and Learning Results
To carry out a stay in a company of conservation of products of the sea with the purpose of approaching practical tasks that, based on the acquired knowledge, allow to the student a better knowledge of the productive environment of the Sector in a global context.	B1
	B2
	B3
	B4
	B5
	B6
	B7
	B8
	C1
	C2
	C3
	C4
	C5
	C6
	C7
	C8
	C9
	C10
	C11
	C12
	C13
	C14
	C15
	C16
	C17
	C18

Contents

Topic
EXTERNAL PRACTICES IN AN INDUSTRY OF CONSERVATIVE SECTOR (*)

Planning

	Class hours	Hours outside the classroom	Total hours
External practises	138	0	138
Group tutoring	6	0	6
Reports / memories of internships or practicum	2	4	6

*The information in the planning table is for guidance only and does not take into account the heterogeneity of the students.

Methodologies

Description

External practises	The student will be integrated in an industry of the sector of the conservation of products of the sea. The student will learn and have an overview of all the modules of the producción process of the industry where he practices. The student will be assigned a task, within the various modules involved in the production process. The activity of companies with which collaboration agreements have been reached allows the student to acquire competencies in the procedures related to the various processes of conservation, safety, quality and technology, environmental management, marketing and innovation and sustainability.
Group tutoring	The activity carried out within the industry will be followed by the tutors of the master's degree and by a responsible of the company designated to supervise and guide the student in the tasks entrusted.

Personalized attention

Methodologies	Description
External practises	Advise the student in those issues of difficulties that arise during external practices.
Group tutoring	An academic leader will be assigned and another in the company that will supervise and advise the work of the Student and will maintain a contact with those responsible for the Master.

Assessment

	Description	Qualification	Training and Learning Results	
External practises	The activity will be supervised and Evaluated by the Tutors appointed for this purpose.	60	B1 B2 B3 B4 B5 B6 B7 B8	C1 C2 C3 C4 C5 C6 C7 C8 C9 C10 C11 C12 C13 C14 C15 C16 C17 C18
Reports / memories of internships or practicum	The student will present at the end of the Memory of assigned work, with the approval of the Responsible person in the company, in which Of the work done the student exposes his Proposals, suggestions or improvement projects that you deem With a view to improving the productive aspects of Of the company.	40	B1 B2 B3 B4 B5 B6 B7 B8	C1 C2 C3 C4 C5 C6 C7 C8 C9 C10 C11 C12 C13 C14 C15 C16 C17 C18

Other comments on the Evaluation

Sources of information

Basic Bibliography

Complementary Bibliography

Recommendations