Syllabus

Subject

Subject / Group	11255 - Bioactive and Functional Components of Food / 1
Degree	Master's in Nutrigenomics and Personalised Nutrition
Credits	3
Period	1st semester
Language of instruction	Spanish

Professors

Lecturers	Office hours for students					
	Starting time	Finishing time	Day	Start date	End date	Office / Building
Joan Ribot Riutort joan.ribot@uib.es	12:00	14:00	Wednesday	01/09/2019	31/07/2020	Despatx Q31/ Mateu Orfila i Rotger

Context

This subject is part of module 1 "Fundamentals in Nutrigenomics and Personalised Nutrition", being one of the basic subjects who gives the basic knowledge useful for the development and uderstanding of other, more specialized, specific subjects of the Master. The main objectives of the subject are:

* Be aware of the biochemical and molecular characteristics of nutrients and other food compounds in foods.
* Be aware of the methods of analysis for the determination and quantification of nutrients and other food compounds in foods.
* Document the amount and bioavailability of nutrients and other compounds in foods.
* Document the effects of the main bioactive compounds that determine the functional properties of food in humans.
* Perform and evaluate a risk / benefit of the main bioactive and functional compounds of foods.

Lectures:

* Dr. Joan Ribot is PhD in Biochemistry, specialist in Clínical Biochemistry and associate professor of the University of the Balearic Islands; with 3 six-year research expertize stretches recognized by the Spanish Government and eighteen years of teaching experience at the University. He is also an active researcher; at present, her research is focused in the field of gene-nutrient/food compounds interactions and the relationship of nutrients and early nutritional interventions with the prevention of metabolic disorders associated to energy control, obesity and associated disorders, including atherosclerosis and Cancer. He has participated in numerous international cooperative research projects.

Requirements

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There are no previous requirements.

Skills

Specific

* E4 - Knowing the main functional and bioactive components of the foods

Generic

* G6 – Capacity for working in an interdisciplinary way
* G8 - Ability to assess and participate in teamwork
* G9 - Ability to collect, organize and critically analyze the literature (research and professional) of the discipline
* G10 – Capacity to articulate the knowledge in oral and written presentations
* G15 - Ability to analyze the risk / benefit balance of a new development (or innovation)
* CB8 - Students should be able to integrate knowledge and handle complexity, and formulate judgments based on information that was incomplete or limited, include reflecting on social and ethical responsibilities linked to the application of their knowledge and judgments
* CB9 - To know how to communicate conclusions and knowledge and reason which support them to specialized and non-specialized audience clearly and without ambiguity
* CB10 - Students should possess the learning skills to allow them to continue studying in a way that will have to be largely self-directed or autonomous

Basic

* You may consult the basic competencies students will have to achieve by the end of the Master's degree at the following address: http://estudis.uib.cat/master/comp_basiques/

Content

The contents of the subject are given below.

Range of topics

Topic 1. Introduction

Definition of bioactive and functional compounds in foods. Essential nutrients (vitamins, minerals, fatty acids ,etc.), 'non-nutrients' and 'anti-nutrients'. Evidence of beneficial effects of bioactive compounds. Approaches to identifying bioactive compounds, and their limitations. Bioavailability of bioactive compounds. Balance between risk and benefit.

Topic 2. Major bioactive and functional components

Structure/subclasses. Food sources and main role in plants/animals/microorganisms. Ingestion. Absorption and bioavailability. Importance of the food matrix. Metabolic effects. Observational studies and beneficial/deleterious effects. Synergies. Farming practices to raise the content of bioactive components. Modification of nutritional profile of foods through biotechnology.

Topic 3. Bioactive and functional components of food

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Chemical and biological characterization of bioactive and functional components of food. Observational studies and beneficial/deleterious effects. Foods or extracts opposed to pure compounds.

Teaching methodology

The programmed activities have the main objectives of allowing the students to get the basic and advanced knowledge in Bioactive and Functional Components of Food, with special emphasis in the analysis of the risk/benefit balance of food components. Moreover, the combination of the different activities to be done is also focused in allowing the students to take advantage, in a practical way, of the learnt concepts in the interpretation of scientific data and in the development of specific topics related to the subject.

It is important to note that the students have the possibility of 2 itineraries for assessment (Itinerary A or Itinerary B), and they must decide which itinerary to follow.

Workload

The volum of work for every item of the subject is given below, taken itinerary A as reference.

In-class work activities (0.6 credits, 15 hours)

Modality	Name	Typ. Grp.	Description	Hours
Theory classes	Lessons	Large group (G)	The objective is to know and understand basic and advanced concepts in Bioactive and Functional Components of Food. Lessons in the classroom, with the explanation of the lecturer in an interactive way with the students (itinerary A).	5
Seminars and workshops	Activity 2: Food characterization (Students' oral presentations)	Medium group 2 (X)	The objective is to put in practice the theory concepts learnt in the subject by the interpretation of specific scientific bibliography and articulate knowledge in a oral presentation. The work that the students have prepared (individually) (about the chemical and biological characterization of bioactive and functional components of one food), must be defended by oral presentation accompanied with a slide presentation. For the oral defence, each student will have a maximum of 10 min. and, afterwards, the students must answer specific questions set by the lecturer. The oral defence must be done the day set for it on the subject timetable (itinerary A) or the day set for exam in January (itinerary B) or February (extraordinary) (itinerary A and B).	6
Seminars and workshops	Activity 1: Debate	Medium group 2 (X)	The objective is to put in practice the theory concepts learnt in the subject by the interpretation of specific scientific bibliography and the elaboration of an consensus opinion based on scientific literature about the topic of interest. A debate on a topic of interest, setting up two groups in favour/against and exposing the position by group spokesperson, overall discussing and writting a concluding remarks (itinerary A). Students who have not attended the debate, they must individualy develop an opinion based on	2

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Modality	Name	Typ. Grp.	Description	Hours
			scientific literature about the debate subject. The written opinion must be delivered two weeks after the day of the debate. The students (itinerary B) must individualy develop an opinion based on scientific literature about a controversial subject proposed by the lecturer, the day set for exam in January or February (extraordinary).	
ECTS tutorials	Activity 3: Major bioactive and functional components of foods	Small group (P)	The objective is to know and understand basic and advanced concepts in Bioactive and Functional Components of Food. To help the students with the establishment of groups for develop activity 3, with the assignation of the bioactive and functional food component group to study in activity 3 and the preparation of the works for the activity 3. The tutorial must be done the day set for it on the subject timetable or electronically (itinerary A).	1
Assessment	Exam	Large group (G)	The objective is to consolidate and expand the knowledge about Bioactive and Functional Components of Food. Exam with test questions of True/False answers on aspects relating to on the theory concepts of the subject developed in the lessons by the lecturer. The exam must be done the day set for it on the subject timetable (itinerary A) or the day set for exam in January (itinerary B) or February (extraordinary) (itinerary A and B).	1

At the beginning of the semester a schedule of the subject will be made available to students through the UIBdigital platform. The schedule shall at least include the dates when the continuing assessment tests will be conducted and the hand-in dates for the assignments. In addition, the lecturer shall inform students as to whether the subject work plan will be carried out through the schedule or through another way included in the Aula Digital platform.

Distance education tasks (2.4 credits, 60 hours)

Modality	Name	Description	Hours
Individual self-study	Study of the theory contents of the subjects	The objective is to know and understand basic and advanced concepts in Bioactive and Functional Components of Food and to consolidate the contents given in the lessons. The students are advised to study the slides of the lessons and to consult the recommended bibliography (itinerary A and B).	6
Individual self-study	Activity 3: Questionnaire	The objective is to know and understand basic and advanced concepts in Bioactive and Functional Components of Food. The students must individualy do an extended-response, discursive questionnaire, with open acces to bibliografic materials and to internet, on aspects relating to on the theory concepts of the subject developed in the lessons by the lecturer and in activity 3 by the students. The questionnaire must be done the day set for it on the subject timetable (itinerary A) or the day set for exam in February (extraordinary) (itinerary A).	5
Individual self-study	Activity 2: Food characterization	The objective is to put in practice the theory concepts learnt in the subject by the interpretation of specific scientific bibliography.	14

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Modality	Name	Description	Hours
		The students must do a chemical and biological characterization of bioactive and functional components of one food, proposed by the student with the approval of the lecturer, based on scientific literature and deliver an outline of the work and the main literature used in it. This work will be used to prepare the oral presentation. The written report must be delivered the day set for it on the subject timetable or one month before the day of the oral defense if it would be in February (extraordinary) (itinerary A).	
Group self-study	Activity 3: Theory work	The objective is to know and understand basic and advanced concepts in Bioactive and Functional Components of Food. The students (in groups of 2-3 students; or individual) must write a theory work about a major group of bioactive and functional components of foods proposed by the lecturer, describing their chemical structure, classes and subclasses, prymary function, food sources, intake, absorption and bioavailability, metabolic and healthy effects, toxicity. The written report must be delivered the day set for it on the subject timetable or the day set for exam in January (itinerary B) or February (extraordinary) (itinerary A and B).	22
Group self-study	Activity 3: Review or cross evaluation	The objective is to know and understand basic and advanced concepts in Bioactive and Functional Components of Food and to learn how criticaly evaluate a work related to the subjects of the topic. The students (in groups of 2-3 students) must review a theory work about a group of bioactive and functional components of foods developed by others students and proposed by the lecturer and write a global and justificed evaluation of the work. The written evaluating report must be delivered the day set for it on the subject timetable or February (extraordinary) (itinerary A).	5
Group or individual self-study	Activity 1: Debate/ Scientific opinion preparation	The objective is to put in practice the theory concepts learnt in the subject by the interpretation of specific scientific bibliography. The students (in two groups) must organize the work and establish the group opinion and defence (itinerary A) or the individual opinion in favour/ against based on scientific interpretation of specific scientific bibliography (itinerary A and B).	8

Specific risks and protective measures

The learning activities of this course do not entail specific health or safety risks for the students and therefore no special protective measures are needed.

Student learning assessment

The students have the possibility of 2 itineraries for assessment (Itinerary A or Itinerary B), and they must decide which itinerary to follow.

Frau en elements d'avaluació

In accordance with article 33 of Regulation of academic studies, "regardless of the disciplinary procedure that may be followed against the offending student, the demonstrably fraudulent performance of any of the

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evaluation elements included in the teaching guides of the subjects will lead, at the discretion of the teacher, a undervaluation in the qualification that may involve the qualification of "suspense 0" in the annual evaluation of the subject".

Activity 2: Food characterization (Students' oral presentations)

Modality	Seminars and workshops
Technique	Oral tests **(retrievable)**
Description	The objective is to put in practice the theory concepts learnt in the subject by the interpretation of specific scientific bibliography and articulate knowledge in a oral presentation. The work that the students have prepared (individually) (about the chemical and biological characterization of bioactive and functional components of one food), must be defended by oral presentation accompanied with a slide presentation. For the oral defence, each student will have a maximum of 10 min. and, afterwards, the students must answer specific questions set by the lecturer. The oral defence must be done the day set for it on the subject timetable (itinerary A) or the day set for exam in January (itinerary B) or February (extraordinary) (itinerary A and B).
Assessment criteria	Quality of the slide presentation and its oral defence, as well as the capacity to adapt to the stablished time for the oral presentation and the answers to specific questions asked by the lecturer.

Final grade percentage: 15% for pathway A
Final grade percentage: 20% for pathway B

Activity 1: Debate

Modality	Seminars and workshops
Technique	Other methods **(non-retrievable)**
Description	The objective is to put in practice the theory concepts learnt in the subject by the interpretation of specific scientific bibliography and the elaboration of an consensus opinion based on scientific literature about the topic of interest. A debate on a topic of interest, setting up two groups in favour/against and exposing the position by group spokesperson, overall discussing and writting a concluding remarks (itinerary A). Students who have not attended the debate, they must individualy develop an opinion based on scientific literature about the debate subject. The written opinion must be delivered two weeks after the day of the debate. The students (itinerary B) must individualy develop an opinion based on scientific literature about a controversial subject proposed by the lecturer, the day set for exam in January or February (extraordinary).
Assessment criteria	Itinerary A: Work in group, quality of the opinion defence, taking into account the contents, structure and the correct use of the bibliography and participation in the debate; or quality of the written opinion delivered, taking into account the contents, structure and the correct use of the bibliography. Itinerary B: Quality of the written opinion delivered, taking into account the contents, structure and the correct use of the bibliography.

Final grade percentage: 15% for pathway A
Final grade percentage: 15% for pathway B

Exam

Modality	Assessment
Technique	Objective tests **(retrievable)**
Description	The objective is to consolidate and expand the knowledge about Bioactive and Functional Components of Food. Exam with test questions of True/False answers on aspects relating to on the theory concepts of the subject developed in the lessons by the lecturer. The exam must be done the day set for it on the subject

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	timetable (itinerary A) or the day set for exam in January (itinerary B) or February (extraordinary) (itinerary A and B).
Assessment criteria	Objective test.

Final grade percentage: 18% for pathway A
Final grade percentage: 25% for pathway Bwith a minimum grade of 5

Activity 3: Questionnaire

Modality	Individual self-study
Technique	Extended-response, discursive examinations **(retrievable)**
Description	The objective is to know and understand basic and advanced concepts in Bioactive and Functional Components of Food. The students must individualy do an extended-response, discursive questionnaire, with open acces to bibliografic materials and to internet, on aspects relating to on the theory concepts of the subject developed in the lessons by the lecturer and in activity 3 by the students. The questionnaire must be done the day set for it on the subject timetable (itinerary A) or the day set for exam in February (extraordinary) (itinerary A).
Assessment criteria	Quality and accuracy of the answers to the questions.

Final grade percentage: 7% for pathway A
Final grade percentage: 0% for pathway B

Activity 2: Food characterization

Modality	Individual self-study
Technique	Papers and projects **(non-retrievable)**
Description	The objective is to put in practice the theory concepts learnt in the subject by the interpretation of specific scientific bibliography. The students must do a chemical and biological characterization of bioactive and functional components of one food, proposed by the student with the approval of the lecturer, based on scientific literature and deliver an outline of the work and the main literature used in it. This work will be used to prepare the oral presentation. The written report must be delivered the day set for it on the subject timetable or one month before the day of the oral defense if it would be in February (extraordinary) (itinerary A).
Assessment criteria	Quality of the written outline of the presentation delivered, taking into account the contents, structure and the correct use of the bibliography.

Final grade percentage: 10% for pathway A
Final grade percentage: 0% for pathway B

Activity 3: Theory work

Modality	Group self-study
Technique	Papers and projects **(retrievable)**
Description	The objective is to know and understand basic and advanced concepts in Bioactive and Functional Components of Food. The students (in groups of 2-3 students; or individual) must write a theory work about a major group of bioactive and functional components of foods proposed by the lecturer, describing their chemical structure, classes and subclasses, prymary function, food sources, intake, absorption and bioavailability, metabolic and healthy effects, toxicity. The written report must be delivered the day set for it

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	on the subject timetable or the day set for exam in January (itinerary B) or February (extraordinary) (itinerary A and B).
Assessment criteria	Quality of the written report delivered, taking into account the contents, structure and the correct use of thebibliography.

Final grade percentage: 25% for pathway Awith a minimum grade of 5
Final grade percentage: 40% for pathway Bwith a minimum grade of 5

Activity 3: Review or cross evaluation

Modality	Group self-study
Technique	Papers and projects **(retrievable)**
Description	The objective is to know and understand basic and advanced concepts in Bioactive and Functional Components of Food and to learn how criticaly evaluate a work related to the subjects of the topic. The students (in groups of 2-3 students) must review a theory work about a group of bioactive and functional components of foods developed by others students and proposed by the lecturer and write a global and justificed evaluation of the work. The written evaluating report must be delivered the day set for it on the subject timetable or February (extraordinary) (itinerary A).
Assessment criteria	Quality of the written evaluation report delivered, taking into account the contents and the correct use of the bibliography.

Final grade percentage: 10% for pathway A
Final grade percentage: 0% for pathway B

Resources, bibliography and additional documentation

Learning resources:

* PowerPoint presentations in lectures.
* Use of Moodle environment to transmit content and materials and as an interactive communication tool.
* Bibliographic materials (books, scientific articles, databases, etc.).

Basic bibliography

1. Crozier A, Clifford MN, Ashihara H (editors) Plant Secondary Metabolites: Occurrence, Structure and Role in the Human Diet. Wiley-Blackwell, 2006. ISBN: 978-1-4051-2509-3
2. Colegate SM, Molyneux RJ (editors) Bioactive Natural Products Detection, Isolation, and Structural Determination (2º edition). CRC Press, 2007. ISBN: 9780849372582

Other resources

http://www.ffnmag.com/ASP/home.asp
http://www.efsa.europa.eu/en.html

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