COURSE DATA

DATA SUBJECT

Code: 33989
Name: Food Additives
Cycle: Undergraduate Studies
ECTS Credits: 4.5
Academic year: 2025-26

STUDY (S)

Degree	Center	Acad. year	Period
1103 - Degree in Food Science and Technology	Facultat de Farmàcia i Ciències de L'alimentació	4	First quarter

SUBJECT-MATTER

Degree	Subject-matter	Character
1103 - Degree in Food Science and Technology	Food additives	ELECTIVES

COORDINATION

HIGUERAS CONTRERAS LAURA

SUMMARY

Food Additives is an elective subject at fourth course of Food Science and Technology, which is taught in the Faculty of Pharmacy, University of Valencia. This course has a total of 4.5 ECTS taught in the first quarter.

Food additives are a basic and indispensable tool in food manufacturing. Today, there is a wide variety of additives and without them would be practically impossible to obtain optimal food production with hygienic security guarantees and quality standards that currently are required. Among the most important groups of additives, there are antioxidants, antimicrobials, colorants, sweeteners, flavor enhancers, thickener sand gelling agents, emulsifiers, etc. The overall objective of the subject is precisely to present the different types of additives and processing aids used in the food industry as well as their roles and rules of use. Therefore most of the course is devoted to describing the composition, characteristics, most important roles in food and rules of use of each of the additive groups above mentioned. In addition, the graduate in Food Science and Technology must have knowledge about general questions, such as the definitions of additive and processing aid and learn to differentiate them. Another objective of this course is to provide knowledge about the toxicology studies leading to additive authorization, issues of safety and labeling and other issues surrounding the legislation of additives. Thus the subject of food additives listed as one of the educational content of interest that must exist within the degree of Food Science and Technology.

PREVIOUS KNOWLEDGE

RELATIONSHIP TO OTHER SUBJECTS OF THE SAME DEGREE

There are no specified enrollment restrictions with other subjects of the curriculum.

OTHER REQUIREMENTS

To study this subject is of interest to have basic knowledge of food chemistry and biochemistry that will allow understand the theoretical concepts of food additives, their composition and mode of action and their participation in food processing.

COMPETENCES / LEARNING OUTCOMES

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Know legislation on additives.

Know the additives arising from new knowledge on their natural sources or resulting from food biotechnology.

Know the methods used for the manufacture of additives.

Know the role of food additives in the design and innovation of new food ingredients, products and processes.

Know the toxicological aspects of additives.

DESCRIPTION OF CONTENTS

1. Introduction, toxicological evaluation and legislation

Topic 1. Introduction to the subject. Historical milestones in the use of food additives. Definitions of additive and processing aid and their differences. Classification of additives. Reasons for the use of additives. Criteria for the employment of additives.

Topic 2. Toxicological evaluation. Food safety. Toxicological evaluation. Acceptable Daily intake (ADI). Maximum Limits. Evaluation organizations. Examples of additives questioned.

Topic 3. Legislation. Introduction. Regulatory organizations. Regulatory framework. Legislation on additives. Labelling of additives. Legislation on technological aids. Legislation on flavors. Legislation on vitamins and minerals: nutritional and health claims.

2. Additives for conservation

Topic 4. Antioxidant additives. Autoxidation: autoxidation reactions, preventive measures. Classification of antioxidants: natural and synthetic. Applications and examples.

Topic 5. Additives antimicrobials. General comments. Classification of preservatives, mineral and organic preservatives. Applications and Examples.

Topic 6. pH control agents. General comments. Additives used as pH control agents and classification. Applications and examples.

Topic 7. Additives used in bakery. General comments. Types o additives used in bakery: emulsifiers, wetting agents and enzymes. Applications and Examples

3. Additives for organoleptic effects

Topic 8. Flavorings and flavor enhancers. Overview flavorings. Classes flavors: natural, concentrated aromas, synthetic nature-identical and synthetic. Biotechnological advances in the production of aromas. Overview of flavor enhancers. Classes flavor enhancers. Applications and examples.

Topic 9. Sweeteners. Overview sweeteners. Types of sweeteners: nutritive and low-power sweeteners no nutritive and high-power sweeteners. Applications and examples.

Topic 10. Dyes. Overview dyes. Classification of dyes: natural, synthetic but identical to naturals, natural extracts and synthetic. Applications and examples.

Topic 11. Thickeners and gelling agents. General comments. Classification: seaweed extracts, seed extracts, plant extracts, extracts of cereals, vegetable products extracts, extracts of microorganisms. Cellulose derivatives. Applications and examples.

Topic 12. Emulsifiers. General comments. Classification: natural and semi synthetic. Applications and examples.

4. Manufacturing aids. Enzymes

Topic 13. Manufacturing aids. Enzymes. General comments and classification of manufacturing aids. Enzymes. Health and legal aspects of using enzymes. Applications of enzymes in the food industry.

5. Practicals

PRACTICAL 1. MAILLARD REACTION OF SUCROSE, GLUCOSE, AND FRUCTOSE ON FLOUR. Variation in color intensity

PRACTICAL 2. USE OF THICKENING AND GELLING AGENTS IN THE PREPARATION OF FOOD PRODUCTS. Emulsion stability. Gel formation: making a flan-type product. Synergies between hydrocolloids. New textures (spherification). Preparation of chocolate coating mixes

PRACTICAL 3. CANDY PREPARATION. Preparation of marshmallows and jelly beans.

PRACTICAL 4. ASSESSMENT OF PRESERVATIVE ACTIVITIES IN FOODS. Determination of nitrates and nitrites in vegetables.

PRACTICAL 5. DETERMINATION OF FOOD ADDITIVES. Rapid detection of preservatives and adulterants in milk. Determination of ascorbic acid (vitamin C) in flour. Determination of sulfites in meat.

PRACTICAL 6. STUDY OF FOOD COLORINGS. Colorings in wine. Arata test. Determination of natural colorings for single-pigment samples using optical methods.

WORKLOAD

PRESENCIAL ACTIVITIES

Activity	Hours
Tutorials	1,00
Theory	25,00
Seminar	2,00
Laboratory	15,00
Total hours	**43,00**

NON PRESENCIAL ACTIVITIES

Activity	Hours
Attendance at other activities	0,00
Individual or group project	15,00
Independent study and work	15,00
Preparation of lessons	17,50
Preparation for assessment activities	20,00
Resolution of case studies	0,00
Total hours	**67,50**

TEACHING METHODOLOGY

The theoretical teaching methodology is based on the delivery of lectures along with the performance, presentation and defense of individual and collective reports. Individual study of the topics above will be strengthened by organizing tutorials. Prior to the date of tutoring, the student must have prepared the proposed activities to reinforce the learning aspects specific agenda. The seminars are group work that will include the delivery of a report on the subject of work and a public exhibition in the classroom.

The seminars will be group projects that will consist of the formulation of a working hypothesis related to the subject. The coordinated seminars will be held on the selected topics following the regulations for coordinated seminars available on the Degree website.

During practice, students can extend and implement the theoretical knowledge. A booklet of practices will be previously available including the necessary materials and the development of each of the perfectly organized practices. The teacher will monitor the practice will address the doubts in the implementation and provide guidance on how to make reports, organizing results and conclusions

EVALUATION

a) Production, presentation and defense of works related to the contents explained and discussed in the classroom related to one of the subjects studied during the semester (**coordinated seminars**). Written work will be evaluated and the level of understanding of the content and skills to their exposure, advocacy and discussion (10%).

b) To make a **written test** to ensure knowledge and understanding of theoretical minimum content established for the subject (60%). Voluntary continuous evaluation will be carried out with various tests throughout the course.It is required to obtain a minimum of 5 points out of 10 in the average of all the tests to eliminate contents. The content of the official exam will refer to the subject not evaluated in the previous continuous evaluation tests or to the entire subject in the event that the student has not taken the continuous evaluation tests or has not obtained the minimum grade required to eliminate content.

c) Evaluation of **laboratory** work by teacher supervision, the ability to solve experimental problems and, eventually, the ability to make very detailed and organized reports of experimental results. The written test will include questions about practical contents. Additionally, the grade obtained will be multiplied by a coefficient between 0.5 and 1 to be considered by the teaching staff depending on the attitude, participation in the laboratory and punctuality shown by the student. (20%).

d) Evaluation of the work during the **tutorials** and the ability to solve the proposed activities throughout the semester (10%).

In order to pass the subject is necessary to obtain minimum 4.5 points out of 10 on the theoretical part of the subject and that the global mark is minimum 5 points out of 10.

The activities of practices, tutorials and seminars, are of MANDATORY ATTENDANCE and, therefore, NOT

RECOVERABLE, in accordance with the provisions of Article 6.5 of the Regulation of Evaluation and Qualification of the UV for Bachelor and Master degrees. If it is not possible to attend any of these activities for justified reasons, it must be communicated in advance. In this way, the person in charge of the subject will determine the actions to be carried out.

Attendance at practices, tutorials and seminars is mandatory to pass the subject. Attendance is NOT mandatory for repeating students who have completed these activities in the two courses after their completion, during which the grades will be kept. Non-attendance without justified cause in the tutorials or in the coordinated seminars will imply a zero in the corresponding evaluation section, on the other hand, the non-presentation of the coordinated seminar will imply the failure of the subject, except for the repeating students who have attended and presented in previous courses.

Evidence of copying or plagiarism in any of the assessable tasks will result in failure to pass the subject and in appropriate disciplinary action being taken. Please note that, in accordance with article 13. d) of the Statute of the University Student (RD 1791/2010, of 30 December), it is the duty of students to refrain from using or participating in dishonest means in assessment tests, assignments or university official documents. In the event of fraudulent practices, the "Action Protocol for fraudulent practices at the University of Valencia" will be applied (ACGUV 123/2020): https://www.uv.es/sgeneral/Protocols/C83sp.pdf.

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