Universidad Zaragoza

Year : 2020/21

63025 - Study of the base chemical of food aroma and taste

Syllabus Information

Academic Year: 2020/21
Subject: 63025 - Study of the base chemical of food aroma and taste
Faculty / School: 105 - Facultad de Veterinaria
Degree: 566 - Master's in Food Quality, Safety and Technology
ECTS: 3.0
Year: 1
Semester: Second semester
Subject Type: Optional
Module: ---

1.General information

1.1.Aims of the course

1.2.Context and importance of this course in the degree

1.3.Recommendations to take this course

2.Learning goals

2.1.Competences

2.2.Learning goals

2.3.Importance of learning goals

3.Assessment (1st and 2nd call)

3.1.Assessment tasks (description of tasks, marking system and assessment criteria)

4.Methodology, learning tasks, syllabus and resources

4.1.Methodological overview

The learning process begins with participative group lectures, combined with practical sessions in the computer room to provide skills to manage various tools and resources related to essential aspects of the subject and other individual activities (resolution of questionnaires and exercises, the study of practical cases derived from the theoretical classes, analysis, and synthesis of bibliographic material, preparation of presentations).

Laboratory practical sessions will be intercalated between the theory blocks so that students can apply in a practical way the knowledge acquired during theory classes.

4.2.Learning tasks

The course includes the following activities:

1. Five lectures in group (10 h)
2. One seminar of 2 h for presentation and discussion of papers
3. Six practical sessions at the sensory laboratory (18 h)
4. Preparation of papers and reports (15 h student only)
5. Questionnaires solving (30 h student only)

4.3.Syllabus

Lecture 1 (2 h): Aroma and flavor from a biological perspective. Basic questions of perception through the chemical senses (taste, smell, trigeminal-chemostasis): ecological function, evolution, structure, operation, hedonic value, bioactivity, education, adaptation and culture.

Practical workshop 1 (2 h): Molecule properties with volatility relevance, solubility and possible interactions with receptors. Chemical databases to obtain volatility and solubility data. Databases of aromatic compounds. Threshold values. Threshold value measurement.

Sensory laboratory practical sessions 1 (2 h): Construction of psychophysical curves and determination personal and group of threshold values.

Lecture 2 (2 h): The most relevant odorant systems in Nature-1. DMS and the sulfur cycle. Geosmin, MIB and eutrophication. Odorants generated by micro-organisms and fungi. Aromas of fermentation processes. Truffles and mushrooms.

Lecture 3 (2 h): The most relevant odorant systems in Nature-2. Main families of plant odorants: terpenes, nor-isoprenoids, phenylpropanoids, derivatives of fatty acids. Strategies, structures and systems for storing and dispensing aroma in the world of plants

Lecture 4 (1 h): Flavour and fragances industry

Sensory laboratory practical session 2 (2 h): The most relevant aromas of micro-organisms, plants and flowers. Components of perfumes.

Lecture 5 (2 h): Introduction to the psychology of perception and the psychophysics of aroma. Perception concept. Analytical (bottom-up) and synthetic (top-down) strategies. Importance of context and expectations. Cross-modality. Psychophysics 1. Measurement of the intensity of odors and other perceptions. Psychophysical curves. Adaptation. Psychophysics of mixtures 1. Intensity of binary and higher mixtures.

Lecture 6 (2 h): Psychophysics of mixtures 2. Intensities of odorant mixtures in the threshold zone. Measurement of quality of odor. Classic and unconventional analytical techniques. Non-verbal techniques for generating vocabulary. Other properties of the quality (hedonic character, familiarity and salience). Aroma of binary mixtures. Identification of odorants in mixtures. Creation of new smells.

Sensory laboratory practical session 3 (2 h): Measures of intensity of odors and their mixtures.

Sensory laboratory practical session 4 (2 h): Non-verbal classification techniques: Napping and RATA techniques for the characterization of complex sensory profiles. Vocabulary generation.

Lecture 7 (2 h): Techniques to identify sensoactive molecules-1. Sensoboloma concept. Strategies of sensory-directed screening. Odor hierarchy by gas chromatography-olfactometry (GCO): Obtaining a representative extract. Experimental systems for representative purge and trap. Strategies for obtaining and treating the olfactometric signal. Applications.

Practical workshop 2 (2 h): Identification of odorants: retention indexes, low and high resolution mass spectra, databases, isolation techniques, concentration and pre-fractionation, two-dimensional CG-O techniques.

Chemical laboratory practical session 5 (2 x 2.5 h): Ranking and identification of the key odorants of a food product. A simplified food sample containing odorant molecules of different volatility and olfactory power will be provided. Students will apply several extract isolation and sample preparation strategies (purge and trap; direct solid phase extraction). The best extracts will be analyzed by semi-quantitative GC-O in two columns of different polarities and by GC-MS to obtain the corresponding mass spectra. With that information and the help of databases, the different odorants will be identified

4.4.Course planning and calendar

Further information concerning the timetable and lectures and work presentations concerning to dates and important events related to the subject are in details described in the Faculty of Veterinary Science website: (http://veterinaria.unizar.es/). This website is updated at the beginning of the academic course.

Course will be start with lectures while practical sessions will be introduced after the corresponding theoretical contents.

4.5.Bibliography and recommended resources

Recommended bibliography at: https://biblioteca.unizar.es/ Additional resources related to databases, software, and other material will be delivered to students as they need them.