

COURSE DESCRIPTION

COURSE DETAILS

Title (of the course): **ANÁLISIS BROMATOLÓGICO**

Code: 102220

Degree/Master: **GRADO DE CIENCIA Y TECNOLOGÍA DE LOS ALIMENTOS**

Year: 3

Name of the module to which it belongs: CIENCIAS DE LOS ALIMENTOS

Field: ANÁLISIS DE ALIMENTOS Y BROMATOLOGÍA

Character: OBLIGATORIA

Duration: FIRST TERM

ECTS Credits: 6.0

Classroom hours: 60

Face-to-face classroom percentage: 40%

Study hours: 90

Online platform: Moodle

LECTURER INFORMATION

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PREREQUISITES AND RECOMMENDATIONS

Prerequisites established in the study plan

None

Recommendations

None specified

INTENDED LEARNING OUTCOMES

- | | |
|------|--|
| CB2 | Students must know how to apply their knowledge to their job or vocation in a professional manner and they must possess the competencies which are usually demonstrated by means of the elaboration and defense of arguments and the solution of problems in their field of study. |
| CB3 | Students must possess the capacity to gather and interpret relevant information (usually in their field of study) in order to give opinions which include a reflection about relevant topics which are social, scientific or ethic in nature. |
| CE3 | To know the techniques and perform food analyses that guarantee optimal conditions for human consumption. |
| CT11 | Ability for organization and scheduling. |
| CT14 | Sensitivity to environmental and social issues. |
| CT2 | Ability to solve problems. |
| CT5 | Ability to take decisions. |
| CT7 | Ability for analysis and synthesis. |



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- CT8 To develop a critical reasoning.
- CU2 To know and improve the user level in the field of ICT.

OBJECTIVES

- To be able of differentiating the different types of samples and sampling, sample pretreatment and preparation and tuning of material and equipment in accordance with Good Laboratory Practices.
- To be aware of current Quality Management Systems in a laboratory of analysis.
- To know how to select the appropriate analytical methodology as a function of the food and purpose of the analysis, whether physical, chemical, microbiological or sensory essay, and to know their principles.
- To know the analytical techniques used for macronutrients in different food commodities.
- To know the most common analytical techniques used to detect the presence of toxins in food commodities, as well as natural chemical compounds beneficial for health.
- To know the principles of sensory analysis, the different sensory tests and interpretation of results.
- To know some of the most frequently used techniques of microbiological analyses and their objectives.
- To know how to report and interpret the results of food analyses.
- To be aware and learn to manage key literature sources on food analysis.

CONTENT

1. Theory contents

PART I

Quality management in analysis laboratories

- Introduction to quality, implementation of quality systems in laboratories. Key policy references for quality systems, standardization, certification and accreditation. UNE-EN ISO/EC 17025 and 22000.
- Quality assessment: audits and accreditation of analysis laboratories.

PART II

Introduction and sampling

- Introduction to food analysis. Concepts related to food analysis. Disorders in foods. Frauds.
- Sampling and preparation of analytical samples. Representativeness. Sampling methodology. Sampling procedure according to food state. Storage, transport and pre-treatment of samples for analysis.

PART III

Analysis of main compounds in foods.

- Definition of moisture in foods. Drying methods: drying, balance, distillation. Analysis of water activity.
- Definition of lipids in food. Extraction and quantification methods. Analysis of the degree of deterioration of lipids in frying oil: peroxide index.
- Definition of nitrogen compounds in foods. Methods for the analysis of nitrogen compounds.
- Definition of carbohydrates in food. Methods for the analysis of carbohydrates. Analysis of polysaccharides, sugars in solution, total soluble carbohydrates and reducing sugars.
- Definition of dietary fiber in foods. Methods for the analysis of dietary fiber. Analysis of soluble and insoluble fractions.
- Definition of ash in foods. Analysis of the mineral contents. Determination of total ash. Wet and dry extraction methods.
- Definition of vitamins in foods. Methods for the analysis of vitamins.

PART IV

Analysis of toxins, contaminants and phytochemicals



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- Analysis of toxins of biological origin. Mycotoxins, bacterial toxins and biogenic amines.
- Determination of chemical contaminants in foods. Pesticides, drugs residues, heavy metals.
- Analysis of compounds of interest in food: allergens and GMO.
- Phytochemicals in foods. Importance in food. Methods for the analysis of phytochemicals.

PART V

Microbiological analysis of food

- Principal techniques of microbiological analysis of food. Interpretation of results.
- Advances in microbiological analysis of food.

PART VI

Sensory analysis of food

- Definition of sensory analysis. Basic principles. Objectives. Sensory properties and attributes definition related to food properties.
- Types of sensory analysis. Discrimination, descriptive and affective tests.
- Development of sensory analysis. Education and training of judges. Sensory panels.
- Analysis and processing of sensory analysis data. Reporting.

2. Practical contents

Seminars (5h)

- Design of Standard Operating Procedures in laboratories and reporting. 2h
- Analytical references. Certified reference materials. 1h
- Microbiological analyses for specific purposes. Exposure and case resolution. 2h.

Laboratory Sessions (22h)

- Sensory analysis. Sensory panels. 4h
- Analysis of drinking water. 4h
- Analysis of milk and dairy products. 4h
- Analysis of fishery products. 3h
- Analysis of various compounds of interest in meat products. 4h
- Analysis of various compounds of interest in vegetable products. 3h

METHODOLOGY

General clarifications on the methodology (optional)

Each particular case will be considered.

Methodological adaptations for part-time students and students with disabilities and special educational needs

Each particular case will be considered.

Face-to-face activities

Activity	Large group	Medium group	Small group	Total
<i>Assessment activities</i>	3	-	-	3
<i>Case study</i>	-	2	-	2
<i>Lab practice</i>	-	-	22	22

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Activity	Large group	Medium group	Small group	Total
Lectures	30	-	-	30
Seminar	-	3	-	3
Total hours:	33	5	22	60

Off-site activities

Activity	Total
Exercises	10
Information search	10
Reference search	10
Self-study	60
Total hours	90

WORK MATERIALS FOR STUDENTS

Dossier
Oral presentations
References

EVALUATION

Intended learnig	Case Studies	Exams	Log	Placement reports
CB2	X	X		X
CB3	X	X		X
CE3				
CT11	X		X	X
CT14	X			X
CT2	X	X		X
CT5	X			X
CT7	X	X		X
CT8	X	X		X
CU2	X			X

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Intended learnig	Case Studies	Exams	Log	Placement reports
Total (100%)	10%	70%	10%	10%
Minimum grade	4	5	7	4

(*)Minimum grade necessary to pass the course

Method of assessment of attendance:

10%

General clarifications on instruments for evaluation:

Before the final exam date, information will be provided in relation to the structure of the exam, and the weights assigned to each part

Clarifications on the methodology for part-time students and students with disabilities and special educational needs:

Each particular case will be considered.

Qualifying criteria for obtaining honors:

To achieve an evaluation above 9. Active participation in class will be considered

BIBLIOGRAPHY

1. Basic Bibliography

- Adrian, J., Potus, J., Poiffait, A., Dauvillier, P. (2000). Análisis Nutricional de los Alimentos. Ed. Acribia, S.A. Zaragoza, España.
- AENOR. (1997). Análisis sensorial. Tomo 1. Alimentación: Recopilación de Normas UNE. AENOR. Madrid, España.
- AENOR. (2010). Análisis sensorial. 2ª edición, AENOR, Madrid, España.
- AENOR. (2010). Microbiología de los alimentos. AENOR, Madrid, España.
- Allaert Vandevenne, C., y Escola Ribes, M. (2003). Métodos de análisis microbiológico de los alimentos. Ed. Diaz de Santos, Madrid
- Alvarado, J. de Dios, Aguilera, J.M. (2001). Métodos para medir propiedades físicas en Industrias de Alimentos. Ed. Acribia, S.A. Zaragoza.
- Anzaldúa-Morales A. (1994). La evaluación sensorial de los alimentos en la teoría y la práctica. Ed. Acribia, S.A., Zaragoza.
- AOAC (1993). Methods of Analysis for nutrition labeling. Eds. Sullivan, D.M.; Carpenter, D.E., Arlington, VA, USA.
- AOAC (2005). Official Methods of Analysis of the Association of Official Analytical Chemists, 18th ed. 4ª rev. 2011. Association of Official Analytical Chemists. Gaithersburg, Maryland (USA).
- Belitz, H.D., W. Grosch. (1997). Química de los alimentos, 2ª ed. Ed. Acribia, S.A., Zaragoza.
- Briz Escribano, J.; García Fure, R. (2004). Análisis sensorial de productos alimentarios. Metodología y aplicación a casos prácticos, 2ª ed. MAPA
- Carpenter, R.P., D.H. Lyon, T.A. Hasdell. (2002). Análisis sensorial en desarrollo y control de la calidad de los alimentos. Ed. Acribia S:A., Zaragoza.
- Chamorro M.C., Losada M.M. (2002). El análisis sensorial de los quesos. Ed. Mundi-Prensa. Madrid, España.
- Chiralt Boix, A.; Martínez Navarrete, N.; González Martínez, C.; Talens Oliag, P.; Moraga Ballesteros, G. (2007) Propiedades físicas de los alimentos. Editorial Universidad Politécnica de Valencia.
- Diario oficial de las Comunidades Europeas. (1998) Métodos oficiales de análisis en la Unión Europea. (1ª Ed.)

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- Tomo I y II .Editorial: Ministerio Agricultura, Pesca y Alimentación, Madrid
- Ducauze, Ch. J. (2006) Fraudes alimentarios. indicaciones reglamentarias y metodología analítica. Ed. Acribia, S.A. Zaragoza, España
- Egan, H., R.S. Kirk, R. Sawyer. (1987). Análisis químico de alimentos de Pearson, 8ª ed., CECSA
- Fennema, O .R. (2000). Química de los alimentos. Ed. Acribia, S.A., Zaragoza.
- Harrigan, W.F. (1998) Laboratory Methods in Food Microbiology. 3era ed, London, Academic Press, London
- Hart, F. Leslie, (1991). Análisis moderno de los alimentos", Ed. Acribia, S.A., Zaragoza.
- Herschdoerfer, S.M. ed. (1987). Quality control in the food industry (4 vol.), 2nd edn. Academic Press
- Hoffm an, G. (1989). The chem istry and technology of edible oils and fats and their high fat products. Academ ic Press.
- Ibáñez F., Barcina Y. (2001). Análisis sensorial de alimentos: métodos y aplicaciones. Ed. Springer-Verlag. Barcelona, España.
- ICMSF (1999) Métodos de muestreo para análisis microbiológicos: principios y aplicaciones específicas. Ed. Acribia SA, Zaragoza
- ICMSF (2000) Su significado y métodos de enumeración. Ed. Acribia SA, Zaragoza
- Instituto Nacional de Consumo. (1999). Métodos Analíticos del Laboratorio del Instituto Nacional del Consumo (CICC). Alimentos I. Ed. Ministerio de Sanidad y Consumo, Madrid, España.
- Juran, J.M., A.B. Godfrey (2001). Manual de control de calidad, 5ª ed., McGraw-Hill, Madrid.
- Kirsop B.E. y Doyle A. (1991) Maintenance of Microorganisms and Cultured Cells. A Manual of Laboratory Methods. 2da edición. Academic Press; London.
- Koopmans M.P.G., Cliver, D.O. y Bosch, A. (2010). Virus De Transmisión Alimentaria: AVANCES Y RETOS. Ed. Acribia, S.A., Zaragoza
- Lawless, H.T., H. Heym ann., H. Lawless. (1998). Sensory evaluation: principles and practices. Chapman & Hall, London.
- Lees, R. (1982). Análisis de los alimentos. Métodos analíticos y de control de calidad. Ed. Acribia, S.A.. Zaragoza.
- Lewis, M. J. (1993) Propiedades físicas de los alimentos y de los sistemas de procesado. Ed. Acribia, S.A.. Zaragoza.
- Madrid Vicente, A., (1994). Métodos Oficiales de Análisis de Los Alimentos. Ed. Mundi Prensa
- Mafart, P. (1994) Ingeniería industrial alimentaria. Vol. 1. Procesos físicos de conservación. Ed. Acribia, S.A.. Zaragoza..
- Matissek, R.; Schnepel, F.M.; Steiner, G. (1998). Análisis de los alimentos. Fundam entos, métodos, aplicaciones. Ed. Acribia, S.A., Zaragoza.
- Müller, G. (1981) Microbiología de los Alimentos Vegetales. Ed. Acribia, S.A., Zaragoza.
- Nielsen. S. (2009)Análisis de los alimentos. Editorial Acribia S.A., Zaragoza.
- Nielsen. S. (2007)Análisis de los alimentos. Manual de Laboratorio. Editorial Acribia, S.A., Zaragoza.
- Osborne, D. R., (1986). Análisis de los nutrientes de los alimentos, Ed. Acribia, S.A., Zaragoza.
- Pascual Anderson, M.R. y Calderón y Pascual, V. (1999). Ediciones Díaz de Santos, Madrid
- Pearson, D. (1986). Técnicas de laboratorio para el análisis de alimentos, Ed. Acribia, S.A., Zaragoza.
- Perruchet, C. y Priel, M. (2001). Estimación de la incertidumbre. Medidas y ensayos. Ed. AENOR, Madrid.
- Picó, Y. (2012). Chemical Analysis of Food: Techniques and Applications. Ed. Elsevier.
- Pomeranz, Y. & C.E. Meloan. (1994). Food analysis: theory and practice, 3rd edn.Chapm an & Hall, London.
- Quevedo, F; Ortega, Y. (1991) Garantía de Calidad de Laboratorios de Microbiología Alimentaria. OPS/OMS, Editorial Harla, México, D. F..
- Revoil, G. (1997) Aseguramiento de la Calidad en los Laboratorios de Análisis y de Ensayos. AENOR, Madrid.
- Rosenthal, A.J. (2001). Textura de los alimentos. Medida y percepción. Ed. Acribia, S.A. Zaragoza, España.
- Roudot, A.C. (2005). Reología y análisis de la textura de los alimentos. Ed. Acribia, S.A.,Zaragoza.
- Sabater, J., A. Vilumara. (1988). Buenas prácticas de laboratorio (GLP) y garantía de calidad: principios básicos. Díaz de Santos, S.A. Madrid.
- Sagrado, S., Bonet, E., Medina, MªJ. y Martín, Y. (2005) Manual práctico de calidad en los laboratorios. Enfoque ISO 17025. Ed. AENOR, Madrid
- Sahin, S. Y Gülüm Sumnu, S. (2009) Propiedades físicas de los alimentos. Editorial Acribia, S.A., Zaragoza.

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Sancho J., Bota E., De Castro J.J. (1999). Introducción al análisis sensorial de los alimentos. Edicions Universitat de Barcelona. Barcelona, España.

Servil Sahin y Server Gülüm Summu. (2009) Propiedades físicas de los alimentos. Ed. Acribia, S.A. Zaragoza.

Stone H., Sidel J.L. (1993). Sensory evaluation practices. Academic Press. California. E.E.U.U.

Wang, S. (2014). Food Chemical Hazard Detection: Development and Application of New Technologies. Ed. Wiley-Blackwell.

2. Further reading

None

COORDINATION CRITERIA

Common evaluation criteria

Common learning outcomes

Tasks performance

SCHEDULE

Period	Assessment activities	Case study	Lab practice	Lectures	Seminar
1# Fortnight	0.0	0.0	0.0	4.0	3.0
2# Fortnight	0.0	0.0	4.0	4.0	0.0
3# Fortnight	0.0	0.0	3.0	4.0	0.0
4# Fortnight	0.0	0.0	4.0	4.0	0.0
5# Fortnight	0.0	0.0	4.0	4.0	0.0
6# Fortnight	0.0	0.0	3.0	4.0	0.0
7# Fortnight	0.0	2.0	4.0	4.0	0.0
8# Fortnight	3.0	0.0	0.0	2.0	0.0
Total hours:	3.0	2.0	22.0	30.0	3.0

The methodological strategies and the evaluation system contemplated in this Course Description will be adapted according to the needs presented by students with disabilities and special educational needs in the cases that are required.