Universitat de Lleida

DEGREE CURRICULUM

MYCOTOXINS IN ANIMAL FEEDING AND PRODUCTION

Coordination: RAMOS GIRONA, ANTONIO JAVIER

Academic year 2023-24

MYCOTOXINS IN ANIMAL FEEDING AND PRODUCTION 2023-24

Subject's general information

Subject name	MYCOTOXINS IN ANIMAL FEEDING AND PRODUCTION
Code	100387
Semester	2nd Q(SEMESTER) CONTINUED EVALUATION
Typology	<table><tr><th>Degree</th><th>Course</th><th>Typology</th><th>Modality</th></tr><tr><td>Double bachelor's degree: Bachelor's Degree in Veterinary Medicine and Bachelor's Degree in Science and Production</td><td>5</td><td>OPTIONAL</td><td>Attendance-based</td></tr></table>
Course number of credits (ECTS)	6
Type of activity, credits, and groups	<table><tr><th>Activity type</th><th>PRALAB</th><th>PRAULA</th><th>TEORIA</th></tr><tr><th>Number of credits</th><td>1.2</td><td>1.2</td><td>3.6</td></tr><tr><th>Number of groups</th><td>2</td><td>1</td><td>1</td></tr></table>
Coordination	RAMOS GIRONA, ANTONIO JAVIER
Department	TECNOLOGIA, ENGINYERIA I CIÈNCIA D'ALIMENTS
Teaching load distribution between lectures and independent student work	Face-to-face classes: 40% Autonomous student work: 60%
Important information on data processing	Consult this link for more information.
Language	Antonio J. Ramos: Spanish Vicente Sanchis: Spanish Sonia Marín: Catalan Francisco Molino: Spanish Catalan: 25% Spanish: 75%Catalan: 25% Spanish: 75% English: part of the docent material will be English
Distribution of credits	Antonio J. Ramos: 30% (coordinator) Vicente Sanchis: 25% Sonia Marín: 23,33% Francisco Molino: 21,66%

MYCOTOXINS IN ANIMAL FEEDING AND PRODUCTION 2023-24

Teaching staff	E-mail addresses	Credits taught by teacher	Office and hour of attention
MARIN SILLUE, SONIA	sonia.marin@udl.cat	1,4	By appointment
MOLINO GAHETE, FRANCISCO	francisco.molino@udl.cat	1,8	By appointment
RAMOS GIRONA, ANTONIO JAVIER	antonio.ramos@udl.cat	1,8	By appointment
SANCHIS ALMENAR, VICENTE	vicente.sanchis@udl.cat	2,2	By appointment

Subject's extra information

In this course the student will study what mycotoxins are, what are the most important challenges in this field, and the importance of mycotoxins in animal health and animal production, being able to carry out an analysis of moulds and mycotoxins in a food or feed, and to develop a risk management system for mycotoxins in primary production, intermediaries, farm, feed companies and agri-food industry.

Learning objectives

The student who attends this subject must be able to assess the importance and impact of the consumption of raw materials, feed, silage and other products contaminated with mycotoxins on animal health and production, as well as being able to plan a mycotoxin risk management system, and to analyze the presence of mycotoxins in food and feed.

Competences

Basic competences:

CB3: That students have the ability to gather and interpret relevant data (usually within their study area) to make judgments that include a reflection on relevant issues of a social, scientific or ethical nature.

CB4: That students can transmit information, ideas, problems and solutions to both specialized and non-specialized audiences.

CB9: Use the basic work methodologies referring to the indicated disciplines.

General competences:

CG3 Analyze the strategies of animal production as a whole (facilities, behavior, welfare, nutrition, improvement, production, reproduction, environment, economy, marketing and product quality) with the aim of optimizing production.

Specific competences:

CE18 Recognize the welfare state of farm animals as a primary factor in production. Describe the different animal diseases, individual and collective, and their prevention measures. Collect and send samples.

CE20 Describe the structure of the productive sector, the market and the product marketing channels. Identify the different agents and elements of the food chain in order to guarantee its safety and traceability. Assess the factors that influence the quality of food of animal origin.

Cross-cutting competences::

CT1 Acquire an adequate oral and written comprehension and expression of Catalan and Spanish.

CT2 Acquire a significant command of a foreign language, especially English.

CT3 Acquire training in the use of new technologies and information and communication technologies.

CT6 Analyze specific situations, define problems, make decisions and implement action plans in search of solutions.

CT9 Select and manage the available written and computerized sources of information related to the professional activity.

CT11 Manage individual and team work.

Subject contents

THEORETICAL LESSONS (34h):

1. Introduction to mycotoxins.

2. Mycotoxigenic molds.

2.1. TYaxonomy

2.2. Fungal ecophysiology.Fungal ecophysiology.

3. Main mycotoxins. Chemical characteristics.

4. Modified mycotoxins and emerging mycotoxins.

5. Mycotoxins in animal feed.

5.1 Mycotoxins in raw materials for the preparation of feed.

5.2 Mycotoxins in by-products used in animal feed.

5.3 Mycotoxins in grass and silages.

6. Legislation.

7. Mycotoxin toxicology. Co-presence and synergies.

8. Mycotoxin analysis.

8.1. Sampling.

8.2. Extraction and purification.

8.3. Analytical methods: instrumental and rapid methods.

9. Mycotoxin residues in products of animal origin: meat, eggs, milk.

10. Mycotoxins in animal production:

10.1. Ruminants.

10.2. Pigs.

10.3. Poultry.

10.4. Fish.

10.5. Horses.

10.6. Pets.

10.7. Laboratory animals.

11. Detoxification of mycotoxins: adsorbents, biodegradation and other strategies.

PRACTICAL LESSONS (22h)

1. Group work in the classroom.

Prevention and control of mycotoxins: risk management for mycotoxins in primary production, farm, feed companies and agri-food industry (8h).

2. Group work and public exposition:

Reading, interpretation and presentation of the most relevant content of a scientific article on mycotoxins (2h).

3. Laboratory practices:

Fungal infection, mould count, and identification of the main genera of mycotoxigenic molds (6h).

Mycotoxin analysis, by quick methods, in milk, cereals and/or feed (4 h).

In principle, all practices are face-to-face. If the health circumstances forced to suspend the attendance of these activities, the presentation of the group work would be done virtually by videoconference, and the laboratory practices would be replaced by other activities whose duration and weight in the evaluation of the subject would be equivalent.

SEMINAR (2h)

1. Seminar on "New Advances in Mycotoxin Toxicology"

Mandatory attendance activity.

Methodology

The methodology of the subject will of theoretical classes, seminars and practical activities, which include group works. The exams, the seminars and the practical activities will be face-to-face, which will be of compulsory attendance.

Development plan

The exact Development Plan will be provided on the first day of the start of the subject, and will be published in the Resources section of the Virtual Campus, so that the student can organize in the most efficient way.

At the closing date of this teaching guide, the proposed calendar is as follows:

Day of the week	Day	Hour	Lesson	Teacher	Notes
FEBRUARY					
Tuesday	6	15,00-16,50h	Introduction (2h)	Antonio	
Wednesday	7	15,00-16,50h	Fungi and ecophysiology I (2h)	Vicente	
Tuesday	13	15,00-16,50h	Fungi and ecophysiology II (2h)	Vicente	
Wednesday	14	15,00-16,50h	Main Micotoxins (2h)	Antonio	
Tuesday	20	15,00-16,50h	Emerging Mycotoxins (2h)	Antonio	
		17,10-19,00h	Mycooxins in Animal Feed I (2h)	Sonia	
Wednesday	21	15,00-16,50h	Legislation (1h)	Francisco	
Tuesday	27	15,00-16,50h	Mycotoxins in Animal Feed II (2h)	Sonia	
Wednesday	28	15,00-19,00h	Practical classes G1 (4h)	Vicente	Lab. 2.3.01.
MARCH					
Tuesday	5	15,00-16,50h	Practical classes Sonia I (2h)	Sonia	
Wednesday	6	15,00-16,50h	Practical classes G1 (2h)	Vicente	Lab. 2.3.01.
		17,10-19,00h	Practical classes G2 (2h)	Vicente	Lab. 2.3.01.
Tuesday	12	15,00-16,50h	Toxicology I (2h)	Vicente	
Wednesday	13	15,00-16,50h	Practical classes Sonia II (2h)	Sonia	
Tuesday	19	12,00-14,00h	Exam (2h)		
APRIL					
Tuesday	2	15,00-16,50h	Toxicology II (2h)	Vicente	
Wednesday	3	15,00-19,00h	Practical classes G2 (4h)	Vicente	Lab. 2.3.01.
Tuesday	9	15,00-16,50h	Seminar (2h)	Aurora	Mandatory activity
Wednesday	10	15,00-18,00h	Analysis of micotox. I (3h)	Antonio	
Tuesday	16	15,00-16,50h	Analysis of micotox. II (2h)	Antonio	
Wednesday	17	15,00-16,50h	Mycotoxicoses I (2h)	Francisco	
Tuesday	23	15,00-19,00h	Practical classes G1 (4h)	Francisco	Lab. 2.3.01.
Wednesday	24	15,00-19,00h	Practical classes G2 (4h)	Francisco	Lab. 2.3.01.
Tuesday	30	15,00-16,50h	Micotoxicoses II (2h)	Francisco	
MAY					

Thursday	2	15,00-16,50h	Micotoxicoses III (2h)	Francisco	
Wednesday	8	15,00-16,50h 16,00-16,50h	Analysis of micotox. III (1h) Residues (1h)	Antonio Francisco	
Tuesday	14	15,00-16,50h	Practical classes Sonia IV (2h)	Sonia	
Wednesday	15	15,00-16,50h	Practical classes Sonia V (2h)	Sonia	
Tuesday	21	15,00-16,50h	Detoxification (2h)	Antonio	
Wednesday	22	15,00-16,50h	--	--	
Tuesday	28	15,00-16,50h	Seminar Antonio (2h)	Antonio	
Wednesday	29	15,00-16,50h	--	--	
JUNE					
Monday	10	12,00-14,00h	Exam (2h)		Classroom SHV 2.04
Wednesday	19	12,00-14,00h	Recovery exam (2h)		Classroom 3.1.02

Unless otherwise indicated in the table above, the classroom is 3.1.02.

Evaluation

This subject is configured in 4 evaluation blocks:

BLOCK 1.- THEORY. Value 50%. Minimum mark: 5.0. Recoverable.

- Activity 1: Exam topics 1 to 6. Value: 25%.

- Activity 2: Exam topics 7 to 11. Value: 25%.

BLOCK 2.- GROUP WORK. Value 20% Unrecoverable.

- Activity 3: Group work on risk management system for mycotoxins and quality of oral contributions during sessions. Value: 20%

BLOCK 3.- SEMINAR. Value 15% Unrecoverable.

- Activity 4: Seminar on a scientific article on mycotoxins. Group work and public exposition by part of the students. Value: 15%

BLOCK 4.- PRACTICAL SESSIONS. Value 15% Unrecoverable.

- Activity 5: Assistance to practices and presentation of the memory of laboratory practices. Value: 15%

The unjustified absence to any of the group work sessions, practices, or the seminar suppose the suspense of this block.

COPY AND PLAGI: In case of detecting copying and/or plagiarism during the performance of the evaluation activities, the activity will be withdrawn and it will be suspended. Moreover a disciplinary file could be open.

ABSENCE JUSTIFICATION

In relation to the justification of the absences, the reasons for which the absence is considered justified, will be the same that are stated in the NORMATIVA DE L'AVALUACIÓ I LA QUALIFICACIÓ DELS APRENENTATGES EN ELS GRAUS I MÀSTERS for not attending the assessment tests programmed in the teaching guide or on the degree website.

ALTERNATIVE ASSESSMENT

- 1 exam of the whole block 1. Value 100% of the grade of the subject. Minimum grade to pass: 5.0. Date of the exam: Monday, June 10 at 12 pm in the SHV 2.04 classroom.

This exam can be recovered on June 19 at 12 pm in the classroom 3.1.02.

Bibliography

RECOMMENDED BIBLIOGRAPHY

- Diaz. D.E. (Ed.). 2005. The mycotoxin blue book. Nottingham University Press, UK.

- Marín, S., Ramos, A.J., Cano-Sancho, G. and Sanchis, V. 2013. Mycotoxins: Occurrence, toxicology, and exposure assessment. *Food and Chemical Toxicology*, 60: 218-237.

- Moretti, A. and Susca, A. (Ed.). 2017. Mycotoxigenic fungi: methods and protocols. Humana Press, New Jersey, USA.

- Ramos, A.J. (Ed.) 2011. Micotoxinas y micotoxicosis. Ed. Madrid Vicente Ediciones, Madrid.

- Ramos A.J. y Marín, S. 2020. Manejo de micotoxinas en producción animal. E. Servet, Zaragoza.

- Rubinstein, H.R. (Ed.) 2006. Micotoxinas: impacto en la producción y salud humana y animal. Narvaja Editor, Córdoba, Argentina.

- Soriano del Castillo, J.M. (Ed.). 2007. Micotoxinas en alimentos. Ed. Diaz de Santos, Madrid.