

Postgraduate Certificate

Multidrug-Resistant Bacteria in the Food Chain





Postgraduate Certificate Multidrug-Resistant Bacteria in the Food Chain

- » Modality: online
- » Duration: 6 weeks
- » Certificate: TECH Global University
- » Accreditation: 6 ECTS
- » Schedule: at your own pace
- » Exams: online

Website: www.techtute.com/us/pharmacy/postgraduate-certificate/multidrug-resistant-bacteria-food-chain

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01

Introduction

With the increased use of antibiotics in agricultural and livestock production, an alarming increase in bacterial resistance has been observed, affecting everything from farms to the food that reaches our plates. In fact, this phenomenon poses serious risks to public health, as these bacteria can be transmitted to humans through contaminated food. In response to this crisis, stricter control and regulation measures are being implemented in food production and handling. In this context, TECH has designed an online program that fits the personal and professional needs of students.

In addition, it is based on the innovative Relearning methodology, a pioneer in this university.



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With this Postgraduate Certificate, you will examine how Multidrug-Resistant Bacteria are spread through food, addressing from agricultural and livestock practices, to industrial food production processes”

According to recent reports from the World Health Organization (WHO), an alarming number of bacteria found in food products, such as meats and vegetables, show resistance to multiple commonly used antibiotics. It also highlights the importance of strict regulatory measures to control the misuse of antibiotics in food production and to promote effective surveillance systems to detect and prevent the spread of these bacteria.

Therefore, this Postgraduate Certificate is born, which will cover the complex problem of antimicrobial resistance in the food context. In this sense, the critical role played by the food chain in the spread of antimicrobial resistance will be analyzed, addressing in detail multi-resistant strains such as ESBL, MRSA and those resistant to colistin. In addition, the importance of the One Health approach will be explored to understand how human, animal and environmental health are interconnected in this global phenomenon.

The study plan will also delve into the dissemination of antimicrobial resistance through different food vectors. Therefore, the spread of resistant bacteria in foods of animal and vegetable origin, as well as through water, will be examined in detail, identifying critical points in the production and distribution of food where these bacteria can proliferate and be transmitted.

Pathogens such as *Salmonella* spp., *Campylobacter* spp., *Escherichia coli* and *Staphylococcus* spp. will also be covered, highlighting their resistance profiles to different antimicrobials and their impact on public health. Advanced strategies to prevent and control the spread of these resistances along the food chain will also be discussed, including preventive measures in primary production, slaughterhouses and food industries.

Therefore, TECH has launched a comprehensive and fully online university program, accessible from any electronic device with Internet access. Additionally, it is based on the revolutionary Relearning methodology, which focuses on the systematic review of key concepts to ensure a solid and fluid understanding of the contents.

This **Postgraduate Certificate in Multidrug-Resistant Bacteria in the Food Chain** contains the most complete and up-to-date scientific program on the market. The most important features include:

- ♦ The development of practical cases presented by experts in Microbiology, Medicine and Parasitology
- ♦ The graphic, schematic and eminently practical contents with which it is conceived gather scientific and practical information on those disciplines that are indispensable for professional practice
- ♦ Practical exercises where self-assessment can be used to improve learning.
- ♦ Its special emphasis on innovative methodologies
- ♦ Theoretical lessons, questions to the expert, debate forums on controversial topics, and individual reflection assignments
- ♦ Content that is accessible from any fixed or portable device with an Internet connection



You will acquire specialized knowledge about the main pathogenic bacteria involved, such as Salmonella, Campylobacter, Escherichia coli and Staphylococcus. With all the quality guarantees that TECH offers you!"

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You will investigate challenges and practices that can contribute to the proliferation of bacterial resistance, including cross-resistance between biocides and antibiotics, thanks to an extensive library of multimedia resources”

The program's teaching staff includes professionals from the field who contribute their work experience to this educational program, as well as renowned specialists from leading societies and prestigious universities.

The multimedia content, developed with the latest educational technology, will provide the professional with situated and contextual learning, i.e., a simulated environment that will provide immersive education programmed to learn in real situations.

This program is designed around Problem-Based Learning, whereby the professional must try to solve the different professional practice situations that arise during the course. For this purpose, students will be assisted by an innovative interactive video system created by renowned and experienced experts.

You will delve into the relevance of the One Health approach to address the complex interaction between human, animal and environmental health, through the best teaching materials, at the forefront of technology and education.

From animal products to plant foods, you will analyze specific cases and mitigation strategies, hand in hand with the best digital university in the world, according to Forbes.



02

Objectives

Thanks to this university program, pharmacists will be able to identify and evaluate the main pathogenic bacteria involved, such as Salmonella, Campylobacter, Escherichia coli and Staphylococcus, as well as to analyze the routes of dispersion of antimicrobial resistances in different types of food. In addition, professionals will develop skills to implement effective preventive and control strategies, both in primary production and in the food industry, in order to mitigate the risks associated with these emerging threats to public health.





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The main objective of the program will be to provide you with specialized qualification, which will enable you to thoroughly understand the dynamics and implications of Multidrug-Resistant Bacteria in the food context.”

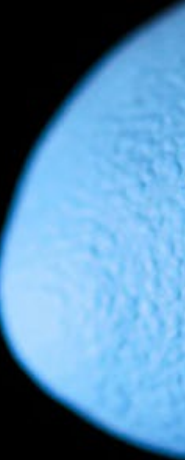


General Objective

- ♦ Acquire knowledge on the dissemination of resistant bacteria in food production



You will be specialized in the identification of agricultural and food production practices that contribute to the spread of bacterial resistance. What are you waiting for to enroll?"





Specific Objective

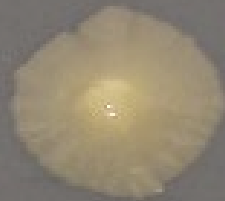
- Analyze the role of the food chain in the spread of bacterial resistance to antibiotics through food of animal and plant origin, as well as through water



03

Course Management

The faculty are recognized experts in Microbiology, Parasitology and Molecular Genetics. In fact, these professionals stand out for their extensive experience in the research and management of antimicrobial resistance in the food context, as well as for their participation in the development of policies and guidelines related to food safety and responsible use of antimicrobials. In addition, its educational approach will focus on providing in-depth and up-to-date knowledge on the most relevant Multidrug-Resistant Bacteria, as well as on fostering practical skills for the application of effective preventive and control strategies.



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The commitment of the faculty to this program will ensure a high level and relevant update for pharmacists seeking to improve Public Health and food safety”

Management



Dr. Ramos Vivas, José

- ♦ Director of the Banco Santander-Universidad Europea del Atlántico Chair in Innovation
- ♦ Researcher at the Center for Innovation and Technology of Cantabria (CITICAN)
- ♦ Academic of Microbiology and Parasitology at the European University of the Atlantic
- ♦ Founder and former director of the Cellular Microbiology Laboratory of the Valdecilla Research Institute (IDIVAL)
- ♦ PhD in Biology from the University of León
- ♦ Doctor in Sciences from the University of Las Palmas de Gran Canaria
- ♦ Degree in Biology from the University of Santiago de Compostela
- ♦ Master's Degree in Molecular Biology and Biomedicine from the University of Cantabria
- ♦ Member of: CIBERINFEC (MICINN-ISCIII), Member of the Spanish Society of Microbiology and Member of the Spanish Network of Research in Infectious Pathology

Professors

Dr. Alegría González, Ángel

- ♦ Researcher and Academician in Food Microbiology and Molecular Genetics of the University of León
- ♦ Researcher in 9 projects funded by public competitive calls
- ♦ Principal Investigator as beneficiary of an Intra-European Marie Curie Fellowship (IEF-FP7) in a project associated to the University of Groningen (The Netherlands)
- ♦ PhD in Food Biotechnology from the University of Oviedo - CSIC
- ♦ Degree in Biology from the University of Oviedo
- ♦ Master's Degree in Food Biotechnology from the University of Oviedo



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Structure and Content

This academic program will deepen the understanding of Multi-Resistant Bacteria present in the food chain, exploring topics such as the critical role of food in the spread of antimicrobial resistance, highlighting the most worrisome variants, such as ESBL, MRSA and colistin resistance. The dissemination of these bacteria through food of animal and plant origin, as well as their spread through water, will also be examined. In addition, food production practices and environments that favor the development and spread of resistance will be analyzed, along with strategies to prevent and control this phenomenon.



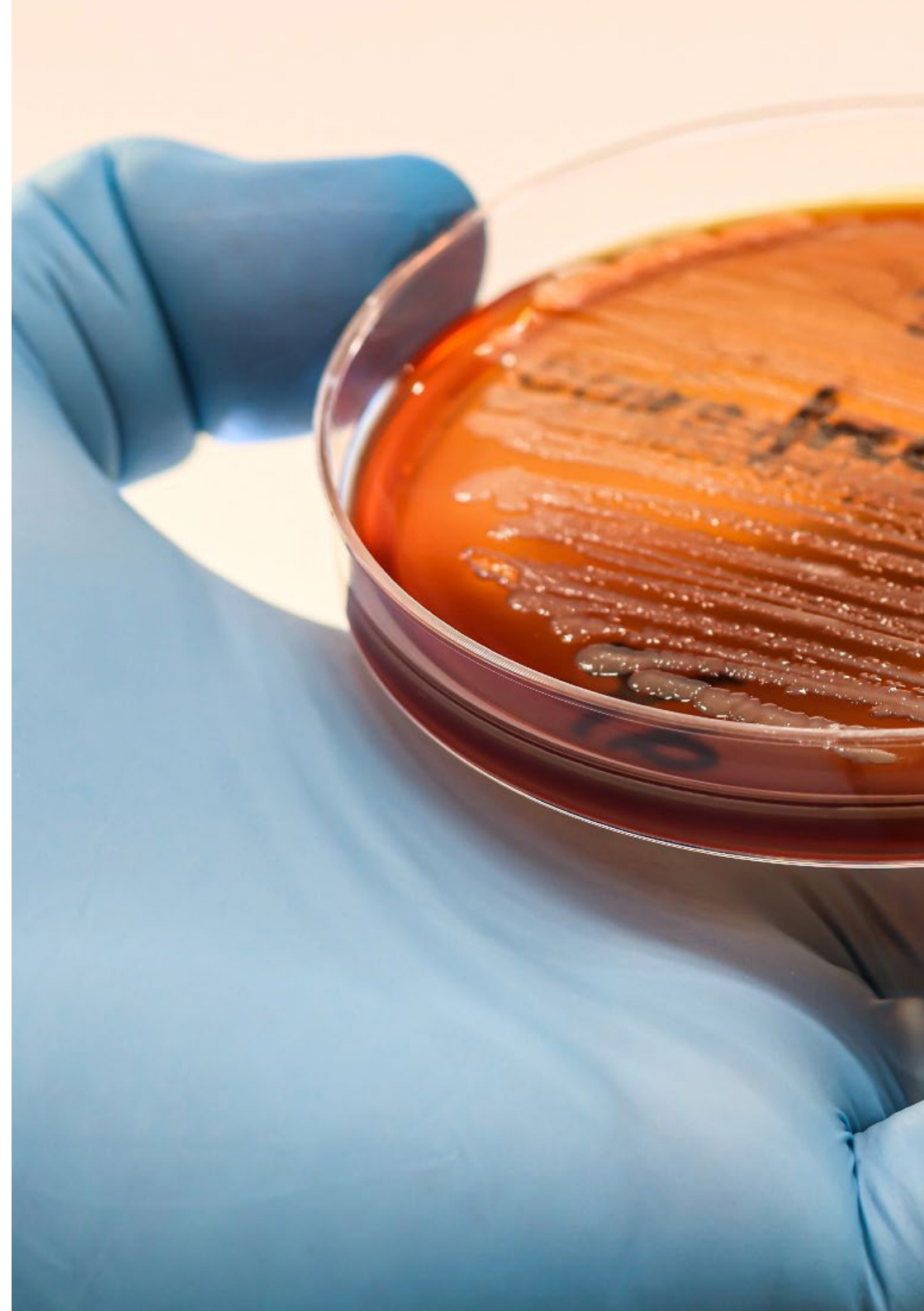


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You will strengthen your ability to adequately manage microbiological threats in the food chain, contributing to the protection of Public Health and the promotion of safe and sustainable food practices”

Module 1. Multidrug-Resistant Bacteria in the Food Chain

- 1.1. Multidrug-Resistant Bacteria in the Food Chain
 - 1.1.1. The Role of the Food Chain in the Spread of Antimicrobial Resistance
 - 1.1.2. Antimicrobial Resistances in Food (ESBL, MRSA, and Colistin)
 - 1.1.3. The Food Chain within the One Health Approach
- 1.2. Dissemination of Antimicrobial Resistance through Food
 - 1.2.1. Food of Animal Origin
 - 1.2.2. Food of Plant Origin
 - 1.2.3. Dissemination of Resistant Bacteria through Water
- 1.3. Spread of Resistant Bacteria in Food Production
 - 1.3.1. Spread of Resistant Bacteria in Food Production Environments
 - 1.3.2. Spread of Resistant Bacteria through Food Handlers
 - 1.3.3. Cross-Resistance between Biocides and Antibiotics
- 1.4. Antimicrobial Resistance in Salmonella Spp
 - 1.4.1. AmpC-, ESBL- and Carbapenemase-Producing Salmonella Spp
 - 1.4.2. Resistant Salmonella Spp in Humans
 - 1.4.3. Antibiotic Resistant Salmonella Spp in Farm and Meat Animals
 - 1.4.4. Multidrug-Resistant Salmonella Spp in Humans
- 1.5. Antimicrobial Resistance in Campylobacter Spp
 - 1.5.1. Antimicrobial Resistance in Campylobacter Spp
 - 1.5.2. Antimicrobial Resistant Campylobacter Spp in Foods
 - 1.5.3. Multi-Drug Resistant Campylobacter Spp
- 1.6. Antimicrobial Resistances in Escherichia Coli
 - 1.6.1. AmpC, ESBL and Carbapenemase Producing E. Coli
 - 1.6.2. Antimicrobial Resistant E. Coli in Farm Animals
 - 1.6.3. Antimicrobial Resistant E. Coli in Food
 - 1.6.4. Multidrug-Resistant E. Coli
- 1.7. Antimicrobial Resistance in Staphylococci
 - 1.7.1. Methicillin-Resistant S. Aureus (MRSA)
 - 1.7.2. MRSA in Food and Farm Animals
 - 1.7.3. Methicillin-Resistant Staphylococcus Epidermidis (MRSE)
 - 1.7.4. Multidrug-Resistant Staphylococcus Spp





- 1.8. Antimicrobial Resistance in Enterobacteria
 - 1.8.1. Shigella Spp
 - 1.8.2. Enterobacter Spp
 - 1.8.3. Other Environmental Enterobacteriaceae
- 1.9. Antimicrobial Resistance in Other Food-Borne Pathogens
 - 1.9.1. Listeria Monocytogenes
 - 1.9.2. Enterococcus Spp
 - 1.9.3. Pseudomonas Spp
 - 1.9.4. Aeromonas Spp and Plesiomonas Spp
- 1.10. Strategies to Prevent and Control the Spread of Microbial Resistance in the Food Chain
 - 1.10.1. Preventive and Control Measures in Primary Production
 - 1.10.2. Preventive and Control Measures in Slaughterhouses
 - 1.10.3. Preventive and Control Measures in Food Industries

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This Postgraduate Certificate in Multidrug-Resistant Bacteria in the Food Chain has been designed specifically for pharmacists, covering a wide range of specialized content”

05

Methodology

This academic program offers students a different way of learning. Our methodology uses a cyclical learning approach: **Relearning**.

This teaching system is used, for example, in the most prestigious medical schools in the world, and major publications such as the **New England Journal of Medicine** have considered it to be one of the most effective.



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Discover Relearning, a system that abandons conventional linear learning, to take you through cyclical teaching systems: a way of learning that has proven to be extremely effective, especially in subjects that require memorization"

At TECH we use the Case Method

What should a professional do in a given situation? Throughout the program, students will be confronted with multiple simulated clinical cases based on real patients, in which they will have to investigate, establish hypotheses and ultimately, resolve the situation. There is an abundance of scientific evidence on the effectiveness of the method. Pharmacists learn better, more quickly and more sustainably over time.

With TECH you will experience a way of learning that is shaking the foundations of traditional universities around the world.



According to Dr. Gervas, the clinical case is the annotated presentation of a patient, or group of patients, which becomes a "case", an example or model that illustrates some peculiar clinical component, either because of its teaching power or because of its uniqueness or rarity. It is essential that the case is based on current professional life, attempting to recreate the actual conditions in a pharmacist's professional practice.

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Did you know that this method was developed in 1912, at Harvard, for law students? The case method consisted of presenting students with real-life, complex situations for them to make decisions and justify their decisions on how to solve them. In 1924, Harvard adopted it as a standard teaching method”

The effectiveness of the method is justified by four fundamental achievements:

1. Pharmacists who follow this method not only grasp concepts, but also develop their mental capacity, by evaluating real situations and applying their knowledge.
2. Learning is solidly translated into practical skills that allow the student to better integrate into the real world.
3. Ideas and concepts are understood more efficiently, given that the example situations are based on real-life.
4. Students like to feel that the effort they put into their studies is worthwhile. This then translates into a greater interest in learning and more time dedicated to working on the course.



Relearning Methodology

At TECH we enhance the case method with the best 100% online teaching methodology available: Relearning.

Our University is the first in the world to combine the study of clinical cases with a 100% online learning system based on repetition, combining a minimum of 8 different elements in each lesson, which represent a real revolution with respect to simply studying and analyzing cases.



Pharmacists will learn through real cases and by solving complex situations in simulated learning environments. These simulations are developed using state-of-the-art software to facilitate immersive learning.

At the forefront of world teaching, the Relearning method has managed to improve the overall satisfaction levels of professionals who complete their studies, with respect to the quality indicators of the best online university (Columbia University).

With this methodology, more than 115,000 pharmacists have been trained with unprecedented success in all clinical specialties, regardless of the surgical load. This pedagogical methodology is developed in a highly demanding environment, with a university student body with a high socioeconomic profile and an average age of 43.5 years.

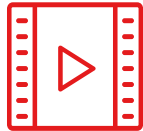
Relearning will allow you to learn with less effort and better performance, involving you more in your specialization, developing a critical mindset, defending arguments, and contrasting opinions: a direct equation to success.

In our program, learning is not a linear process, but rather a spiral (learn, unlearn, forget, and re-learn). Therefore, we combine each of these elements concentrically.

The overall score obtained by TECH's learning system is 8.01, according to the highest international standards.



This program offers the best educational material, prepared with professionals in mind:



Study Material

All teaching material is created specifically for the course by specialist pharmacists who will be teaching the course, so that the didactic development is highly specific and accurate.

These contents are then applied to the audiovisual format, to create the TECH online working method. All this, with the latest techniques that offer high quality pieces in each and every one of the materials that are made available to the student.



Video Techniques and Procedures

TECH introduces students to the latest techniques, to the latest educational advances, to the forefront of current pharmaceutical care procedures. All of this, first hand, and explained and detailed with precision to contribute to assimilation and a better understanding. And best of all, you can watch them as many times as you want.



Interactive Summaries

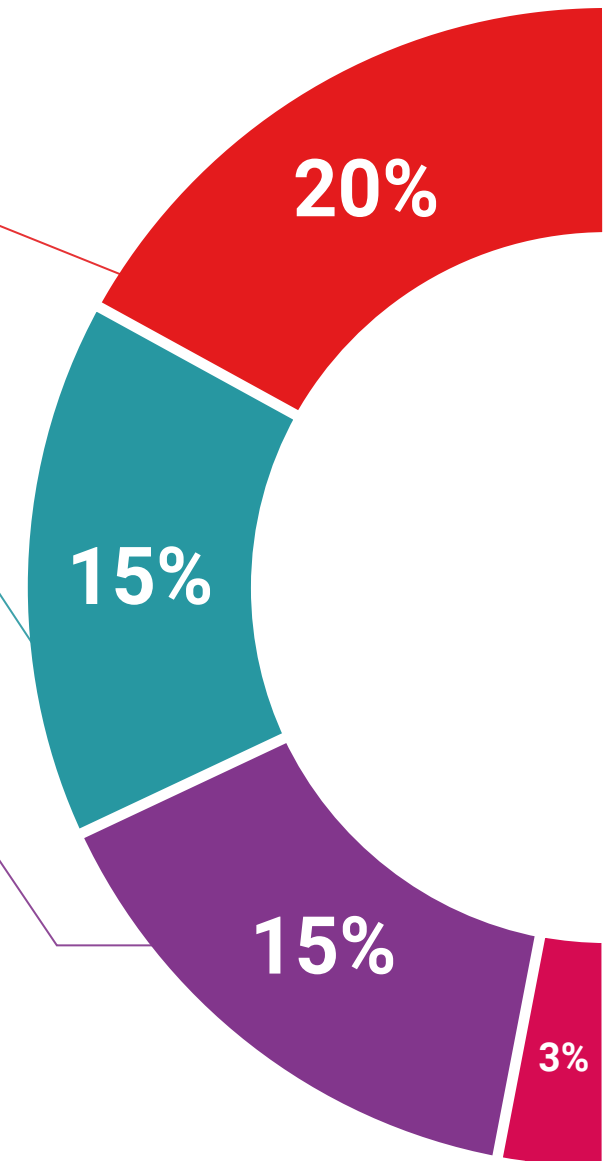
The TECH team presents the contents attractively and dynamically in multimedia lessons that include audio, videos, images, diagrams, and concept maps in order to reinforce knowledge.

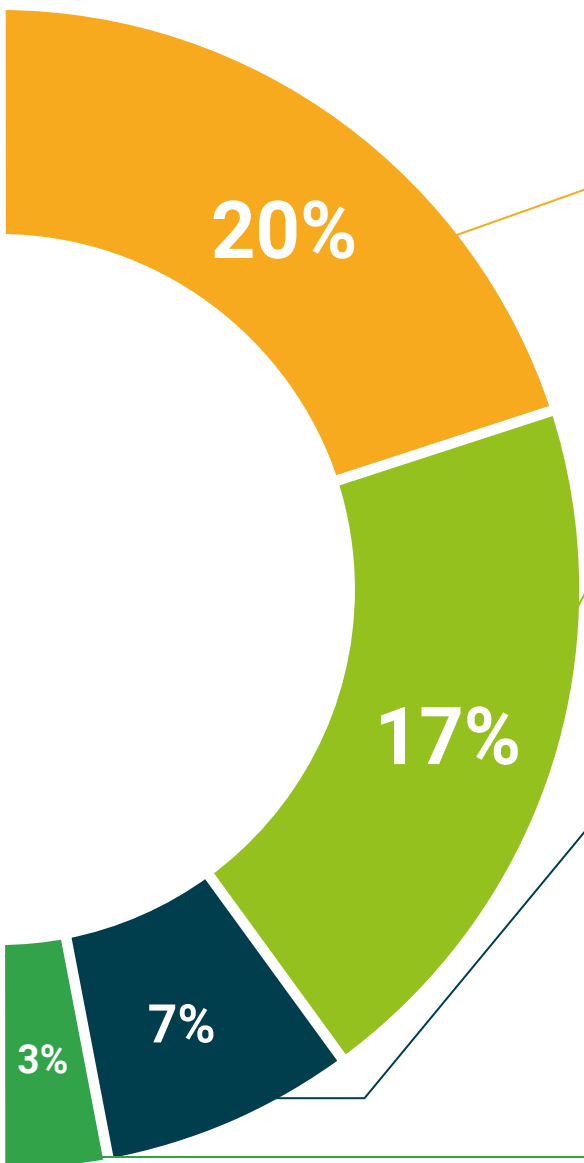
This unique multimedia content presentation training system was awarded by Microsoft as a "European Success Story".



Additional Reading

Recent articles, consensus documents and international guidelines, among others. In TECH's virtual library, students will have access to everything they need to complete their course.





Expert-Led Case Studies and Case Analysis

Effective learning ought to be contextual. Therefore, we will present you with real case developments in which the expert will guide you through focusing on and solving the different situations: a clear and direct way to achieve the highest degree of understanding.



Testing & Retesting

We periodically evaluate and re-evaluate students' knowledge throughout the program, through assessment and self-assessment activities and exercises, so that they can see how they are achieving their goals.



Classes

There is scientific evidence on the usefulness of learning by observing experts. The system known as Learning from an Expert strengthens knowledge and memory, and generates confidence in future difficult decisions.



Quick Action Guides

TECH offers the most relevant contents of the course in the form of worksheets or quick action guides. A synthetic, practical, and effective way to help students progress in their learning.



06

Certificate

The Postgraduate Certificate in Multidrug-Resistant Bacteria in the Food Chain guarantees, in addition to the most accurate and up-to-date education, access to a Postgraduate Certificate issued by TECH Global University.





Successfully complete this program and receive your university qualification without having to travel or fill out laborious paperwork"

This private qualification will allow you to obtain a **Postgraduate Certificate in Multidrug-Resistant Bacteria in the Food Chain** endorsed by **TECH Global University**, the world's largest online university.

TECH Global University, is an official European University publicly recognized by the Government of Andorra ([official bulletin](#)). Andorra is part of the European Higher Education Area (EHEA) since 2003. The EHEA is an initiative promoted by the European Union that aims to organize the international training framework and harmonize the higher education systems of the member countries of this space. The project promotes common values, the implementation of collaborative tools and strengthening its quality assurance mechanisms to enhance collaboration and mobility among students, researchers and academics.

This **TECH Global University** private qualification, is a European program of continuing education and professional updating that guarantees the acquisition of competencies in its area of knowledge, providing a high curricular value to the student who completes the program.

Title: **Postgraduate Certificate in Multidrug-Resistant Bacteria in the Food Chain**

Modality: **online**

Duration: **6 weeks**

Accreditation: **6 ECTS**



*Apostille Convention. In the event that the student wishes to have their paper diploma issued with an apostille, TECH Global University will make the necessary arrangements to obtain it, at an additional cost.



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