

# Postgraduate Certificate

Chemical Composition of  
Food and Quality of the Raw  
Materials for Ruminants and  
Non-Ruminants





## Postgraduate Certificate

### Chemical Composition of Food and Quality of the Raw Materials for Ruminants and Non-Ruminants

- » Modality: online
- » Duration: 6 weeks
- » Certificate: TECH Technological University
- » Dedication: 16h/week
- » Schedule: at your own pace
- » Exams: online

Website: [www.techtute.com/in/nutrition/postgraduate-certificate/chemical-composition-food-quality-raw-materials-ruminants-non-ruminants](http://www.techtute.com/in/nutrition/postgraduate-certificate/chemical-composition-food-quality-raw-materials-ruminants-non-ruminants)

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# 01

# Introduction

This program is an ambitious, broad, structured and intertwined proposal, covering the chemical composition of food and the quality of raw materials for ruminants and non-ruminants. All this with the characteristics of a course of a high scientific, teaching and technological level.



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*Become one of the most demanded professionals of the moment: study our Course in Chemical Composition of Food and Quality of Raw Materials for Ruminants and Non-Ruminants”*

This Postgraduate Certificate in Chemical Composition of Food and Quality of Raw Materials for Ruminants and Non-Ruminants is unique given its level of specialization and the logical sequence of learning with which the content is arranged.

The demand for protein and energy from beef and dairy production is growing worldwide to improve human nutrition and health and the socio-economic development of the population. This new scenario makes it necessary for professionals involved in livestock activities to have the best possible educational program and updating. Specialized knowledge of the chemical composition of foods and the best utilization of foods is required to meet these growing demands.

This Postgraduate Certificate is designed for Nutritionists to update and perfect their technical and practical knowledge in this field. A complete and effective Postgraduate Certificate that will propel you to the highest level of competence.



*Join the elite with this highly effective educational program and open new paths to your professional progress”*

This **Postgraduate Certificate in Chemical Composition of Food and Quality of Raw Materials for Ruminants and Non-Ruminants** contains the most complete and up-to-date scientific program on the market. The most important features of the program include:

- The latest technology in online teaching software
- Intensely visual teaching system, supported by graphic and schematic contents, easy to assimilate and understand
- Practical cases presented by practising experts
- State-of-the-art interactive video systems
- Teaching supported by telepractice
- Continuous updating and recycling systems
- Autonomous learning: full compatibility with other occupations
- Practical exercises for self-assessment and learning verification
- Support groups and educational synergies: questions to the expert, debate and knowledge forums
- Communication with the teacher and individual reflection work
- Content that is accessible from any fixed or portable device with an Internet connection
- Supplementary documentation databases are permanently available, even after the course

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*A course that will enable you to work in the sectors of food production for or with animal origin, with the solvency of a high-level professional”*

TECH's teaching staff is made up of professionals from different fields related to this specialty. That way, TECH ensures to offer students the educational program and updating intended. A multidisciplinary team of professionals prepared and experienced in different environments, who will cover the theoretical knowledge in an efficient way, but, above all, will bring the practical knowledge from their own experience to the program: one of the differential qualities of this program.

This mastery of the subject is complemented by the effectiveness of the methodological design of this Postgraduate Certificate. Developed by a multidisciplinary team of *e-learning* experts, it integrates the latest advances in educational technology. In this way, our students will be able to study with a range of convenient and versatile multimedia tools that will give them the operability they need during the program.

The design of this program is based on Problem-Based Learning: an approach that conceives learning as a highly practical process. To achieve this remotely, telepractice will be used: with the help of an innovative system of interactive videos, and *Learning from an Expert* you will be able to acquire the knowledge as if you were facing the case you are learning in real time. A concept that will allow you to integrate and fix learning in a more realistic and permanent way.

*Become an expert and access the most demanded positions by standing out with the skills and abilities that this Postgraduate Certificate provides you with.*

*You will have at your disposal a Virtual Campus available 24 hours a day and you will be able to download the material to consult it whenever you need it.*



# 02 Objectives

The objective is to enable highly qualified professionals for work experience. An objective that is complemented, moreover, in a global manner, by promoting human development that lays the foundations for a better society. This objective is focused on helping medical professionals reach a much higher level of expertise and control. A goal you will easily achieve with a course of high intensity and precision.







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*If your objective is to broaden your skill set to include new routes to success and development, this is the course for you: education that aspires to excellence”*



## General Objectives

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- Determine the properties, use and metabolic transformations of nutrients in relation to the nutritional needs of an animal
- Provide clear and practical tools so that the professional can identify and classify the different foods that are available in the region and have better elements of judgment to make the most appropriate decision in terms of differential costs, etc
- Propose a series of technical arguments which allow for a better quality of diet and nutrition and therefore, improve the end produce (meat or milk)
- Analyze the different raw material components with both positive and negative effects on Animals. Nutrition and how animals use them for the production of animal protein
- Identify and understand the different levels of digestibility for each of the various nutritional components according to their origin
- To analyze the key aspects for the design and creation of diets (food) aimed at achieving the maximum utilization of nutrients by animals intended for animal protein production
- Provide specialized training on the nutritional requirements for the two main species of pigs to be used in animal protein production
- Develop specialized understanding of the nutritional requirements of the porcine species and the different feeding strategies needed in order to guarantee that they reach the expected welfare and production standards according to their production stage
- Provide practical, theoretical and specialized knowledge on the physiology of canine and feline digestive systems
- Analyze the digestive system of ruminants and their particular way of assimilating nutrients from fiber-rich foods
- Analyze the main additive groups used in the food production industry, focused on ensuring the quality and performance of different food products
- Analyze, in a clear way, how the complete animal feed manufacturing process is developed: the phases and processes which feed undergoes to guarantee its nutritional composition, quality and safety



*A path to achieve education and professional growth that will propel you towards a greater level of competitiveness in the employment market"*



## Specific Objectives

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- ◆ Develop the most important concepts of animal nutrition, taking into account the functions and effects of food in the digestion process in large and small livestock
- ◆ Classify foods according to their origin and their nutritional characteristics
- ◆ Design a balanced diet considering the nutritional requirements of the species and categories
- ◆ Implement the procedures for manufacturing concentrates, guaranteeing the quality of the product to be used for feeding the different productive species
- ◆ Apply nutrition and feeding strategies for the different productive species according to an annual program based on the herd's requirements
- ◆ Evaluate the nutritional quality and impact on production systems (meat or milk) of different fresh, preserved and natural feed. These could be either in direct grazing or as forage reserves such as hay (rolls) or whole plant silage, with or without the addition of additives (Nutralig, Smartfeed, etc.), Multi-Nutritional Blocks (MNB), Rumen Activator Supplements (RAS) or energy or protein concentrates
- ◆ Develop the main chemical determinations that characterize feed (concentrates, fresh forages, preserved forages and additives)

03

# Course Management

Within the concept of total quality of the program, TECH is proud to offer a teaching staff of the highest level, chosen for their proven experience. Professionals from different areas and fields of expertise that make up a complete, multidisciplinary team. A unique opportunity to learn from the best.



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*A unique, key, and decisive educational experience  
to boost your professional development”*

## Management



### Dr. Cuello Ocampo, Carlos Julio

- ♦ Technical Director at Huvepharma in Latin America
- ♦ Degree in Veterinary Medicine from the National University of Colombia
- ♦ Professional Master's Degree in Animal Production with emphasis on Monogastric Nutrition at the Universidad Nacional de Colombia
- ♦ Postgraduate Certificate in Ration Formulation for Productive Species at the University of Applied and Environmental Sciences UDCA

## Professors

### Dr. Fernández Mayer, Anibal Enrique

- ♦ Academic Research at INTA
- ♦ Specialist and Private Advisor in Milk Production
- ♦ Technician Specialized in Animal Production at the Bordenave Agricultural Experimental Station (EEA)
- ♦ Agricultural Engineer from the University of Nacional de la Plata
- ♦ Veterinary Doctor from the La Habana Agricultural University

### Dr. Páez Bernal, Luis Ernesto

- ♦ Commercial Director at BIALTEC, a company dedicated to efficient and sustainable animal nutrition.
- ♦ Doctor in Nutrition and Monogastric Production from Viçosa Federal University
- ♦ Bachelor's Degree in Veterinary from the National University of Colombia
- ♦ Master's Degree in Zootechnics from Viçosa Federal University
- ♦ Lecturer

**Ms. Sarmiento García, Ainhoa**

- ♦ Collaborative Researcher at the Faculty of Agricultural and Environmental Sciences and the Polytechnic School of Zamora
- ♦ Research Director at Entogreen
- ♦ Reviewer of scientific articles in Iranian Journal of Applied Science
- ♦ Veterinarian in charge of the nutrition department at Casaseca Livestock
- ♦ Veterinary Clinic El Parque in Zamora
- ♦ Associate Professor at the Faculty of Agricultural Sciences of the University of Salamanca
- ♦ Bachelor's Degree in Veterinary Medicine from the University of León
- ♦ PhD. in Chemical Science and Technology from the University of Salamanca
- ♦ Master's Degree in Innovation in Biomedical and Health Sciences by the University of León

**D. Ordoñez Gómez, Ciro Alberto**

- ♦ Researcher specialized in animal nutrition
- ♦ Author of the book *Glycerin and biodiesel by-products: alternative energy for poultry and swine feed*
- ♦ Lecturer in the area of animal nutrition and feeding at the Francisco de Paula Santander University
- ♦ Master's Degree in animal production at the Francisco de Paula Santander University
- ♦ Degree in Animal Husbandry from Francisco de Paula Santander University

**Ms. Portillo Hoyos, Diana Paola**

- ♦ Zootechnician at *Dog Home* Veterinary Clinic
- ♦ Zootechnician at Productos Lácteos San Andrés
- ♦ Expert researcher in Animal Production
- ♦ Co-author of several books on veterenary
- ♦ Zootechnician at the National University of Colombia

**Dr. Rodríguez Patiño, Leonardo**

- ♦ Technical Manager at Avícola Fernandez (poultry company)
- ♦ Nutritionist at Grupo Casa Grande
- ♦ Nutritionist at Unicol
- ♦ Technical-Commercial Consultant at PREMEX
- ♦ Nutritionist at Corporación Fernández for Broilers and Pigs
- ♦ Master's Degree in Animals. Nutrition
- ♦ Zootechnician at the National University of Colombia



*An impressive teaching staff, prepared by professionals from different areas of expertise, will be your teachers during your specialization: a unique occasion not to be missed"*

# 04

# Structure and Content

The contents of this program have been developed by the different experts of this postgraduate certificate, with a clear purpose: to ensure that our students acquire each and every one of the necessary skills to become true experts in this field.

A comprehensive and well-structured program that will lead you to the highest standards of quality and success.







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*A comprehensive teaching program, structured in well-developed teaching units, oriented towards learning that is compatible with your personal and professional life"*

**Module 1.** Key Concepts of Raw Materials Used in Feeding Ruminants and Non- Ruminants

1.1. Introduction

1.1.2. Chemical Composition of Food

1.1.2.1. Water and Dry Matter

1.1.2.2. Organic Material and Minerals

1.1.2.3. Protein Rich Foods

1.1.2.4. Energy Rich Foods

1.1.2.5. Vitamins

1.1.3. Vitamins

1.1.3.1. Winter Grains, Summer Grains and Pastures (Grasslands)

1.1.4. Conserved Forages:

1.1.4.1. Silage, Hay and Other Types of Preserved Fodder (Haylage, Silage)

1.1.4.1.1. Silages

1.1.4.1.2. Hay and Haylage

1.1.5. Energy and Protein Concentrates

1.1.5.1. Energy Compounds

1.1.5.2. Protein Powders

1.2. Plant-Based By-Products used in Feeding Ruminants and Non-Ruminants

1.2.1. Cereal Grains

1.2.1.1. Corn

1.2.1.1.1. Fine-Ground Bran, Bran or Corn Bran

1.2.1.1.2. *Corn Gluten Feed* and *Corn Gluten Meal*

1.2.1.1.2.1. *Corn Gluten Feed*

1.2.1.1.2.2. *Corn Gluten Meal*

1.2.1.2. Sorghum Grain

1.2.1.3. Oats, Barley and Wheat Grain

1.2.1.3.1. Oat Grain

1.2.1.3.2. Barley Grain

1.2.1.3.3. Wheat Grain

1.2.1.3.3.1. Fine-Ground Bran, Bran or Wheat Bran

1.2.2. Rice By-Products

1.2.2.1. Fine-Ground Bran or Rice Bran



- 1.2.3. Oilseed By-Products
  - 1.2.3.1. Cotton
    - 1.2.3.1.1. Cotton Seed
    - 1.2.3.1.2. Cotton Flour
  - 1.2.3.2. Soy
    - 1.2.3.2.1. Soybeans
    - 1.2.3.2.2. Soybean Shell
    - 1.2.3.2.3. Soy Flour
  - 1.2.3.3. Sunflower
    - 1.2.3.3.1. Sunflower Shell
    - 1.2.3.3.2. Sunflower Flour
- 1.2.4. Horticultural By-Products
  - 1.2.4.1. Salad Cucumber Crop Residue
  - 1.2.4.2. Melon Crop Residue
  - 1.2.4.3. Tomato Crop Residue
- 1.3. Animal-Based By-Products used in Feeding Ruminants and Non-Ruminants
  - 1.3.1. Dairy Industry
    - 1.3.1.1. Serum Permeate
    - 1.3.1.2. Cheese Whey and Butter
  - 1.3.2. Fishing Industry
    - 1.3.2.1. Fish Flour
  - 1.3.3. Meat Industry
    - 1.3.3.1. Recycled Animal Fat
  - 1.3.4. Poultry Production
    - 1.3.4.1. Feather Flour
      - 1.3.4.1.1. Processes to Improve Digestibility
      - 1.3.4.1.2. Supply Methods
    - 1.3.4.2. Chicken/Hen Litter (Chicken Manure)
- 1.4. Fats and Oils used in Feeding Ruminants and Non-Ruminants
  - 1.4.1. Nutritional Values of Fats in the Feeding of Ruminants and Non-Ruminants
    - 1.4.1.1. Sources and Types of Fat
      - 1.4.1.1.1. Yellow Fat
      - 1.4.1.1.2. Tallow
      - 1.4.1.1.3. Mixed Fats
      - 1.4.1.1.4. Soap Extract and Other Sources of Fat
    - 1.4.1.2. Factors Which Indicate the Digestibility in Ruminants and Non-Ruminants
      - 1.4.1.2.1. Free Fatty Acids
      - 1.4.1.2.2. Proportion of Saturated and Unsaturated Fatty Acids
      - 1.4.1.2.3. Addition Method and Level of Inclusion
      - 1.4.1.2.4. Protected Fats
        - 1.4.1.2.4.1. Calcium Salts of Fatty Acids or Protected Soaps
        - 1.4.1.2.4.2. Saturated Fats with Variable Degrees of Hydrogenation
    - 1.4.1.3. Oils Used in Feeding Ruminants and Non-Ruminants
      - 1.4.1.3.1. African Palm Oil
      - 1.4.1.3.2. Other Vegetable Oils
- 1.5. Probiotics, Prebiotics, Enzymes and Organic Acids in Feeding Ruminants and Non-Ruminants
  - 1.5.1. Characterization and Classification of Probiotics and Prebiotics
    - 1.5.1.1. Prebiotic
      - 1.5.1.1.1. Basifying Agents or Ruminal Buffers
      - 1.5.1.1.2. Organic Acids: Malic and Fumaric Acid
      - 1.5.1.1.3. Plant Extracts: Essential Oils
      - 1.5.1.1.4. Enzymes
    - 1.5.1.2. Probiotic
    - 1.5.1.3. Symbiotics

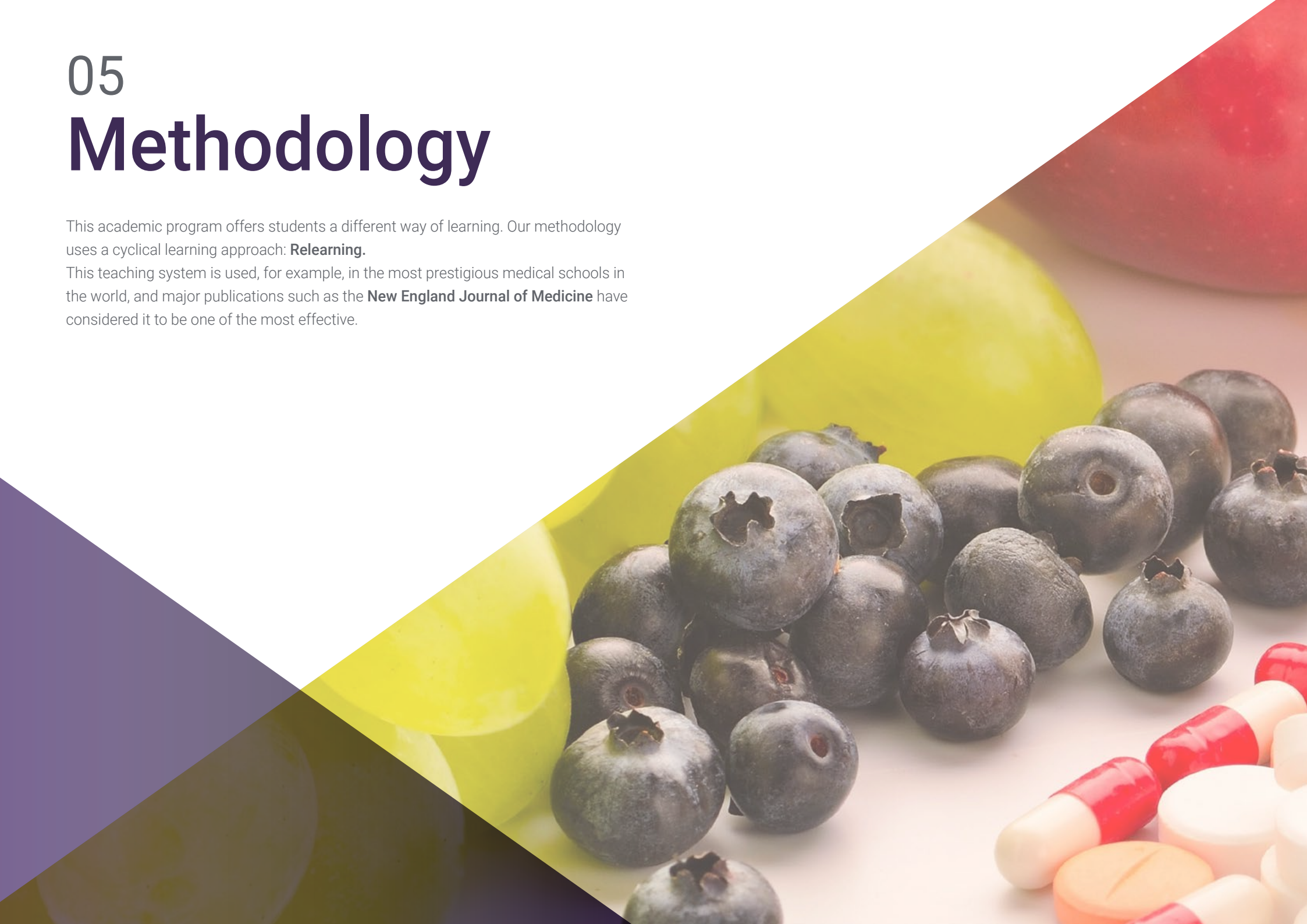
- 1.5.2. Mechanisms of Action and Productive Response
  - 1.5.2.1. Effects on Young Animals
  - 1.5.2.2. Effects on Adult Animals
- 1.5.3. Brewer's Yeast
  - 1.5.3.1. Reduction of Unpleasant Odors and Firm Stools
  - 1.5.3.2. Effects on Growing and Finishing Animals
  - 1.5.3.3. Effects on Lactating Cows
  - 1.5.3.4. Effects on Lactating Sheep
  - 1.5.3.5. Effects on Lactating Goats
- 1.6. Liquid Additives, Multinutritional Blocks and Rumen Activator Supplement for Ruminants
  - 1.6.1. Characteristics of Liquid Energy, Protein and Mineral Additives
  - 1.6.2. Multinutritional Blocks (MNB) and Rumen Activator Supplement (RAS)
    - 1.6.2.1. Procedure to Create MNB and RAS
      - 1.6.2.1.1. Proportions of Ingredients and Chemical Composition of MNB and RAS
        - 1.6.2.1.1.1. Composition of "MNB" or "RAS" with "Smartfeed"
        - 1.6.2.1.1.2. Composition of "MNB" or "RAS" with "Nutraliq 2050" (including Urea)
        - 1.6.2.1.1.3. Composition of "MNB" or "RAS" with Glucose or Molasses"
        - 1.6.2.1.1.4. Composition of the Salty Minerals of the MNB and RAS
      - 1.6.2.1.2. Purpose of Each Ingredient
      - 1.6.2.1.3. Differences Between the MNB and RAS
      - 1.6.2.1.4. Forms of Supply and Consumption of BMN or SAR
      - 1.6.2.1.5. Experimental Work
    - 1.6.2.2. Purpose of Each Ingredient
    - 1.6.2.3. Differences Between the MNB and RAS
    - 1.6.2.4. Forms of Supply and Consumption of BMN or SAR
    - 1.6.2.5. Experimental Work
- 1.7. Glycerol and Corn and Sorghum Starch for Ruminant and Non-Ruminant Food
  - 1.7.1. Glycerol
    - 1.7.1.1. Principal Characteristics of Glycerol
    - 1.7.1.2. Chemical Composition of Glycerol for Animal Consumption
    - 1.7.1.3. Productive Response
    - 1.7.1.4. Recommendations
  - 1.7.2. Corn and Sorghum Starch
    - 1.7.2.1. Chemical Composition
    - 1.7.2.2. Dry or Wet Starch
    - 1.7.2.3. Recommendations
- 1.8. Tannins, Saponins and Essential Oils in Ruminants
  - 1.8.1. Effect on Ruminant Bacterias
  - 1.8.2. Effects on Protozoa
  - 1.8.3. Effects on Rumen Fungi
  - 1.8.4. Effects on Methanogenic Bacteria
  - 1.8.5. Effect on Secondary Metabolites of Plants
    - 1.8.5.1. Effects on the Digestibility
    - 1.8.5.2. Effects on the Parameters of Ruminant Fermentation
      - 1.8.5.2.1. Volatile Fatty Acids (AGV)
      - 1.8.5.2.2. Concentration of Ammonia
      - 1.8.5.2.3. Production of Gas
      - 1.8.5.2.4. Impacts on Rumen Degeneration and the Digestibility of DM and Cell Wall
      - 1.8.5.2.5. Impacts on Rumen Degeneration and the Digestibility of Protein
      - 1.8.5.2.6. Impacts on Digesta Transit Kinetics
    - 1.8.5.3. Effects on Methanogenesis
  - 1.8.6. Adaptations to Tannin Consumption
  - 1.8.7. Positive Effects of Tannins on the Non-Animal Metabolism and Some of the Productive Results
- 1.9. Mycotoxins and Contaminants in Concentrates and Forage Concentrates in both Ruminants and Non-Ruminants
  - 1.9.1. Characteristics of Mycotoxins, Typology of Fungi and Favorable Conditions
  - 1.9.2. Clinical Diagnosis of Mycotoxins, Symptomatology and Associated Diseases Affecting Ruminants and Non-Ruminants
    - 1.9.2.1. Ruminants
      - 1.9.2.1.1. Sensitivity
      - 1.9.2.1.2. Some Symptomatology
      - 1.9.2.1.3. Symptomatology Associated with Illnesses
      - 1.9.2.1.4. Mycotoxins and Mycotoxicosis in Poultry and Swine Symptomatology and Associated Illnesses
        - 1.9.2.1.4.1. Aflatoxins
        - 1.9.2.1.4.2. Ochratoxins
        - 1.9.2.1.4.3. T-2 and DAS
        - 1.9.2.1.4.4. Fumonisin
        - 1.9.2.1.4.5. DON (Vomitoxina)

- 1.9.2.2. Non-Ruminants
  - 1.9.2.2.1. Mycotoxins and Mycotoxicosis in Poultry and Swine. Symptomology and Associated Illnesses
    - 1.9.2.2.1.1. Aflatoxins
    - 1.9.2.2.1.2. Ochratoxins
    - 1.9.2.2.1.3. Trichothecenes
    - 1.9.2.2.1.4. Zearalenone
    - 1.9.2.2.1.5. Fumonisin
    - 1.9.2.2.2. Use of Mycotoxin-Absorbing Substances in Food for Ruminants and Non-Ruminants
- 1.9.3. Factors for the Development of Fungi and their Mycotoxins
  - 1.9.3.1. In the Countryside
  - 1.9.3.2. During Storage of the Concentrates
- 1.10. Analysis and Quality Control of the Ingredients used in Ruminants and Non-Ruminants
  - 1.10.1. Chemical Determinations
    - 1.10.1.1. Dry Matter (DM)
    - 1.10.1.2. Organic Material (OM) and Minerals
    - 1.10.1.3. Digestibility of Dry Matter
      - 1.10.1.3.1. Direct Methods
      - 1.10.1.3.2. "In Vivo" Methods
    - 1.10.1.4. Indirect Methods
      - 1.10.1.4.1. "Different" Method
      - 1.10.1.4.2. Internal Markers
      - 1.10.1.4.3. Lignin
      - 1.10.1.4.4. Silica
      - 1.10.1.4.5. Acid Insoluble Ash
    - 1.10.1.5. External Markers
      - 1.10.1.5.1. Dyed Food
      - 1.10.1.5.2. Chromic Oxide
      - 1.10.1.5.3. Rare Earth Elements
      - 1.10.1.5.4. Mordant Chrome-Treated Fiber
      - 1.10.1.5.5. Hydrosoluble Markers
      - 1.10.1.5.6. Alkanes
    - 1.10.1.6. "In Vitro" Methods
      - 1.10.1.6.1. "In Vitro" Digestibility of Dry Matter (DM)
      - 1.10.1.6.2. Neutral Detergent Fiber (NDF)
      - 1.10.1.6.3. "In Vitro" Digestibility of Neutral Detergent Fiber (NDF)
      - 1.10.1.6.4. Acidic Detergent Fiber (ADF)
    - 1.10.1.7. Protein
      - 1.10.1.7.1. Crude Protein (Total Nitrogen, CP)
      - 1.10.1.7.2. Soluble Crude Protein (SCP)
      - 1.10.1.7.3. Neutral Detergent Fiber-Bound Nitrogen (ADIN)
    - 1.10.1.8. Ethereal Extract (EE)
    - 1.10.1.9. Water Soluble Carbohydrates (WSC)
    - 1.10.1.10. Lignin, Cellulose, Hemicellulose and Silica (LIG, CEL, HEM, SIL)
    - 1.10.1.11. Tannin
    - 1.10.1.12. PH in Silage Samples
    - 1.10.1.13. Particle Sizes
  - 1.10.2. Summary of Some Laboratory Techniques
    - 1.10.2.1. Total Nitrogen (Semi-Micro Kjeldahl)
    - 1.10.2.2. "In Vitro" Digestibility (Tilley Terry Edited. Direct Acidification Method)
    - 1.10.2.3. Neutral Detergent Fiber (NDF) (with ANKOM equipment)
    - 1.10.2.4. Acidic Detergent Fiber (ADF) (with ANKOM equipment)
    - 1.10.2.5. Soluble Non-Structural Carbohydrates (NSC) Antrona Method, Developed by A.J. Silva (Viscosa-Brasil)
    - 1.10.2.6. Total Starch (Megazyme enzyme kit - AA/AMG) (AACC Method 76-12)

# 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.





“

*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*

In a given situation, what should a professional do? Throughout the program, students will face multiple simulated clinical cases, based on real patients, in which they will have to do research, establish hypotheses, and ultimately resolve the situation. There is an abundance of scientific evidence on the effectiveness of the method. Specialists learn better, faster, and more sustainably over time.

*With TECH, nutritionists can experience a way of learning that is shaking the foundations of traditional universities around the world.*



According to Dr. Gérvas, 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, trying to recreate the real conditions of professional nutritional practice.



“

*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. Nutritionists who follow this method not only achieve the assimilation of concepts, but also a development of their mental capacity through exercises to evaluate real situations and the application of knowledge.
2. Learning is solidly translated into practical skills that allow the nutritionist to better integrate knowledge into clinical practice.
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.

This 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, a real revolution with respect to the mere study and analysis of cases.

*The nutritionist 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 45,000 nutritionists have been trained with unprecedented success in all clinical specialties regardless of the surgical load. All this in a highly demanding environment, where the students have a strong socio-economic 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 training, developing a critical mindset, defending arguments, and contrasting opinions: a direct equation for 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 produced by the specialists who teach the course, specifically for the course, so that the teaching content is highly specific and precise.

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.



#### Nutrition Techniques and Procedures on Video

TECH brings students closer to the latest techniques, the latest educational advances and to the forefront of current nutritional counselling techniques and procedures. All of this in direct contact with students and explained in detail so as to aid their assimilation and understanding. And best of all, you can watch the videos as many times as you like.



#### 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 exclusive educational system for presenting multimedia content 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, TECH presents real cases in which the expert will guide students, 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 suggesting that observing third-party experts can be useful.

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 Quality Chemical Composition of Food and Quality of Raw Materials for Ruminants and Non-Ruminants guarantees students, in addition to the most rigorous and up-to-date education, access to a Postgraduate Certificate issued by TECH Technological University.



“

*Successfully complete this program and receive your Postgraduate Certificate without having to travel or fill out laborious paperwork"*

This **Postgraduate Certificate in Chemical Composition of Food and Quality of Raw Materials for Ruminants and Non-Ruminants** contains the most complete and up-to-date scientific program on the market.

After the student has passed the assessments, they will receive their corresponding **Postgraduate Certificate** issued by **TECH Technological University** via tracked delivery\*.

The certificate issued by **TECH Technological University** will reflect the qualification obtained in the Postgraduate Certificate, and meets the requirements commonly demanded by labor exchanges, competitive examinations and professional career evaluation committees.

Program: **Postgraduate Certificate in Chemical Composition of Food and Quality of Raw Materials for Ruminants and Non-Ruminants**

Official No. of Hours: **150 h.**



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





## Postgraduate Certificate

### Chemical Composition of Food and Quality of the Raw Materials for Ruminants and Non-Ruminants

- » Modality: online
- » Duration: 6 weeks
- » Certificate: TECH Technological University
- » Dedication: 16h/week
- » Schedule: at your own pace
- » Exams: online

# Postgraduate Certificate

Chemical Composition of  
Food and Quality of the Raw  
Materials for Ruminants and  
Non-Ruminants

