

Course Unit	Pharmaceutical Biotechnology and New Therapeutic Systems	Field of study	Pharmacy
Bachelor in	Pharmacy	School	School of Health
Academic Year	2022/2023	Year of study	3
Type	Semestral	Semester	1
Level	1-3	ECTS credits	5.0
Code	9549-644-3102-00-22		
Workload (hours)	135	Contact hours	T - , TP 45, PL - , TC - , S - , E - , OT 7,5, O -

T - Lectures; TP - Lectures and problem-solving; PL - Problem-solving, project or laboratory; TC - Fieldwork; S - Seminar; E - Placement; OT - Tutorial; O - Other

Name(s) of lecturer(s) Luis Migue Fernandes Nascimento

Learning outcomes and competences

At the end of the course unit the learner is expected to be able to:

1. Mastering the basics of biotechnology and its interest in production Drug;
2. Understand the techniques and methods used in pharmaceutical production by biotechnology;
3. Understand the benefits that may or may not arise from the use of drugs obtained through biotechnology;
4. Identify the drugs that are currently obtained by the industry biotechnology;
5. Lead students to reflect on the prospects, challenges and future biotechnology applications in health care.

Prerequisites

Before the course unit the learner is expected to be able to:
Not applicable.

Course contents

Concept and Biotechnology application, biocatalysts, microbial biotechnology, industrial processes related to the area, sterilization. The biotechnology and health and biopharmaceuticals.

Course contents (extended version)

1. INTRODUCTION
 - Definitions, concepts and objectives
 - Historical development of biotechnology
 - Interconnection of Biotechnology with various disciplines
 - Areas of Application of Biotechnology
2. BIOCATALYSTS
 - Types of biocatalysts
 - Immobilized biocatalysts / free
 - Preparation of Biocatalysts
 - Criteria for Selection of biocatalysts
 - Advantages of Biocatalysts for Chemical Catalysts
 - Biocatalysts of biological importance and its applications
3. MICROBIAL BIOTECHNOLOGY
 - Microbial Diversity and systematic
 - Isolation of Micro organisms
 - Composition of the microbial cells
 - Culture media
 - Development of inoculums
 - Types of Cultures
 - Phases of Growth
 - Kinetics of Microbial Growth - General
 - Kinetics of Microbial Growth in Discontinuous ("Batch")
 - Kinetics of Microbial Growth in Continuous
4. INDUSTRIAL PROCESSES IN BIOTECHNOLOGY
 - Bioreactors
 - Fermentation
 - Use of isolated enzymes as biocatalysts
 - Biotransformation
5. STERILIZATION
 - Death kinetics of vegetative cells
 - Death kinetics of spores
 - Decimal reduction time
 - Sterilization versus degradation of nutrients
 - Relative resistance to moist heat
 - Choose the time / temperature sterilization
 - Factor or Del Nabra
 - Stages and processes of sterilization of fermented
6. RECOVERY AND PURIFICATION OF PRODUCTS
 - Operations used
 - Factors that influence the choice of process
 - Income
7. BIOTECHNOLOGY AND HEALTH NEW THERAPEUTIC SYSTEMS
 - Gene therapy and new vaccines
 - Systems for controlled release of drugs
 - Biomaterials
 - Pharmaceutical Administration
 - Delivery of biopharmaceutical products. New drug delivery technologies.
8. BIOPHARMACEUTICALS
 - Genetic engineering
 - Recombinant DNA Technology
 - Alternatives to recombinant DNA technology
 - Advantages of biopharmaceuticals
 - Handling and storage of biopharmaceuticals
 - Regulation of biopharmaceuticals
 - Examples of biopharmaceuticals
 - Biosimilar pharmaceuticals
9. SAFETY AND REGULATION IN BIOTECHNOLOGY
10. ETHICS IN BIOTECHNOLOGY

Recommended reading

1. Walsh, G. (2003). Biopharmaceuticals: biochemistry and biotechnology. Chichester, Wiley.
2. Lima N. (2006), Biotecnologia, Fundamentos e Aplicações. Lisboa, LIDEL.
3. Ahuja, S. (1992). Chromatography of Pharmaceuticals: Natural, Synthetic, and Recombinant Products. Washington, American Chemical Society.
4. Oréfice, R. L. , de Magalhães Pereira, M. , & Mansur, H. S. (2006). Biomateriais: fundamentos e aplicações. Rio de Janeiro, Cultura Médica.
5. Rehm , H. J. ;Reed , G.; Nagodawithana , T. W.(2000). Biotechnology. VCH

Teaching and learning methods

Theoretical-Practical Learning: Expositive method

Assessment methods

1. Alternative 1 - (Regular, Student Worker) (Final)
 - Final Written Exam - 80% (Minimum grade of 8,5 values as Pedagogical Regulation of ESSa)
 - Development Topics - 20% (Minimum grade of 8,5 values as Pedagogical Regulation of ESSa)
2. Alternative 2 - (Regular, Student Worker) (Supplementary, Special)
 - Final Written Exam - 80% (Minimum grade of 8,5 values as Pedagogical Regulation of ESSa)
 - Development Topics - 20% (Minimum grade of 8. 5 values as Pedagogical Regulation of ESSa)
3. Alternative 3 - (Student Worker) (Final, Supplementary, Special)
 - Final Written Exam - 100%

Language of instruction

1. Portuguese
2. Portuguese, with additional English support for foreign students.

Electronic validation

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14-11-2022	15-11-2022	28-02-2023	04-03-2023