

Course Unit	Natural product technology	Field of study	Pharmaceutical Sciences
Master in	Natural Products and Bioprospecting	School	School of Agriculture
Academic Year	2023/2024	Year of study	2
Type	Semestral	Semester	1
Level	2-2	ECTS credits	6.0
Code	5012-740-2101-00-23		
Workload (hours)	162	Contact hours	T 15 TP - PL 45 TC - S - E - OT 4 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) Sandrina Alves Heleno

Learning outcomes and competences

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

1. Control the technology associated with the packaging, storage, processing and stabilization of natural products of various origins (fungi, bacteria, animals)
2. Consult and select sources of information on drugs/cosmetics and nutrients/nutraceuticals/prebiotics and their technological development
3. Use drug/cosmetic development techniques from P. N. Knowing information related to phytopharmaceuticals/cosmetics/food packaging; new packaging technologies based on P. N.

Prerequisites

Before the course unit the learner is expected to be able to: knowledge of chemistry, biochemistry and pharmacology

Course contents

1. Development and screening of drugs from natural products.
2. Evaluation of stability and toxicity of pharmaceutical/cosmetic formulations.
3. Biotechnological and chemical methods for obtaining natural products from different sources
4. Basic production structures
5. Post-harvest technology
6. Labeling. information leaflets, 6. Stabilization of natural products for industrial application

Course contents (extended version)

1. Part I
 - 1. History of the use of medicinal plants and other sources.
 - Development of drugs/cosmetics from natural products: advantages and disadvantages
 - Basic knowledge about the structure and characteristics of the skin.
 - Development of drugs from natural products; Phases involved.
 - use of plants, microorganisms and animals; required quantities
 - Screening, breeding, combinatorial biosynthesis, elicitation
 - Bioreactors. Immobilization of Biocatalysts and microorganisms.
 - Use of natural nutrient and nutraceutical products.
2. Part II
 - pharmaceutical form, active substance
 - Evaluation of stability and toxicity of pharmaceutical/cosmetic formulations
 - Environmental conditioning. Facilities, equipment, production flow
 - packaging/storage. Packing: immediate, secondary containers.
 - New natural products applied to packaging,
 - biotechnologies for production of bioplastics, biofilms and combined materials for production
 - Labeling. Information leaflets.

Recommended reading

1. GAD S. C. (2008) Pharmaceutical Manufacturing Handbook: Production and Processes; 1st Edition, John Wiley & Sons; New Jersey; USA (ISBN 978-0-470-25958-0).
2. ANTÓNIO CORREIA ALVES, RUI MORGADO E LUÍS PRISTA: Tecnologia Farmacêutica vol. I; II; III; Fundação Calouste Gulbenkian, Lisboa, Portugal, 2013
3. - THARWAT F. TADROS: Pharmaceutical, Cosmetic and Personal Care Formulations, in Formulation Science and Technology De Gruyter, 2018 DOI: <https://doi.org/10.1515/9783110587982>
4. DAAN J. A. CROMMELIN, ROBERT D. SINDELAR, BERND MEIBOHM (2019) Pharmaceutical Biotechnology: Fundamentals and Applications; Springer; 5th ed. 2019 edition (April 30, 2019)
5. SIMOES, CMO Farmacognosia: Do Produto Natural ao Medicamento; 1 edição, Artmed, 2016

Teaching and learning methods

Theoretical Classes: Exposition of theoretical contents and resolution of exercises. Practical Laboratory Classes: Realization of experimental protocols related to the product development, namely extraction, bioactivity, stabilization, shelf-life, labeling

Assessment methods

1. final evaluation - (Regular, Student Worker) (Final)
 - Work Discussion - 20% (development of theoretical group work)
 - Final Written Exam - 50% (final theoretical exam)
 - Laboratory Work - 30% (practical work to be developed in group laboratory with final presentation.)
2. student worker - (Regular, Student Worker) (Supplementary, Special)
 - Final Written Exam - 55% (theoretical exam, with a minimum grade of 9.5)

Language of instruction

Portuguese, with additional English support for foreign students.

Electronic validation

Sandrina Alves Heleno	Lillian Boucada de Barros	Maria João Almeida Coelho Sousa	Paula Cristina Azevedo Rodrigues
12-02-2024	13-02-2024	14-02-2024	14-02-2024