Advanced Course on Herbal Medicines (second edition)

FFUL Postgraduation (15 ECTS)

Study Plan

The course will be lead in English to 6 – 16 students at Faculty of Pharmacy of Universidade de Lisboa, for twelve weeks, from Monday to Friday, 4 hours /day, starting at 15 of September of 2024, or later.

The course will be composed of 210h of theorical, theorical-practical/laboratory, and tutorial classes, correspondents to 420h of the total work of the student and of a total of 15 credits (European Credit Transfer and Accumulation System - ECTS)

The program of the course will involve and the quality, safety, mode of action and pharmaceutical development aspects of the medicinal plants-based health products, according to the European Vision and Rules.

From the FFUL, the person responsible for the course will be Prof. Olga Silva. Teaching staff will include Prof. Olga Silva, Prof. Beatriz Lima, Prof. João Pinto, Prof. Maryam Malmir and other invited speakers.

Subject	**Total (h)**	**Teorical classes**	**Theorical-practical/laboratory, and tutorial classes**		**ECTS**
Plant-based Medicines and Dietary supplements	140	28	11	67	5
Quality and Safety of Medicines and Food Supplements Used in Human Health	140	28	11	67	5
Development of Plant-Based Health Products	140	28	11	67	5

Note: in this plan the aspects related with the efficacy of the herbal products will be taught, in an abbreviated way, in the Plant-based Medicines and Dietary supplements subject.

Syllabus

Development of Plant-Based Health Products

Syllabus

- Introduction to the Development of Herbal Products: Principles, Stages and Challenges.
- Applied Pharmaceutical Technology: Microencapsulation, freeze-drying and 3D printing techniques.
- New Pharmaceutical Forms: Development of innovative formulations, such as nanoparticles, liposomes, and controlled-release systems.
- Formulation of Herbal Products: Development of formulations for medicines, supplements, and functional plant-based foods.
- Good Manufacturing Practices (GMP): Standards and guidelines for the production of herbal products.

Plant-based Medicines and Dietary supplements

Syllabus

- Introductory Concepts:

  Definition of medicines, food supplements and novel food.

  Importance and regulation of these products.
- Main Medicinal Plants with Therapeutic Use:
  - Central Nervous System: Plants with anxiolytic, antidepressant, nootropic and sedative effects.
  - Cardiovascular System: Plants with antihypertensive, cardiotonic and lipid-lowering effects.
  - Digestive System: Plants with digestive, hepatoprotective, and carminative effects.
  - Respiratory System: Plants with expectorant, bronchodilator and antitussive effects.
  - Immune System: Plants with immunomodulatory and adaptogenic effects.
  - Endocrine System: Plants with hormonal and antidiabetic effects.

- Mechanisms of Action of Bioactive Compounds:
    - Analysis of the main bioactive compounds present in medicinal plants and their mechanisms of action.
- Therapeutic Application of Medicinal Plants:
    - Case studies and clinical evidence on the use of medicinal plants in different health conditions.
- Systems Pharmacology:
    - Integration of the concepts of systems pharmacology for the understanding of the therapeutic effects of medicinal plants.

Quality and Safety of Medicines and Food Supplements Used in Human Health

Syllabus

- Quality Assurance:
    - Principles and practices of quality assurance in medicines, food supplements and novel food.
    - Good Manufacturing Practices (GMP) and quality control.
    - Process and equipment validation procedures.
- Monographs for Medicinal Plants and Finished Products:
    - Structure and content of the monographs of the European Pharmacopoeia.
    - Quality criteria for medicinal plants and herbal products.
    - Methods of analysis and tests specified in the monographs.
- Toxicity Assessment:
    - Principles of toxicology and safety assessment methods.
    - In vitro toxicity studies: cytotoxicity, genotoxicity, mutagenicity assays.
    - In vivo toxicity studies: acute, sub-chronic and chronic toxicity, carcinogenicity studies.
    - Specific safety tests for novel food.
- Quality and Safety of Finished Products:
    - Physicochemical and microbiological tests.
    - Quality control in all stages of production.
    - Post-marketing monitoring and pharmacovigilance.

- Regulations and Standards:
    - National and international guidelines applicable to the quality and safety of herbal medicinal products.
    - EFSA regulation for food supplements and novel plant-based food.

01/08/2025