

ФАРМАЦЕВТИЧЕН ФАКУЛТЕТ
МЕДИЦИНСКИ УНИВЕРСИТЕТ - СОФИЯ
КАТЕДРА ФАРМАКОГНОЗИЯ

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PHARMACOGNOSY SYLLABUS PART II

**INCLUDED IN THE PHARMACY EDUCATION CURRICULUM
DEGREE MASTER OF EDUCATION
CREDITS (ECTS): 7**

**THE PHARMACOGNOSY COURSE - PART II IS INTENDED FOR STUDENTS FROM
THE FIFTH YEAR, IX SEMESTER.**

English language training

ANNOTATION

The course aims, after passing the basic course in Pharmacognosy (Part I) and familiarizing the students with the basics of Pharmacognosy: medicinal plants and their active principles (BAS), the main phytochemical groups active substances, their origin and application, to give the students a wider a practical look at the place of natural products in healthcare. At least 25% of prescription drugs and more than 40% of over-the-counter drugs contain one or more active ingredients from plant or animal sources. In some groups, medicines derived from plants reach up to 80%. The intake of herbal medicines shows a growing trend worldwide.

Herbal medicines are a category of medicines that patients often use in combination with other treatments. The new European directives finally harmonize the registration and related quality and effectiveness of these particular drugs, where the active ingredients are often not a single chemical entity, but a complex mixture of compounds with complex biological properties and chemical characteristics. Therefore, the pharmacist plays a unique role in providing counseling to his patients about the benefits and risks of herbal products.

The aim of the course is to prepare highly qualified practitioners, on the one hand, competent to advise patients in the pharmacy on plant-based medicines, their safety and efficacy, and on the other - able to carry out scientific research in the process of drug discovery, or to find a place in the developing global phytopharmaceutical industry. This will be achieved through lectures and exercises covering the latest developments in phytopharmaceutical research, modern technologies for the production of herbal medicines, as well as familiarization with European and National legislation on herbal medicinal products. The knowledge from this course is essential in the practice of toxicological chemistry of BAS and forensic medical examinations, when it is necessary to decide which poisonous plant is the cause of poisoning or death of a person, because forms knowledge in the field of chemistry of natural compounds and their analysis.

The main problems related to herbal medicines are the lack of standardization, knowledge of their toxicity, safety, quality and, in some cases, the rules of their storage and shelf life. Correct identification of plant materials and pharmacologically active ingredients, standardization, pharmacological basis of efficacy, toxicity, clinical and non-clinical studies, as well as strict enforcement of regulatory legislation are necessary to improve the uptake, quality and integration of herbal products with modern medicine for effective management of healthcare.

The aim of the curriculum in Pharmacognosy part 2 is for students to be able, on the basis of the qualitative and quantitative data from the various physical, physicochemical, chemical, microbiological and biological methods, to know the basic requirements in the production of herbal medicinal products for diagnosis, treatment and prevention and the related requirements for "Good Manufacturing Practice" and "Good Laboratory Practice", to approach creatively when evaluating the quality and control of herbal medicinal products produced by classical and biotechnological methods. Introduces students to herbal medicinal products registered in Bulgaria, their efficacy and safety, as well as the European requirements for storage and distribution in the pharmacy network in the country.

SYLLABUS

- Origin and stages of development of Pharmacognosy. Characteristics and status of modern phytomedicine. Potential and limitations.
- Pharmaceutical importance of primary and secondary metabolites of plant origin. Species distribution and function in their natural sources. Pharmaceutical application of secondary metabolites and mechanisms of action. Examples.
- Regulatory control on herbal medicinal products/traditional herbal medicinal products. Standardization documents on herbal medicinal drugs (substances and preparations) according to European Pharmacopoeia. Monographs – content and advantages.
- Parameters for quality control of herbal medicines (organoleptic and microscopic evaluation, determination of foreign bodies, ash, heavy metals, aflatoxins and microbial contaminants, pesticide residues, radioactive contamination).
- Metabolomics - foundation of modern methods for qualitative and quantitative analysis of natural substances. Separation and analysis of phytoproducts. Analytical methods in metabolomics - modern methods for qualitative and quantitative analysis of natural substances. Examples. Combined separation methods for the analysis of phytoproducts. Relation of separation techniques and spectroscopic methods.
- Modern trends in pharmacognosy - methods for discovering bioactive leading structures from natural sources. Examples..Bioprospecting: The Search for Bioactive Lead Structures from Nature. Fast Reliable Methods of Extraction and High-Throughput Screening (HTS). Metabolic engineering in medicinal plants
- Origins of Medicinal Plants for the Manufacture of Herbal Products. Wild harvested herbs-goals, milestones, accumulation dynamics, classical accumulation periods, advantages and disadvantages. Legislative measures for the protection of wild medicinal plants.Drying, Storage of medicinal plants.
- Origins of Medicinal Plants for the Manufacture of Herbal Products. In vivo cultivated herbs. Advantages and disadvantages. Examples. Basic rules and ways of picking, drying, packing, labeling and storing drugs. Quality control in the production chain of herbal products.
- Origins of Medicinal Plants for the Manufacture of Herbal Products: In vitro cultivated herbs. Formation of biological active substances in conventional cultures (callus, suspension) in vitro. Growth kinetics (growth-dependent and growth-independent

- production) and BAV accumulation. Formation of BAS in vitro. Methods for induction of secondary metabolism in vitro.
- Organ cultures – morphological differentiation and hairy roots cultures in vitro. Genetic transformation in medicinal plants. Hairy roots for production of plant derived active substances.
 - Types of phytoproducts. Composition and problems about their standardization. Steps in creating of phytoproducts. Registration and marketing.
 - Toxicity of medicinal plants. Poisonous, hallucinogenic, narcotic, allergenic, teratogenic toxic plants and their mode of action. Examples.
 - Medicinal plants and herbal medicines acting on the respiratory and cardiovascular systems. Examples.
 - Medicinal plants and herbal medicines acting on the gastrointestinal system, urinary and reproductive tracts, central nervous systems. Examples.
 - Antitumor medicinal plants and plant antitumor products. Immunomodulatory effects of medicinal plant product (phytocompounds). Examples.

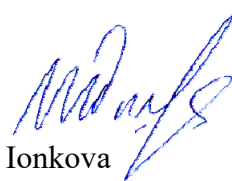
Student control and assessment system

Current control: 1 seminar, 1 colloquium, course project - preparation of a monograph on a natural chemical subject

Final exam: written and oral

April 2022

Author of the program: Prof. DSci. Iliana Ionkova



Leading teacher of the program: Prof. DSci. Iliana Ionkova