PROGRAM
FOR THE STATE EXAM IN PHARMACOGNOSY

The program for the state exam in Pharmacognosy includes the main groups of biologically active substances (BAS) of plant origin, some of which are studied only in this discipline (polysaccharides, flavonoids, tannins, saponins, etc.).

When developing the individual questions, the student must demonstrate knowledge about: chemical structure, classification, properties, methods of analysis and activity of the individual groups of BAS. For each group BAS, the most important plant substances in which they are contained, must be considered indicating: botanical affiliation, chemical composition, activity and application.

Questions about ways and stages in obtaining the plant substances and about the advantages and disadvantages of obtaining them from natural and cultivated medicinal plants are included. Questions about their standardization and the types of standardization documents for phytoproducts used in practice and stages in their creation are considered. Students have to know the main phytoproducts from the different groups of BAS used in our country and comment on their plant origin, composition and therapeutic application.

General characteristic of polysaccharides and plant substances (drugs) that contain them.

Lipids - general characteristic. Hard and soft fats. Fixed oils. Oils with specific action. Lipoids.

Phenolic compounds - general characteristic. Plant substances containing simple phenolic glycosides, hydroxycinnamic acids and their derivatives, and lignans.

General characteristic of coumarins and plant substances containing them.

General characteristic of flavonoids and plant substances containing them.

General characteristic of anthraquinones and plant substances containing them.

General characteristic of tannins and plant substances containing them.

Steroidal and triterpene saponins – general characteristic and plant substances containing them.

General characteristic of cardiac glycosides and plant substances containing them.

General characteristic of iridoids and plant substances containing them.

Essential oils - general characteristics. Plant substances and oils containing acyclic, monocyclic and bicyclic monoterpenes.

Plant substances and essential oils containing sesquiterpenes and aromatic terpenes.

Alkaloids - general characteristic. Alkaloids with nitrogen in the side chain. Pyrrolidine and pyrrolizidine alkaloids. Plant substances that containing them.

Tropane and quinolizidine alkaloids, and plant substances containing them.

Quinoline and purine alkaloids, and plant substances containing them.

Isoquinoline alkaloids and plant substances containing them.

Indole alkaloids and plant substances containing them.

Pharmaceutical importance of primary and secondary metabolites of plant origin. Types, distribution and functions in their natural sources. Pharmaceutical application of the secondary metabolites and mechanisms of their action. Examples.

Standardization documents for herbal drugs - types, content and benefits. Composition of phytoproducts and standardization issues. Stages in their creation.

Extraction of the plant material (plant substance). Classical methods of extraction, supercritical solid-liquid extraction, supercritical liquid extraction, ultrasound-assisted extraction, microwave-assisted extraction.

Quality control parameters for herbal substances. Registration and marketing of phytoproducts.

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.

Modern trends in pharmacognosy – methods for discovering leading bioactive structures from natural sources. Examples.

Obtaining plant substances from wild medicinal plants – objectives, stages, dynamics of accumulation, classical periods of collection, advantages and disadvantages. Legislative measures for the protection of wild-grown medicinal plants.

Obtaining plant substances from cultivated medicinal plants under natural conditions. Factors and methods of quality improvement. Basic rules and ways of collection, drying, packing, labeling and storing drugs. Quality control in the production chain of plant products.

Obtaining plant substances from *in vitro* cultivated medicinal plants – essence, advantages and disadvantages. Formation of BAS *in vitro*. Examples. Methods and techniques related to the induction of secondary metabolism. Genetically-transformed cultures.

Types of medicinal phytoproducts. Pure (isolated) natural compounds and their semi-synthetic derivatives. Plant substances (mono- and combined herbal teas), liquid medicinal phytoproducts, and solid medicinal phytoproducts.

Toxicity of medicinal plants. Special groups of patients – basic rules for their treatment. Classification of toxic medicinal plants according to the BAS, which they contain. Overview of poisonous, narcotic, allergic, teratogenic plants and their mode of toxic action with an emphasis on Bulgarian poisonous plants – examples.

Plant substances and herbal medicinal products used in diseases of the nervous system.

Plant substances and herbal medicinal products used in diseases of the cardiovascular system.

Plant substances and herbal medicinal products used in diseases of the respiratory system.

Plant substances and herbal medicinal products used in diseases of the digestive system.

Plant substances and herbal medicinal products used in diseases of the urinary and reproductive systems.

Plant substances and herbal medicinal products with antitumor and immunomodulation effects.

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