

Syllabus for the State Exam

PHARMACOGNOSY

№	Topic
1.	Nature, object, objectives and tasks of Pharmacognosy. Systems in the Pharmacognosy. Basic concepts and approaches.
2.	Pharmacognosy as a multidisciplinary science. Development of Pharmacognosy in Republic of Bulgaria.
3.	Medicinal plants and herbal substances. Basic concepts and classification. Nomenclature. Contemporary approaches to discover new medicinal plants - screening programs,
4.	ethnopharmacology and ethnobotany, ethnomedicine. Chemotaxonomic and phylogenetic approaches.
5.	Products of natural origin. Basic concepts and classification: herbal substances, herbal preparations, herbal teas, essential oils, fats, extracts.
6.	Products of natural origin. Obtaining identification, quality tests. Basic legal provisions in the Republic of Bulgaria.
7.	Medicinal plants as raw plant material. Rules and requirements for collection, primary processing, packaging and storage of plant materials.
8.	Wild plants as a source for the herbal preparations and herbal substances - biodiversity and characterization.
9.	Cultivation of medicinal plants: introduction and acclimatization. Plant tissue culture. Cultivation of medicinal plants under controlled conditions.
10.	European Pharmacopoeia. The purpose, tasks and structure of the European Pharmacopoeia. Herbal substances, herbal preparations, herbal medicinal products, traditional herbal medicinal products.
11.	Morphological and anatomical diagnostic features for the characterization of the different types of herbal substances.
12.	Macroscopic methods of analysis. Morphological and anatomical diagnostic features for the characterization of the different types of herbal substances.
13.	Microscopic methods of analysis. Morphological and anatomical diagnostic features for the characterization of the different types of herbal substances.
14.	Pharmacognostic analysis of herbal substances. Indicators and methods: loss on drying; determination of total ash content, ash content insoluble in hydrochloric acid, swelling index, bitterness, microbial contamination.
15.	Herbal medicinal products. Definition and classification. Types of herbal medicines: definition, sources and methods of production, recognition and analysis.
16.	Place of the herbal medicinal products and herbal preparations in Ph. Eur. Basic legal provisions in R Bulgaria: Law on Medicinal Products in Human Medicine
17.	Quality, efficacy and safety of herbal medicinal products. Purpose and objectives, requirements and quality control.
18.	Determination of biologically active compounds in herbal substances and herbal preparations. Purpose and objectives of the qualitative and quantitative analysis.
19.	General methods for the isolation of biologically active compounds.

20. Contemporary approaches for study the chemical structure of the new compounds of plant origin.
21. Biologically active compounds of natural origin. Chemical composition of the plants. Primary metabolites.
22. Biologically active compounds of natural origin. Chemical composition of the plants. Secondary metabolites.
23. Biologically active compounds of natural origin. Basic biosynthetic pathways.
24. Accumulation of biologically active compounds in plants - dynamics and factors influencing accumulation. Localization in the whole plant, parts and tissues.
25. Carbohydrates. General characteristics and classification. Herbal substances and herbal medicinal products containing monosaccharides. Action and application.
26. Carbohydrates. Oligosaccharides. Plant fibers. Plant gums and mucilage. Herbal substances containing carbohydrates. Herbal medicinal products and herbal preparations. Action and application.
27. Carbohydrates. Homopolysaccharides and heteropolysaccharide. Herbal substances containing carbohydrates. Herbal medicinal products and herbal preparations. Action and application.
28. Lipids. Glycerides, fat-substances - waxes and phospholipids. Herbal substances containing lipids. Herbal medicinal products and herbal preparations. Action and application.
29. Vegetable fatty oils (Olea herbaria) – not drying, semi-drying and drying. Oils with specific action.
30. Phenols. Herbal substances and herbal medicinal products containing phenols. Action and application.
31. Flavonoids. Classification. Flavonoids, isoflavonoids and neoflavonoids. Biogenesis. Isolation, identification and analysis. Relationship between chemical structure and therapeutically action.
32. Flavonoids. Herbal substances containing flavones, flavonols, flavonol glycosides, flavanones, dihydroflavonols, chalcones, proanthocyanidins and cyanidines. Action and application.
33. Flavonoids. Herbal medicinal products and herbal preparations. Action and application.
34. Coumarins and furanocoumarins. Herbal substances and herbal medicinal products containing coumarins and furanocoumarins. Action and application.
35. Tannins. Herbal substances and herbal medicinal products containing hydrolysable tannins. Action and application.
36. Tannins. Herbal substances and herbal medicinal products containing condensed tannins. Action and application.
37. Terpenes. Herbal substances and herbal medicinal products containing mono-, sesqui-, di-, tri- and tetraterpenes. Action and application.
38. Terpenes. Herbal substances and herbal medicinal products containing iridoids and sesquiterpene lactones. Action and application.
39. Essential oils. Herbal preparations. Action and application.
40. Essential oils. Herbal substances and herbal medicinal products containing essential oils. Action and application.
41. Resins and balsams. Herbal substances and herbal medicinal products containing resins and balsams. Action and application.

42. Quinones. Herbal substances and herbal medicinal products containing quinones. Action and application.
43. Anthraquinones. Herbal substances and herbal medicinal products containing anthraquinones. Action and application.
44. Sterols. Herbal substances and herbal medicinal products containing sterols. Action and application.
45. Cardiac glycosides. Herbal substances and herbal medicinal products containing cardenolides. Action and application.
46. Cardiac glycosides. Herbal substances and herbal medicinal products containing bufadienolides. Action and application.
47. Saponins. Herbal substances and herbal medicinal products containing steroid saponins. Action and application.
48. Saponins. Herbal substances and herbal medicinal products containing triterpene saponins. Action and application.
49. Alkaloids. Herbal substances and herbal medicinal products containing alkaloids with a nitrogen atom in the side chain. Action and application.
50. Alkaloids. Herbal substances and herbal medicinal products containing tropane alkaloids. Action and application.
51. Alkaloids. Herbal substances and herbal medicinal products containing quinolizidine and quinoline alkaloids. Action and application.
52. Alkaloids. Herbal substances and herbal medicinal products containing isoquinoline alkaloids. Action and application.
53. Alkaloids. Herbal substances and herbal medicinal products containing indole alkaloids. Action and application.
54. Alkaloids. Herbal substances and herbal medicinal products containing purine alkaloids. Action and application.
55. Alkaloids. Herbal substances and herbal medicinal products containing imidazole alkaloids. Action and application.
56. Alkaloids. Herbal substances and herbal medicinal products containing steroidal alkaloids. Action and application.
57. Alkaloids. Plant substances containing pyrrolizidine alkaloids. Action and application.
58. Vitamins. Plant substances containing vitamins. Action and application.

Bibliography

1. Bruneton., J. Pharmacognosy, Phytochemistry, Medicinal Plants. Intercept Ltd., 1999.
2. Heinrich, M., Barnes, J., Gibbons, S., Williamson, E. Fundamentals of Pharmacognosy and Phytotherapy. Elsevier Ltd., 2012.
3. Council of Europe (COE) - European Directorate for the Quality of Medicines, 2019, 2023. European Pharmacopoeia – 10th and 11 edition - Council of Europe, Strasbourg.
4. EDQM (European Directorate for the Quality of Medicines & Health Care). 2023. Guide for the elaboration of monographs on herbal drugs and herbal drug preparation, Council of Europe, 67075 Strasbourg Cedex, France – 2023. <https://www.edqm.eu/en/-/edqm-publishes-2nd-edition-of-herbal-guide>

5. EMA (European Medicines Agency) 2022. Guideline on Specifications: Test Procedures and Acceptance Criteria for Herbal Substances, Herbal Preparations and Herbal Medicinal Products/Traditional Herbal Medicinal Products EMA/HMPC/CHMP/CVMP/162241/2005 Rev. 3
6. WHO 1999. Monographs on Selected Medicinal Plants, Vol. 1. Geneva, 295.
7. WHO 2002. Monographs on Selected Medicinal Plants, Vol. 2, Geneva, .
8. WHO 2002. General Guidelines for Methodologies on Research and Evaluation of Traditional Medicine, Geneva, 80.
9. WHO 2003. Guidelines on Good Agricultural and Collection Practices (GACP) for Medicinal Plants, Geneva, 80.
10. WHO 2007. Monographs on selected medicinal plants, Vol. 3, Geneva, 390.