ODESSA NATIONAL MEDICAL UNIVERSITY
Department of General and Clinical Pharmacology and Pharmacognosy

METHODOLOGICAL DEVELOPMENT

Course: “Pharmacognosy”

practical lesson for students on the topic:

"Diterpenoids. Resins and balms. Medicinal plants and raw materials that contain diterpenoids, resins and balms. General characteristics."
Course: 3rd Faculty: medico-pharmaceutical

Approved on methodical meeting of the department
"30" August 2024
Protocol № 1
Head department
MD, prof. JV Rozhkovsky

Odessa - 2024

1. The topic of the lesson: "Diterpenoids. Resins and balms. Medicinal plants and raw materials that contain diterpenoids, resins and balms. General characteristics. ”- 2 hours.

2. Relevance of the topic.

Consideration of diterpenes, resins, balms and raw materials containing them, logically continues the study of isoprenoids. Although diterpenes, which are part of resins and balms, are widely used mainly in the East and South, turpentine from more common conifers is important for world medicine and modern pharmacy as a source for turpentine, rosin, camphor synthesis - products used. for the manufacture of some dosage forms, and also have their own medicinal properties. Of the modern sources of diterpenoids, HFC 1.3 includes stevia, which is now in high demand.

3. Objectives of the lesson:

3.1. General goals: to study medicinal plants that contain diterpenoid compounds, and to master the methods of macro- and microscopic analysis of LRS of the research topic.

3.2.Educational goals: Formation of a professionally significant substructure of personality with relevant aspects of deontological, ecological, legal, psychological, patriotic, professional responsibility.

3.3. Specific goals:

- to know (level of assimilation according to Bezpalk - II):

1. Latin and Russian names of LRS, producing plants and families of the studied objects.
2. Morphological characteristics of plants, their habitats (cultivation areas), places of growth.
3. External signs of the studied types of medicinal raw materials.
4. The main anatomical diagnostic features of pine, poplar, stevia.

6. Ways of using raw materials and its medical application.

Based on theoretical knowledge of the topic:

- master the techniques (be able to) (level of assimilation according to Bezpalk - III):

- Recognize the external features of the plant (pine, poplar, stevia) and distinguish them from possible to bag;
- Determine identity and good quality of raw materials by external features and anatomical structure.

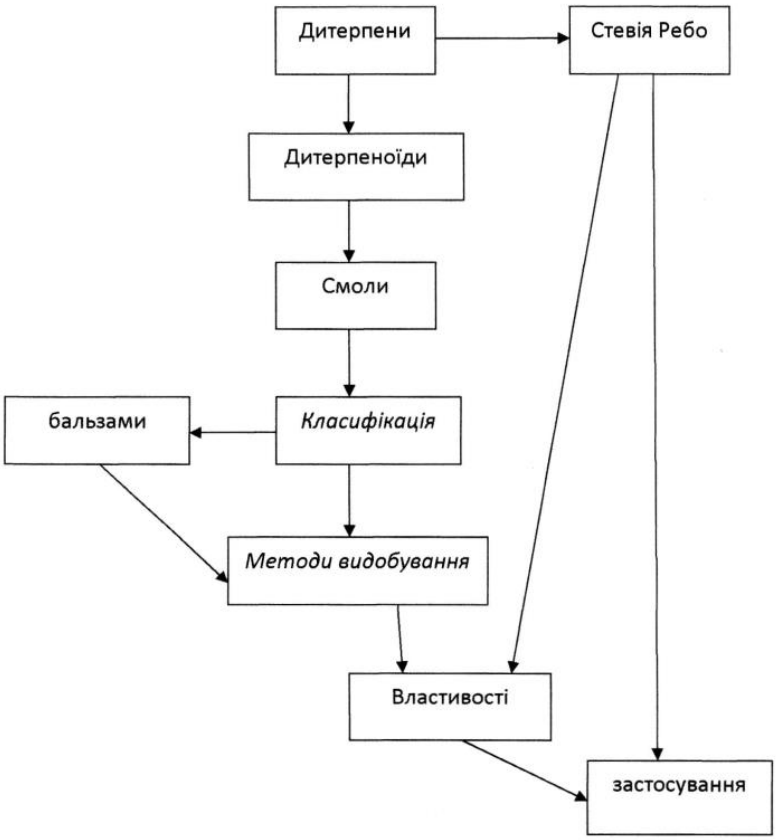
4. Interdisciplinary integration

№ p.p.	discipline	know	be able
1	2	3	4
1.	Previous disciplines: 1. Botany	Characteristic features of the families of the studied plants. Morphology of stem, bark, leaves, flower, fruit, root and rhizome. Anatomical structure of the leaf, bark, fruit, root, rhizome.	Use a microscope, prepare surface preparations and cross-sections.
	2. Organic chemistry	Physical and chemical properties of polysaccharides, glycosides, terpenoids, aromatic derivatives, heterocycles.	Carry out qualitative reactions; purification of organic compounds.
	3. Analytical chemistry	Methods of acid-base titration (neutralization) and permanganatometry	Work with analytical scales, measuring vessels, photoelectro-colorimeter, use methods of chromatography on paper and in a thin layer of sorbent.
2.	The following disciplines: 1. Physical and colloid chemistry	Solubility of solids and liquids in liquids. Distillation. Raoul's law. Konovalov's law. Vapor pressure and composition over mutually insoluble liquids. Buffer solutions. Polarography. Potentiometric titration. Adsorption. Ion exchange adsorption.	

	2. Pharmacy technology of drugs	Chromatography: paper, column, in a thin layer of sorbent, gel chromatography. Methods of measuring mass and volume. Preparation of powders or liquid drugs for internal and external use. Analysis of prepared liquid drugs using a burette system.	
	3. Industrial technology of medicines	Conditions of industrial preparation of medicines. Principles of organization of pharmaceutical production of various dosage forms: liquid, solid, soft, injectable solutions, etc. Machines, devices, equipment for the production of medicines.	
	4. Clinical pharmacology	Pharmacodynamics and pharmacokinetics of drugs. The pattern of action of drugs on the human body and its corresponding reactions. Basic principles of treatment in terms of drug selection, evaluation of their effectiveness and safety. Methods of qualitative and quantitative study of drugs.	
	5. Pharmaceutical chemistry	Pharmaceutical service management. Storage of medicines. Control and analytical service, organization of its work. Accounting for inventory and cash. Economic analysis of the pharmacy.	
	6. Organization and economics of pharmacy	Management and entrepreneurship. Organization as an object of management. Connecting processes in management. Human Resource	

	7. Management and marketing in pharmacy	Management Pharmaceutical Marketing Management. Pharmaceutical market research. International marketing.	

5.Topic content (text and thesis), graphological structure of the lesson.
(See the text of the lecture)



6. Plan and organizational structure of the lesson.

№№ p.p.	The main stages of the lesson, their functions and content.	Learning objectives in the levels of mastery.	Means of training and control.	Materials on methodical forensuring the visibility of the lesson, control the knowledge of those who teachis.	Term (in minutes or in%) of the total class time.
1	**2**	**3**	**4**	**5**	**6**
1	*Preparatory stage*				

	Organization of classes Setting learning goals Homework check	II	Oral interview on the topic	Methodical works for students, album	1% 2% 25%
2	*The main stage* Conducting a practical lesson	III	Herbariums of medicinal plants, LRS, reagents		50%
3	*The final stage* Testing and assessment of practical skills Checking the final level of knowledge Providing homework with a reference to the literature	II- III II- III	Herbariums of medicinal plants, LRS, reagents	Methodical works for students, album Tests and situational tasks	5% 15% 3%

7. Materials on methodological support of the lesson

7.1. Control materials for the preparatory stage of the lesson: questions, tasks, tests.

Tests:

1. If turpentine is a volatile substance (essential oil) in pine resin, then how is it usually extracted?

AND. Distillation with water vapor

B. Extraction with hot water

B. Alcohol extraction

D. Evaporation

D. Pressing

1. Toxic diterpenes include

A. Diterpene alkaloids

B. Resin acids

B. Stevioside

D. Diterpene alcohols

D. Aromatic resins

3. Resins dissolved in essential oil are called

A. Oil-resin

B. Comedy-resin

B. Actually resin

G. Gumi

D. Rosin

4. The resin contained in this LRS, participates in the overall pharmacological action of the drug as a diuretic. This LRS

A. Birch buds

B. Buckthorn bark

B. Leaves of legumes

D. Rose hips

D. Flax seeds

5. Glassy pieces of yellow color, crispy, shiny, used in technology and in the manufacture of patches - are:

A. Rosin

B. Turpentine

B. Wax

G. Lanolin

D. Paraffin

Question:

A. Name the types of diterpenes that are most common.

B. What is resin.

C. Give the classification of resins.

D. Name the most common method of resin extraction.

E. What is the source of asafetida gum-resin?

F. What pharmacological activity do resins show?

G. Name the ways of using resins.

7.2. Materials of methodical support of the main stage of employment: professional algorithms, orientation maps for formation of practical abilities and skills, educational tasks.

List of educational practical tasksto be performed during a practical laboratory lesson:

Task 1. Task 1. To study an ordinary pine and to carry out the analysis of raw materials on AND (external signs).

1.1. Examine the appearance of Scots pine by herbarium pattern. Write down the Latin and Russian names of the raw materials that produce plants and families (give synonyms), draw.

DEFINITION OF PLANTS BY EXTERNAL SIGNS

	Botanical description of the plant (specify the characteristics of any distinctive features)

	Growth area, ecology

1.2. Write down the conditions of procurement, drying and storage of raw materials

_____

_____

_____

_____.

1.3.Write down possible impurities in the raw materials

_____

_____.

1.4. Describe the appearance of pine buds on the example of a sample of raw materials.

ANALYSIS OF RAW MATERIALS "KIDNEYS" on external signs.

- Commodity type of raw material

_____

_____.

- Shape (spherical, conical, elongated-ovate, etc.)

_____.

- The nature of the assembly of scales (tile-like, spiral, pressed)

_____.

- Surface (color, edge of scales)

_____

_____.

Dimensions

_____

_____.

- 3apah

_____

_____.

- Taste

_____

_____.

- Specific features

_____

_____.

1.5. Note the compliance of the test sample of raw materials to the requirements of the AND: _____

1.6. The main active ingredients of LRS pine:

_____

_____

_____

_____

1.7. Preparations of pine and their application:

_____

_____

Task 2. To study black poplar and to carry out the analysis of raw materials on AND (external signs).

1.1. Examine the appearance of black poplar on a herbarium pattern. Write down the Latin and Russian names of the raw materials that produce plants and families (give synonyms), draw.

DEFINITION OF PLANTS BY EXTERNAL SIGNS

	Botanical description of the plant (specify the characteristics of any distinctive features) **Growth area, ecology**

1.2. Write down the conditions of procurement, drying and storage of raw materials

_____

_____

_____

_____.

1.3.Write down possible impurities in the raw materials

_____

_____.

1.4. Describe the appearance of poplar buds on the example of a sample of raw materials.

ANALYSIS OF RAW MATERIALS "KIDNEYS" on external signs.

- Commodity type of raw material

_____

_____.

- Shape (spherical, conical, elongated-ovate, etc.)

_____.

- The nature of the assembly of scales (tile-like, spiral, pressed)

_____.

- Surface (color, edge of scales)

_____

_____.

Dimensions

_____

_____.

- 3apah

_____

_____.

- Taste

_____

_____.

- Specific features

_____

_____.

1.5. Note the compliance of the test sample of raw materials to the requirements of the AND: _____

1.6. The main active ingredients of LRS poplar:

_____

_____

_____

_____

1.7. Poplar preparations and their application:

_____

_____

Task 3. To study stevia Rebo and to carry out the analysis of raw materials on AND (external signs).

3.1. Examine the appearance of stevia Rebo by herbarium specimen. Write down the Latin and Russian names of the raw materials that produce plants and families, sketch.

DEFINITION OF PLANTS BY EXTERNAL SIGNS

	Botanical description of the plant (specify the characteristics of any distinctive features) **Growth area, ecology**

1.2. Write down the conditions of procurement, drying and storage of raw materials

_____

_____

_____

_____.

1.3.Write down possible impurities in the raw materials

_____

_____.

3.4. Describe the appearance of a stevia leaf on the example of a sample of raw materials.

ANALYSIS OF RAW MATERIAL "LETTER" on external signs

- Commodity type of raw material

_____

_____.

- Type of leaf and dissection of the leaf blade: simple: palchatorassechenna, palchato- or peristorozdelnym, peristolopastnye, three- or five-lobed; complex: even or odd-pinnate, trifoliate, finger-shaped _____.

- Stem leaf or sessile

_____

_____.

- Shape (round, elliptical, ovoid, lanceolate, linear)

_____.

- The edge of the leaf and leaves (whole, serrated, toothed, crenate, etc.)

_____.

- The nature of veining (arcuate, reticular, finger, pinnate, parallel)

_____.

- Smoking

_____

_____.

- The color of the upper and lower sides

_____

_____.

- The dimensions of the sheet and leaves

_____

_____.

- Odor when rubbing the object or wetting with water

_____

_____.

- Taste (in non-toxic objects)

_____

_____.

3.5. Note the compliance of the test sample of raw materials to the requirements of the AND: _____

3.6. The main active ingredients of stevia LRS:

_____

_____

3.7. Stevia preparations and their application:

_____

_____

_____

Instructional materials for mastering professional skills, skills:

Methods of work, stages of implementation ::

a) get the necessary LRS

b) to study and describe the appearance of the obtained LRS, draw LRS

c) to conduct LRS training

d) to study the anatomical and diagnostic features of roots and rhizomes

e) to study the anatomical and diagnostic features of fruits and leaves

f) record the observations in a laboratory journal

7.3. Control materials for the final stage of the lesson: tasks, tasks, tests, etc.

Tests:

1. If turpentine is a volatile substance (essential oil) in pine resin, then how is it usually extracted?

AND. Distillation with water vapor

B. Extraction with hot water

B. Alcohol extraction

D. Evaporation

D. Pressing

2. Toxic diterpenes include

A. Diterpene alkaloids

B. Resin acids

B. Stevioside

D. Diterpene alcohols

D. Aromatic resins

6. Resins dissolved in essential oil are called

A. Oil-resin

B. Comedy-resin

B. Actually resin

G. Gumi

D. Rosin

7. The resin contained in this LRS, participates in the overall pharmacological action of the drug as a diuretic. This LRS

A. Birch buds

B. Buckthorn bark

B. Leaves of legumes

D. Rose hips

D. Flax seeds

8. Glassy pieces of yellow color, crispy, shiny, used in technology and in the manufacture of patches - are:

A. Rosin

B. Turpentine

B. Wax

G. Lanolin

D. Paraffin

8. Literature

Basic literature

1. Фармакогнозія: підручник (I—III р. а.) / І.А. Бобкова, Л.В. Варлахова. – 3-є видання Всеукраїнське спеціалізоване видавництво «Медицина» 2018, 504с.

2. Фармакогнозія: базовий підручн. для студ. вищ. фармац. навч. закл.(фармац. ф-тів) IV рівня акредитації / В.С. Кисличенко, І.О. Журавель, С.М. Марчишин та ін.; за ред. В.С. Кисличенко. – Харків: НФаУ: Золоті сторінки, 2015. - 736 с.

3. Навчальний посібник з дисципліни «Фармакогнозія» / Я. В. Рожковський, Б. В. Приступа, І. А. Бойко, Н. В. Герасимюк, В. В. Черногорюк -: Методична розробка кафедри фармакогнозії ОНМедУ. – Одеса: ОНМедУ, 2019 – 51 с.

4. Державна Фармакопея України: в 3 т. / Державне підприємство «Український науковий фармакопейний центр якості лікарських засобів». – 2-е вид. – Харків: Державне підприємство «Український науковий фармакопейний центр якості лікарських засобів», 2015. – Т. 1. – 1500 с.

Additional literature:

1 Державна Фармакопея України: в 3 т. / Державне підприємство «Український науковий фармакопейний центр якості лікарських засобів». – 2-е вид. – Харків: Державне підприємство «Український науковий фармакопейний центр якості лікарських засобів», 2014. – Т. 3. – 732 с.

2. Практикум з ідентифікації лікарської рослинної сировини: навч. посіб. / [В. М. Ковальов, С. М. Марчишин, О. П. Хворост та ін.] ; за ред. В. М. Ковальова, С. М. Марчишин. – Тернопіль: ТДМУ, 2014. – 250 с.

10. The topic of the next lesson:

"Triterpenoids. Steroids. Saponins. General characteristics. Methods of qualitative and quantitative determination. LR and raw materials containing triterpenoids and triterpene saponins. Types of licorice, bitter chestnut, horsetail, orthosyphon stamen, ginseng, Manchurian aralia, woolly astragalus »

Methodical recommendations were _____ Associate Professor Boyko IA

(Signature)