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

GUIDELINES
on independent work of students / VTS / № 15

on the topic: «Quinones. Benzoquinones: ubiquinone; naphthoquinones: walnut, sundew, rowan.»

Course: 3rd Faculty: medico-pharmaceutical

Approved
at the methodical meeting
departments
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Protocol № 1

Head departments _____
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Topic: «Quinones. Benzoquinones: ubiquinone; naphthoquinones: walnut, sundew, rowan.»- 4 years.

1. Relevance of the topic

Quinones are a large group of phenolic compounds, which include anthraquinones - the most common in the plant world. On the example of anthraquinones we illustrate the connection between the chemical structure of biologically active substances and their pharmacological action, consider and evaluate the advantages of traditional and modern phytopreparations, pay attention to the application (dosage) of phytopreparations containing together biologically active substances . All this knowledge will be used by students to master some sections of ATL, pharmaceutical chemistry, pharmacology, pharmacotherapy and in future professional activities.

2. Learning objectives:

As a result of independent elaboration of this theme students should:

- know:

- basic information on macroscopic and microscopic methods of analysis of LR and LRS, which contain anthracene derivatives.
- effects on the human body of raw materials containing anthracene derivatives.
- LR and LRS, which have benzoquinones: ubiquinone;
- *LR and LRS, which have naphthoquinones*: walnut, round-leaved sundew, medicinal sparrow

- be able to:

- to carry out macroscopic analysis of LRS, which contains anthracene derivatives.
- to conduct microscopic analysis of LRS, which has anthracene derivatives.
- to know LR containing anthracene derivatives according to herbarium samples
- distinguish from impurities raw materials that contain anthracene derivatives.

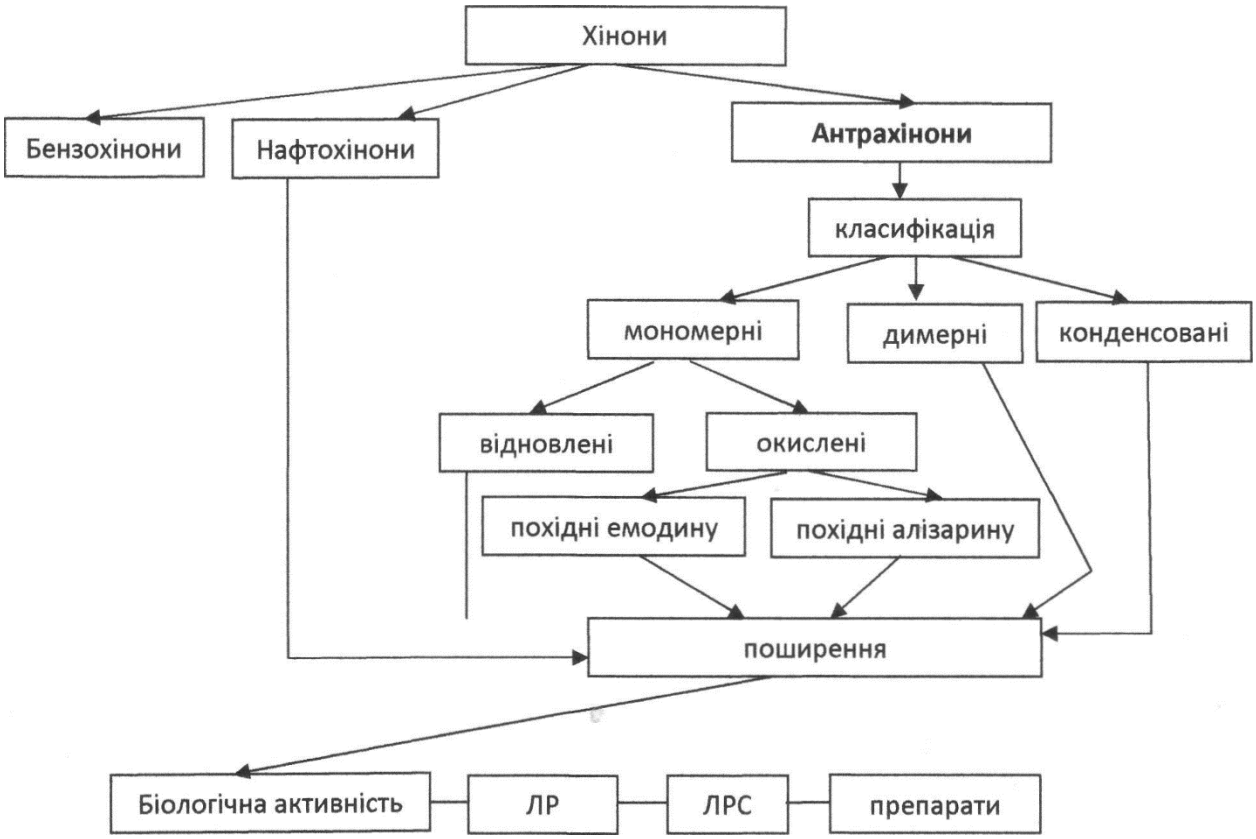
3. Materials for pre-classroom training of students.

3.1. Basic basic knowledge, skills, abilities that are necessary for independent study and mastering of the topic and which are based on interdisciplinary connections:

№ №	Discipline	Know	Be able
1	2	3	4
	1. Botany	Characteristic features of the families of the studied plants. Morphology of stem, bark, leaves, flower, fruit, root and rhizome. Anatomical structure of leaves, bark, fruit, roots, rhizomes.	Use a microscope, prepare surface preparations and cross-sections.
	2. Organic chemistry	Physical and chemical properties of polysaccharides, glycosides, terpenoids, derivatives of aromatic series, heterocycles.	Carry out qualitative reactions; purification of organic compounds.
	3. Analytical chemistry	Methods of acid - base titration (neutralization) and permanganatometry	Work with analytical balances, measuring vessels, photoelectrocalometer, use methods of chromatography on paper and in a thin layer of sorbent.

3.2. Contents of the topic.

- *structural and logical scheme*



3.3. Recommended Books:

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.

1.

3.4. Guidance card for self - study of a student with using the literature on the topic:

№№ p / p	Basic tasks and instructions	Answers
1.	2	3
1.	Write down the Latin name of the walnut and LRS, which are obtained from this plant.	
2.	Give a botanical description of the walnut	
3.	Which organs of the walnut are used in medicine, give their pharmacognostic description, how they are harvested and dried.	
4.	Walnut in medicine is used as	
5.	Write down the Latin name of the round-leaved sundew and LRS, which is obtained from this plant.	
6.	Give a botanical description of sundew	
7.	What organs of sundew are used in medicine, give their pharmacognostic description, how to harvest and dry them.	
8.	Round-leaved sundew is used in medicine	

	as	
9.	Write down the Latin name of the medicinal sparrow and LRS, which is obtained from this plant.	
10.	Give a botanical description of the medicinal sparrow	
11.	What organs of medicinal rowan are used in medicine, give their pharmacognostic description, how they are harvested and dried.	
12.	Medicinal sparrow in medicine is used as	

3.5. Materials for self-control.

3.5.1. Questions for self-control.

1. Definition of "quinones"
2. Classification of quinones
3. Definition of "anthraquinones"
4. Classification of anthracene derivatives.
5. Physicochemical properties of anthracene derivatives.
6. Studies (qualitative detection reactions) of anthracene derivatives.
7. Describe the distribution of anthracene derivatives in the plant world.
7. Features of harvesting, drying storage of LRS containing anthraquinones.
8. Ways of using raw materials containing anthraquinones and its medical significance.
9. Describe LRS containing naphthoquinones and its use.

3.5.2. Test tasks for self-control.

1. At identification of leaves of a cassia sharp-leaved the pharmacist-analyst carried out qualitative reaction for extraction from vegetable raw materials with 10% solution of sodium hydroxide (red color). What group of biologically active substances is present in the raw material.

A anthracene derivatives

B alkaloids

C fatty oils

D tannins

E mucus

2. When wetting the inner surface of buckthorn bark with 5% alkali solution, a cherry-red color appears, which confirms the presence of raw materials

A. Anthracene derivatives

B. Alkaloids

C. Saponins

D. Flavonoids

E. Tannins

3. The fruits of ragweed contain anthracene derivatives. What qualitative reactions prove the presence of these substances in LRS?

A. Reaction with alkali

B. Reaction with Dragendorf reagent

C. Reaction with iron-ammonium alum

D. Reaction with ferrous sulfate

E. Reaction with Fehling's reagent

4. Buckthorn bark contains anthracene derivatives. What qualitative reactions prove the presence of these substances in LRS?

A. Reaction with alkali

B. Reaction with Dragendorf reagent

C. Reaction with iron-ammonium alum

D. Reaction with ferrous sulfate

E. Reaction with Fehling's reagent

5. To identify the hay leaf, carry out the reaction of the reliability of the extract with a 10% solution of potassium hydroxide. A cherry-red color appears, which indicates the presence of:

A. anthracene derivatives;

B. alkaloids;

C. saponins;

D. cardiac glycosides;

E. tannins.

6. To the decoction of buckthorn bark was added a solution of alkali, resulting in a red color, which is evidence of the presence in the raw material:

A. Anthracene derivatives

B. Saponins

C. Tannins

D. Flavonoids

E. Phenoalcohols

7. The identity of raw cassia raw materials shall be established at the pharmaceutical enterprise. During the reaction with alkali, a cherry-red color was observed. The presence of which substance has been proven?

A. Anthraquinones

B. Tannins

C. Alkaloids

D. Glycosides

E. Iridoids

8. Buckthorn bark is used as a laxative. A solution of alkali was added to the decoction of buckthorn bark, resulting in a red color, which is evidence of the presence of raw materials

A. Anthracene derivatives

B. Saponins

C. Tannins

D. Flavonoids

E. Phenoalcohols

9. To quantify the active substances of this group using photoelectrocalorimetric method, this group:

A. Anthracene derivatives

B. Coumarins

C. Chromones

D. Glycosides

E. Polysaccharides

10. The pharmacist-analyst must check the good quality of raw cassia. Which method according to the AND should be used in this case to determine the amount of biologically active substances?

A. Photoelectrocolorimetry

B. Permanganatometry

C. Gravimetry

D. Nephelometry

E. Iodometry

11. Preparations of buckthorn bark are used as a laxative. The content of active substances - anthraquinones is determined by the method:

A spectrophoticolorimetric

B chromospectrometric

C Weight

D polarimetric

E titrimetric

12. Quantitative analysis of the content of anthracene derivatives in buckthorn bark is performed using the spectrophotometric method. What is the reaction underlying this method?

A Formation of phenolates with an alcoholic solution of alkali

B Deposition of the formed salt

C Recovery of anthraquinone

D Oxidation of anthracene derivatives

E Sublimation reaction

13. Anthraquinones of the emodin group are able to increase the motility of the colon, which causes their laxative effect. Specify the following connection:

A. Frangulaemodin

B. Ruberitric acid

C. Lucidin

D. Silibin

E. Podophyllotoxin

14. What medicinal plant raw materials are the source of preparations containing anthracene derivatives.

A. Folia Sennae

B. Folia Digitalis

C. Herbe Ephedrae

D. Folia Ficusi Caricae

E. Cormi Visci

15. A batch of medicinal plant raw materials of cassia leaves arrived at the pharmacy warehouse. The content of which active substances is defined as the quality of raw materials in accordance with the requirements of the Pharmacopoeia .:

A anthracene derivatives;

B tannins;

C flavonoids;

D coumarins;

E extractives.

Methodical recommendations were made by  *associate professor Boyko IA*