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

GUIDELINES
on independent work of students / VTS / № 3

on the topic: «Fats and fat-like substances.Pumpkin seeds, peanut oil, flaxseed, corn germ; evening primrose (aspen), coconut oil, palm; oil and freon extracts of wheat germ, walnut, rose hips and chokeberry. Fish oil, solid animal fats. Waxes. Lanolin, spermaceti. Products of soy processing (oil, protein, phospholipids). "

Course: 3rd Faculty: medico-pharmaceutical

Approved
at the methodical meeting
departments
August 30, 2024
Protocol № 1

Head departments _____
prof. Rozhkovsky Ya.V.

Odessa - 2024

Subject: «Fats and fat-like substances.Pumpkin seeds, peanut oil, flaxseed, corn germ; evening primrose (aspen), coconut oil, palm; oil and freon extracts of wheat germ, walnut, rose hips and chokeberry. Fish oil, solid animal fats. Waxes. Lanolin, spermaceti. Products of soy processing (oil, protein, phospholipids). " - 4 years

1. Relevance of the topic

Fats (lipids) consist almost entirely of triglycerides of high molecular weight fatty acids. They are accompanied by pigments, sterols, vitamins and some other fat-soluble substances. Fatty oils of plants and fats of spare tissues of animals represent along with carbohydrates the concentrated power and building reserve of vital activity of an organism. Up to 90% of plant species contain spare fats in the seeds. In addition to seeds, spare fats are often found in other dormant organs and plant tissues. The accumulation of fat in plants can be quite significant: for example, in domestic varieties of sunflower oil content reaches 60% by weight of the nucleus, and in algae cells chlorella - up to 80% by dry weight. Plants with a high oil content in seeds and fruits in the tropics and subtropics are represented mainly by trees (palms, tung, castor, cotton, etc.), and in areas with a temperate climate, they are mainly herbaceous plants (flax, sunflower, peanuts, etc.), less often shrubs, and even less often trees. The sign of oiliness is genetically related to a certain type of metabolism. Spare fats play an important role in protective substances that help organisms tolerate adverse environmental conditions, including low temperatures. Accumulated in the cotyledons of wintering seeds, fats allow you to keep the embryo in the cold. Climatic factors - light, heat and moisture significantly affect the efficiency of oil formation. which help organisms to tolerate adverse environmental conditions, including low temperatures. Accumulated in the cotyledons of wintering seeds, fats allow you to keep the embryo in the cold. Climatic factors - light, heat and moisture significantly affect the efficiency of oil formation. which help organisms to tolerate adverse environmental conditions, including low temperatures. Accumulated in the

cotyledons of wintering seeds, fats allow you to keep the embryo in the cold. Climatic factors - light, heat and moisture significantly affect the efficiency of oil formation.

The properties of fats are determined by the qualitative composition of fatty acids, their quantitative ratio, the percentage of free, unrelated to glycerol fatty acids, the ratio of different triglycerides and others.

2. Learning objectives:

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

- know:

- basic information about macroscopic and macroscopic methods of analysis of LR and LRS, which contain lipids
- effects on the human body, raw materials that contain lipids
- about the main sources of vegetable fats: pumpkin seeds, peanut oil, flaxseed, corn germ; evening primrose (aspen), coconut oil, palm; oil and freon extracts of wheat germ, walnut, rose hips and chokeberry.
- sources of animal fats: fish oil, solid animal fats. Waxes, lanolin, spermaceti, soybean products (oil, protein, phospholipids).

- be able to:

- to carry out the macroscopic analysis of LRS which contains fats
- perform microscopic analysis of LRS, which contains fats

3. Materials for pre-classroom training of students.

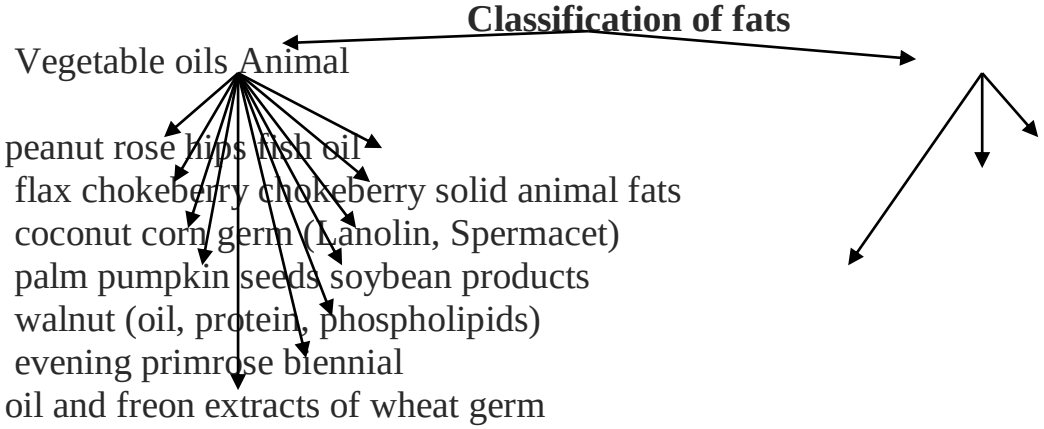
3.1. Basic basic knowledge, skills, abilities that are necessary for independent study and mastering of the topic and which are based on interdisciplinary connections:

№ №	Discipline	Know	Be able
1	2	3	4
	1. Botany	Characteristic features of the families of the studied plants.	Use a microscope, prepare surface

		Morphology of stem, bark, leaves, flower, fruit, root and rhizome. Anatomical structure of leaves, bark, fruit, roots, rhizomes.	preparations and cross-sections. Carry out qualitative reactions; purification of organic compounds.
	2. Organic chemistry	Physical and chemical properties of polysaccharides, glycosides, terpenoids, derivatives of aromatic series, heterocycles.	
	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 of the content of the topic



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.

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

№	Basic task	Instructions	Answers
1	2	3	4
1 2 3	Disassemble LR and LRS for receiving oil	Write down the Latin names of corn and the oil obtained from this plant ..... Give a botanical description of common corn .... Characteristics and chemical composition of corn oil .... Biological action and use of corn oil	

4 5 6 7 8		..... Write down the Latin names of soy bristles and the oil obtained from this plant ..... Give a botanical description of soy bristles .... Characteristics and chemical composition of soybean oil .... Biological action and use of soybean oil	

3.5. Materials for self-control.

3.5.1. Questions for self-control.

1. Definition of "lipids".

2. The distribution of fats in the plant world and the resources of the studied raw materials.

3. Morphological characteristics of plants containing lipids, their habitats (areas of cultivation), habitats.

4. Fats consist of triglycerides of fatty acids. Write the general formula of triglycerides.

5. Chemical composition of LRS of the researched topic.

6. Measures for the protection and rational use of medicinal plants contain lipids.

7. What factors affect the process of formation and accumulation of fats in plants.

8. Name the chemical process of fat spoilage during storage in adverse conditions and what indicators characterize this process.

9. Ways of use and medical application of LRS containing lipids.

10. Name the climatic factors that have a significant impact on the efficiency of oil retention.

3.5.2. Test tasks for self-control.

1. Which of the following indicators is one of the most important for the qualitative assessment of oils, which gives an idea of their ability to dry and reflects the content of unsaturated acids:

A. iodine number

B. acid number

C. the number of saponification

D. ethereal number

E. chloroform number

2. Name the plant, the seeds of which contain 45-47% of fatty oil, 1-2% of the alkaloid theobromine and traces of caffeine.

A. chocolate tree

B. almonds

C. sunflower

D. flax

E. ricin

3. Which tropical or subtropical plant has a high oil content in seeds and fruits:

A. palm tree

B. flax

C. sunflower

D. corn

E. almond tree

4. The oil of which plant is obtained by pressing and it resembles ghee (different density), yellow, has a pleasant smell and taste ("nut"):

A. palm oil

B. cedar oil

C. cocoa butter

D. hemp oil

E. soybean oil

5. Non-drying fatty oils are used as solvents for injectable drugs. Name the medicinal plant that is the source of this type of oil:

A. Amygdalus communis

B. Helianthus amiuus

C. Salvia officinalis

D. Inula helenium

E. Zea maydis

6. One of the indicators of authenticity and quality of fatty oil is insolubility in alcohol. Specify the fatty oil, which is an exception and must be soluble in ethanol:

A. Oleum Ricini

B. Oleum Maydis

C. Oleum Lini

D. Oleum Persicorum

E. Oleum Olivarum

7. Peach oil is used as a solvent for injectable drugs (camphor, hormones). What fatty oil can replace peach oil:

A. Oleum Amygdalarum

B. Oleum Ricini

C. Oleum Helianti

D. Oleum Maydis

E. Oleum Gossypii

8. The main component of oils that do not form a film (do not dry out) are

glycerides:

A. oleic acid

B. linolenic acid

C. elaidic acid

D. linoleic acid

E. arachidonic acid

9. Almond oil is used in the manufacture of a number of dosage forms. The method of obtaining this oil is:

A. pressing

B. enfleurage

C. distillation with water

D. distillation with water vapor

E. sublimation

10. The seeds of which plants contain from 40 to 55% of fatty oil and a large amount of the enzyme lipase, which breaks down fats.

A. castor oil

B. flax

C. sunflower

D. soy

E. corn

Methodical recommendations were made by  *associate professor Boyko IA*