PHARMACOGNOSY

**LABORATORY CLASS. Topic: «Chemical, morphological and anatomical analysis of MPM containing alkaloids – І.»**

**OBJECTIVE.**

Know the definition of the term “Alkaloids”, their classification, physical and chemical properties, the identification and quantitative analysis, pharmacological properties.

**RELEVANSE.**

Alkaloids are natural compound of high pharmacological activity. They often are characterized by selective action. Due to their specific activity, alkaloids are widely used in medicine. Among natural biologically active substances alkaloids are represented by the largest amount of highly active pharmaceuticals (more than 10%). Alkaloids containing plants are used in drug stores for preparation of medicines *ex tempore* (especially in homeopathy) and mainly as an industrial source for individual and halenic pharmaceuticals manufacturing. Alkaloids are used in treatment of almost all diseases.

**CONTROL QUESTIONS.**

1. Give the definition of the term “Alkaloids”.
2. Describe classification of alkaloids.
3. Characterize physical and chemical properties of alkaloids.
4. Describe the extraction of alkaloids.
5. Describe the identification of alkaloids (reagent used – result of the reaction).
6. Describe quantitative analysis of alkaloids.
7. Describe pharmacological properties of alkaloids (compound – its activity).

**TEST.**

1. Alkaloids-containing medicinal raw material should be dried at the temperature:

***A*** 90-100°С

***B*** 50-60°С

***C*** 70-80°С

***D*** 80-90°С

***E*** 30-45°С

1. Medicines of ephedra herb have bronchodilatory and psychostimulative effect. Such plant material and medicines should be kept:

***A***  According to the B list

***B*** According to the ordinary list

***C*** Like odorous material

***D*** Like a dye-stuff

***E*** Like a poison

1. Codeine for medical purpose can be received in a semisynthetic way from a plant-derived alkaloid of the similar structure. Specify this alkaloid:

***A***  Protopine

***B*** Papaverine

***C*** Berberine

***D*** Chelidonine

***E*** Morphine

1. Medicines of ergot are used in obstetric-gynecological practice for uterus contraction and for cardiovascular diseases treatment. Quality of this raw material is estimated according to the quantity of:

***A***  Ergotoxine

***B*** Atropine

***C*** Hyoscyamine

***D*** Reserpine

***E*** Ajmaline

1. The positive result with Dragendorff ‘s reagent at chemical analysis of barberry root was received. Presence of which compounds does this reaction confirm?

***A*** Triterpenoids

***B*** Alkaloids

***C*** Steroids

***D*** Furocoumarins

***E*** Chromones

1. The adulteration with alkaloids-containing medicinal plant material is possible during plant material collection. These compounds can be identified using the reaction with:

***A*** Stahl’s reagent

***B*** Legal’s reagent

***C*** Trim-Hill’s reagent

***D*** Dragendorff’s reagent

***E*** Fehling’s reagent

1. Orange-red spots appear on the yellow background after processing of a chromatogram with Belladonna leaves extract by Dragendorff’s reagent. It confirms the presence of:

***A*** Tannins

***B*** Saponins

***C*** Alkaloids

***D*** Cardiac glycosides

***E*** Phenolic glycosides

1. Analysis of alkaloid containing raw material was carried out in an analytical lab. Choose drug which gives positive result in Vitali-Morin reaction:

***A*** Scopolamine hydrochloride

***B*** Platyphylline hydrotartrate

***C*** Quinine sulfate

***D*** Papaverine hydrochloride

***E*** Morphine hydrochloride

1. Which substance from purine alkaloids forms a white precipitate with 0.1% tannin solution?

***A*** Euphylline

***B*** Theobromine

***C*** Theophylline

***D*** Diprophylline

***E*** Caffeine

1. The alkaloid codeine with anticough action also has a narcotic effect. Therefore in pediatric practice it is necessary to replace it by other alkaloid which does not have this side effect:

***A*** Capsaicine

***B*** Papaverine

***C*** Glaucine

***D*** Thebaine

***E*** Jervine

1. Match the following compound with its classification group.

|  |  |  |
| --- | --- | --- |
| Ephedrine | 1. Protoalkaloid | I. Quinoline derivative |
| II. Tropane derivative |
| 2. Typical alkaloid | III. Terpenoidal compound |
| IV. Purine derivative |
| 3. Pseudoalkaloid | V. Steroidal compound |
| VI. Acridine derivative |

1. Match the following compound with its classification group.

|  |  |  |
| --- | --- | --- |
| Morphine | 1. Protoalkaloid | I. Piperidine derivative |
| II. Purine derivative |
| 2. Typical alkaloid | III. Terpenoidal compound |
| IV. Quinolizidine derivative |
| 3. Pseudoalkaloid | V. Steroidal compound |
| VI. Isoquinoline derivative |

1. Match the following compound with its classification group.

|  |  |  |
| --- | --- | --- |
| Colchicine | 1. Protoalkaloid | I. Piperidine derivative |
| II. Imidazole derivative |
| 2. Typical alkaloid | III. Terpenoidal compound |
| IV. Isoquinoline derivative |
| 3. Pseudoalkaloid | V. Steroidal compound |
| VI. Pyrimidine derivative |

1. Match the following compound with its classification group.

|  |  |  |
| --- | --- | --- |
| Caffeine | 1. Protoalkaloid | I. Piperidine derivative |
| II. Purine derivative |
| 2. Typical alkaloid | III. Terpenoidal compound |
| IV. Isoquinoline derivative |
| 3. Pseudoalkaloid | V. Steroidal compound |
| VI. Quinoline derivative |

1. Match the following compound with its classification group.

|  |  |  |
| --- | --- | --- |
| Thermopsine | 1. Protoalkaloid | I. Piperidine derivative |
| II. Purine derivative |
| 2. Typical alkaloid | III. Terpenoidal compound |
| IV. Quinolizidine derivative |
| 3. Pseudoalkaloid | V. Steroidal compound |
| VI. Quinoline derivative |

1. Match the following compound with its classification group

|  |  |  |
| --- | --- | --- |
| Aconitine | 1. Protoalkaloid | I. Piperidine derivative |
| II. Tropane derivative |
| 2. Typical alkaloid | III. Terpenoidal compound |
| IV. Purine derivative |
| 3. Pseudoalkaloid | V. Steroidal compound |
| VI. Pyridine derivative |

1. Match the names of heterocycles with their structures:

|  |  |  |
| --- | --- | --- |
| A.  | B.  | C.  |
| I. Acridine | II. Imidazole | III. Piperidine |
|  |  |  |

1. Match the names of heterocycles with their structures:

|  |  |  |
| --- | --- | --- |
| A.   | B.  | C.  |
| I. Isoquinoline | II. Pyrimidine  | III. Purine  |
|  |  |  |

1. Match the names of heterocycles with their structures:

|  |  |  |
| --- | --- | --- |
| A.   | B.   | C.  |
| I. Quinoline | II. Tropane | III.Pyrrolizidine  |
|  |  |  |

1. Match the names of heterocycles with their structures:

|  |  |  |
| --- | --- | --- |
| A.  | B.  | C.  |
| I. Quinolizidine | II. Indole | III. Pyridine |

**PRACTICAL TASKS.**

You have to fill in your laboratory hand-book on the topic: Chemical analysis of medicinal plant containing alkaloids.

**LITERATURE TO PREPARE FOR THE LESSON.**

1. Pharmacognosy: textbook for higher school students / V.S. Kyslychenko, L.V. Upyr, Ya.V. Dyakonova, V.Yu. Kuznetsova, I.G. Zinchenko, O.A. Kyslychenko; ed. by V.S. Kyslychenko. – Kharkiv : NUPH: GoldenPages, 2011. – 552 p.; il.
2. Pharmacognosy: textbook for higher school students / V.S. Kyslychenko, L.V. Lenchyk, I.G. Gurieva et al.; ed. by V.S. Kyslychenko. – Kharkiv : NUPH: GoldenPages, 2019. – 584 p.
3. Tests KROK–2. Topic Alkaloids.