Topic of the lesson:

"Qualitative and quantitative analysis of medicinal plant raw materials containing various groups of biologically active substances (essential oils)".

Objective:

1. To learn how to determine the authenticity and purity of plant essential oils. 2.

2. To learn the method of quantitative analysis of medicinal plant raw materials containing essential oils according to method 1.

3. Know the nomenclature of essential oils.

Work 1. Determination of the authenticity and purity of essential oils.

Take samples of essential oils from the teacher for analysis.

Determine the colour, transparency, odour and taste of the proposed samples of essential oils.

Determine the purity of the essential oils offered.

Determination of authenticity:

Determine the authenticity, purity and goodness of the essential oils by the methods described in OFS 1.5.2.0001.15 "Essential oils".

Colour and transparency: determined in a 10 ml test tube of colourless glass, 2-3 cm in diameter, observing in transmitted light.

Odour: 0.1ml (2 drops) of the oil is applied on a 12 cm long and 5 cm wide strip of filter paper without wetting the edges of the paper, and the smell of the test piece is compared every 15 minutes with that of a control piece applied in the same way on the filter paper. Within 1 hour the smell should be the same as that of the control sample.

Taste: determined by placing a strip of paper with a drop of oil on it on the tongue.

Purity test:

Purity is determined by the absence of alcohol and mineral oils using the method suggested in the information material.

Testing for an admixture of alcohol:

(a) A few drops of essential oil are applied to water poured on a watch glass. When observed against a black background, there should be no noticeable turbidity around the oil drops.

b) 1 ml of essential oil is poured into a test tube, covered with a loose lump of cotton wool, with a crystal of fuchsin in the centre, and brought to the boil. If

alcohol is present, the alcohol vapour dissolves the fuchsin and the cotton wool turns red.

Check for admixture of fat or mineral oil:

Shake 1 ml of essential oil in a test tube with 10 ml of alcohol; no turbidity or greasy droplets should appear.

Record the results in the form of a test report.

Work 2: Determination of the moisture content of the medicinal plant material "Chamomilla recutita".

Take a sample of raw material from your teacher for analysis.

Carry out moisture determination and calculate the percentage of moisture content in the sample of raw material to be examined.

Compare the obtained result with the data in the pharmacopoeial article "Chamomillae recutitae flores". Draw a conclusion.

Record the results of the study in the form of a protocol.

Work 3. Quantification of essential oil by method 1 in the raw material "Chamomilla recutita".

Take a sample of raw material from the teacher. Find and study FS.2.5.0037.15 "Chamomile flowers", section definition of essential oil. Determine the weight of a sample of raw material, the degree of crushing and distillation time.

Place the sample of raw material in a 1000 mL wide round bottom or flat bottom flask, add as much water as necessary (according to the FS) and close with a rubber stopper with a reflux condenser. Attach metal hooks to the bottom of the stopper, to which a graduated receiver is suspended by means of a thin wire, so that the end of the refrigerator is above the funnel-shaped extension of the receiver without touching it. The receiver must fit freely in the neck of the flask without touching the walls and be at least 50 mm from the water level. The graduated part of the receiver has a scale value of 0.025 mL.

Heat and boil the flask with the contents for the time specified in the FS. Measure the volume of oil in the graduated part of the receiver after the end of distillation and cooling down to room temperature.

The content of essential oil in volume weight percent (X) in terms of absolutely dry raw materials calculated by the formula:

$$X = \frac{V \times 100 \times 100}{m \times (100 - W)}$$

where V is the volume of essential oil in ml;

m - mass of raw material in g;

W - loss in weight during drying of raw materials in percentage.

Compare the results with the data in the ND. Make a conclusion.

Protocol of analysis of medicinal raw materials

Date _____

Medicinal raw material
Eng/Lat._____
_____
Medicinal plant Eng/Lat._____
_____
Family Eng/Lat_____

Results for the authenticity and purity of essential oils:

Name of oil	Colour and visibility	Odour	Taste	Presence of impurities

Determination of moisture:
Moisture indicator according to regulations:
Calculations**:**

Quantification of essential oil by method 1:
Standardisation of raw materials by regulatory documentation:
Calculations:

Conclusion:_____
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