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PROPAGATION OF INULA HELENIUM L PLANT AND DETERMINATION OF ELEMENTS CONTENT AND BIOLOGICAL CHARACTERISTICS

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Abstract:
In this article, methods of reproduction of the medicinal plant Inula helenium L growing in the territories of Langar ota collective farm, Khatirchi district, Navoi region, biological properties and composition of micro and macroelements of the plant Inula helenium L are studied.

Key words: Inula helenium L.; Inula grandis, inulin, carbohydrates, benzoic acid, alantolactone, isoalantolactone, dihydroalantolactone, antiseptic, expectorant, anthelmintic.

Introduction:

Currently, large-scale research is being conducted on the creation of new effective drugs based on medicinal plants. In this case, it is of urgent importance to separate natural medicines from local raw materials, to prepare cheap and high-quality drugs that can replace imports, and to create the initial raw material bases. The effective use of the achievements of folk medicine in the creation of new drugs will definitely bring positive results. In this sense, the common species of andis plant in Uzbekistan are black andis-Inula helenium L.; yellow andiz-Inula grandis Schrenk.; Asteraceae belong to the Asteraceae family (Compositae) and are found in the Caucasus, Central Asia, Moldova, Ukraine, Belarus, in the desert and forest-desert zone of the European part of Russia and in the Far Siberia, Krasnodar and Stavropol Territories, as well as in Kazakhstan, Uzbekistan, in wetlands, watersides, and meadows. and grows among the bushes. Andis species are very similar in appearance. Since their products contain the same compounds,

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they are used in medicine to treat the same diseases. That's why the products of Andiz species are prepared together.

Theoretical part:

Inula helenium L plant species is a perennial herb with a height of 100-150 cm, one or more stems, erect, erect, branched at the top. The root leaf is long-banded, large (the leaf plate is up to 50 cm), elliptic or oblong-ovate, with a sharp tip, narrowing towards the base. The leaves on the stem are smaller, oblong-ovate, and become smaller towards the top of the stem. The leaf plate has a serrated edge, the upper side is sparsely and hard hairy, and the lower side is soft, hard. The leaves on the upper part of the stem are unbanded, and the lower ones are arranged in a row on the stem with a short band. The flowers are golden in color and are collected in a basket. Baskets form a shield-shaped or shingle-shaped flower cluster at the top of the stems and branches. The wrapping leaves of the basket are arranged like a cherepitsa. The leaves are ovate, curved and covered with many hairs. The flowers on the edge of the basket are yellow, tongue-shaped, and the middle ones are also yellow, fluffy, tube-shaped. The calyx leaves of the flowers are turned into tufts, the corolla and 5 sepals, the maternal node is single, located below. The fruit is an elongated, four-sided, brown or brown pistachio. It blooms from May-July to September, the fruit ripens in July-October. Above-ground part of Inula helenium L plant Fig.1 [1-5]

1 2 3

Figure 1. Inula helenium L plant, 1. above-ground part, 2. dirty appearance of the underground part (root), 3. crushing of the underground part (root).

The finished product of Inula helenium consists of long, thick roots and short, thick and multi-headed rhizomes of various shapes. Roots and rhizomes are 2-20 cm long, 1-3 cm thick, covered with wrinkled gray-brown bark. The inside of the product is yellowish-white. There are shiny brown spots where the essential oil

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stays. The product is brittle, does not break horizontally. The root and rhizome have a characteristic aromatic strong smell and a more bitter and pungent taste. Inula helenium product moisture content 13%, total ash 10%, ash insoluble in 10% hydrochloric acid 4%, internal rot, old rhizome and root, basal part of the stem and other parts of the andis 5%, blackened internal rhizome and roots 5%, 2 cm root pieces shorter than (for whole, untrimmed product) 5%, large pieces that do not pass through a sieve with a diameter of 7 mm (for trimmed product) 10%, part that passes through a sieve with a diameter of 0.5 mm (for trimmed product) 10 %, organic impurities 0.5% and mineral impurities should not be more than 1%.

Inula helenium plant product. microscopic structure. The root softened by cold (in a mixture of water and glycerin) is cut crosswise, the drug is prepared and it is viewed under a microscope in a chloral hydrate solution (Fig. 5). In the cross section of the root, multi-row gray-brown pods, bark and wood parts (xylem) are visible. Bark parenchyma consists of large cells. In the secondary cortex, the lobe has the appearance of small, group-group cells. The cambium is clearly visible. In the wood part - xylem, there are large water tubes (especially near the cambium). Bark and wood parts have round or oval shaped, large, schizogenous resin and essential oil storage areas. Their essential oil and resin-producing cells look good.

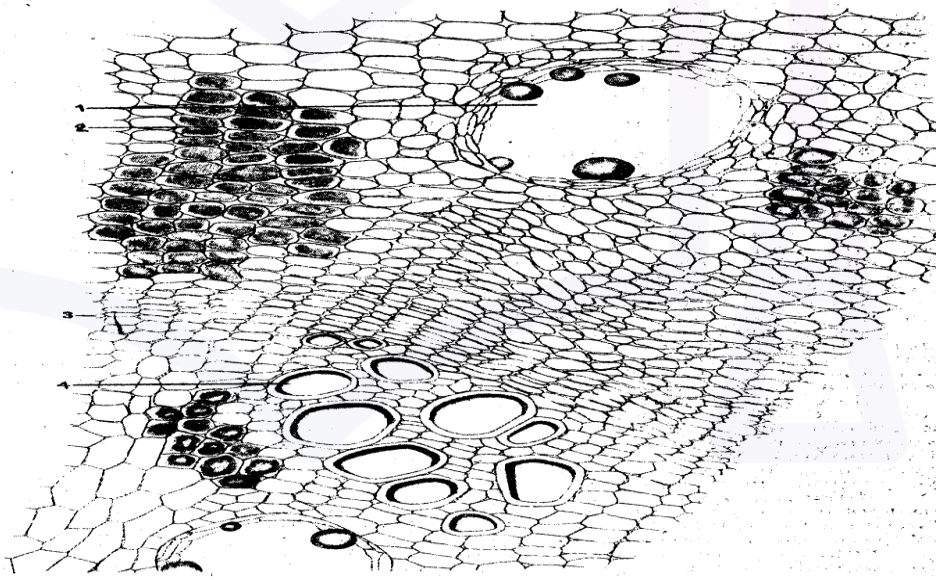

Figure 2. Cross-section of the root of the Inula helenium

1- essential oil place; 2- parenchyma cells (with inulin); 3- cambium; 4- xylem water tubes

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The chemical composition of the Inula helenium plant contains 1-3% essential oil, up to 44% inulin and other carbohydrates, small amounts of alkaloids, acetic and benzoic acids, and saponins. . The crystalline part of the essential oil - gelenin consists of a mixture of three sesquiterpene lactones (alantholactone, isoalantolactone and dihydroalantholactone). In addition to gelenin, the essential oil contains a small amount of alantol and proazulene. The above-ground part of the plant contains up to 3% essential oil, and the leaves contain a bitter substance called alantopyrin.

Medicinal use of the plant Inula helenium L. Andis species is used as an expectorant and for stomach and intestinal diseases. The essential oil has antiseptic, anthelmintic and anti-inflammatory properties. Its anthelmintic property is due to the presence of active substances similar to santonin - allanto-lactones. The medicinal preparation allanton is obtained from the rhizome and root of black andis. Allanthone is a sum of sesquiterpenes in the product, which has anti-inflammatory, vasoconstrictive and antiseptic effects and accelerates wound healing in peptic ulcer disease. [1-5]

Medicinal preparations of the plant Inula helenium L. allanton (in the form of tablets), and the root and rhizome, which are used against cough and expectoration, are part of teas.

Discussion of Results

In our republic, many of our scientists are conducting scientific research on breeding medicinal plants and studying their biological and chemical structures. Inula helenium plant is being propagated in "INVITRO" conditions in the "experimetal" biological laboratory of Guliston State University with the scientists of the Institute of Bioorganic Chemistry named after Academician O.S. Sodikov. is going

For introduction, in vitro culture of Inula helenium plant, green growing shoots or mature cuttings are taken as primary material for growing tissue. Green shoots are sterilized in 70% ethanol without touching the tip, washed and placed in nutrient medium in a biological test tube, intensive green growing shoots or Ripe cuttings are placed for growing. The plant was planted in a nutrient medium in a biological test tube and under the conditions of falling light during the day, the temperature was kept at 25-28 0 C during the day and 20-22 0 C at night. The growth depends on the branches: from green shoots to roots in 8-10 days and from jointed branches in 40-60 days. grew during the day. If there is a lack of

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primary raw materials for introduction, the plant grown in a test tube is cut into one-bud cuttings and planted again, the plant obtained in vitro is planted on a substrate in a greenhouse. The substrate consists of two layers of sand and wood chips. The top of the substrate is a simple substrate, the surface layer is covered with wood shavings. In hydroponics, a good result is obtained when large river sand or diorite is used as a substrate.

The planted plant should not be exposed to direct light for 12-13 days, and to increase humidity, cover the substrate with a film at a height of 30-60 cm. Once a day, the film is removed and aired for a few minutes. (At this time, the leaves of the plant should be wet). Watering is carried out 1-2 times a day, depending on the temperature. If the greenhouse is equipped with devices that generate artificial fog, there will be no need to cover the plant with a film. In the first 30-60 days, the root system develops in the upper layer of the substrate. Depending on the biological characteristics of the variety and the period of planting, the ripe branches of the plant in the greenhouse reach 0.4-0.5 m. In autumn, the seedlings are dug out of the greenhouse and planted in the open field. [6-9]

Development and reproduction of Inula helenium L plant growing technology In the fields dedicated to Inula helenium L plant, before plowing in early autumn, 5-10 tons of organic fertilizers and superphosphate are plowed to a depth of 25-30 cm per hectare. If the plant grows in soils with low precipitation, it is appropriate to give 15 kg of nitrogen and potassium fertilizers per hectare along with plowing. Inula helenium L is also propagated from seed and rhizome cuttings. Before planting, soak the seeds in a 0.002% solution of potassium permanganate and copper sulfate for 10-12 hours and then sow. In early spring, plowed land is harrowed, plowed and cultivated. When the soil temperature is 10-12°C, 12-14 kg of seeds per hectare are used in mid-March. Its planting depth should not be less than 4-5 cm. Seed germination should not be less than 80-85%.

If the temperature of the soil is moderate and moisture is sufficient, the sown seeds will germinate in 10-12 days. If the rhizome is propagated from cuttings, its germination rate should not be less than 80-90%. The rhizomes should be planted in early spring at a depth of 8-10 cm. On average, 11-13 centners of rhizomes are used per hectare. The plant density is 10-15 plants per 1 meter. If the distance between the seed and the cuttings is 60 cm, the plant will develop its roots well in the second and subsequent years, and conditions will be created to completely cover the soil surface. [10]

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The Inula helenium L plant is watered 6-7 times in the first year, and the number of waterings is reduced in subsequent years. In the first year, the interstices of the plant are softened, cleaned of foreign matter. The first fertilizing is carried out in May and June by giving 25 kg of nitrogen and 15 kg of potassium fertilizer per hectare. The second feeding is completed by giving 25 kg of nitrogen and 15 kg of superphosphate fertilizer in August. Plant feeding is done before watering. In late autumn or early spring, roots and rhizomes are removed from the ground by plowing 30-35 cm, washed in water and dried in a dryer at 45-50°C.

The seeds of the Inula helenium L plant are harvested manually or mechanically. On average, 80-100 kg of seeds and 12-13 centners of dry roots can be harvested from each hectare of land. [10]

The amount of macro- and microelements in the root of Inula helenium L. was carried out using the Optima-2100DV optical emission spectrometer with inductively coupled argon plasma (SShA). For this purpose, the sample solutions were supplied to the wells in an autodispenser, and the final processing was carried out by Win-Lab (offline) equipment. The device automatically calculates noise, the shape of the solution in the specified places of the studied elements. The obtained results and the analysis of the spectra were automatically determined by the "multispectral analysis" method. The results of these studies show that the amount of 44 elements in the root of Inula helenium L. was determined, and the root contained Ca (25634.479 mg/g), K (29324.359 mg/g), Na (6068.696 mg/g), P (5542.561 mg/g), Mg (5385.231 mg/g), Fe (4751.517 mg/g), Al (3241.716 mg/g) elements were found to be more than other elements.

EXPERIMENTAL PART:

1. For in vitro cultivation of Inula helenium L plant, intensively green growing shoots or mature cuttings tissues are obtained as primary material. Without touching the tip of the green shoot, it is sterilized in 70% ethanol for 30 seconds, then they are washed 3-4 times for 10 min and placed in the nutrient medium in the biological test tube, intensively green growing branches or mature cuttings for growth. The composition of the nutrient medium in the biological test tube is as follows KNO_3-950 mg /l; NH_4NO_3-412 mg/l; $MgSO_47H_2O$-185mg/l; $CaCl_2$ $2H_2O$-440 mg/l; KH_2PO_4-68mg/l; Fe-chelate, trace elements, mesoinosit 50 mg/l; thiamine HCl-0.2 mg/l; nicotinic acid -0.2 mg/l; pyridoxine HCl-0.2 mg/l; indolyl acetic acid 0.5 mg/g; ferulic acid 1 mg/l; sucrose 10 g/l, agar 7.5 g/l; pH 5.8. A plant was planted in a test tube and under conditions of 16 hours of light, the

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temperature was kept at 25-28 0 C during the day and 20-22 0 C at night. Germination depends on the branches: from green shoots to roots in 8-10 days and from jointed branches in 40-60 days. grew during. If there is a lack of primary raw materials for introduction, the plant grown in a test tube is cut into cuttings with one bud and planted again, the composition of the nutrient medium is the same, the amount of indolyl acetic acid (0.2 mg/l) is reduced. the plant obtained from in vitro was planted on the substrate in the greenhouse. The substrate consists of two layers of sand and sawdust. The top of the substrate is a simple substrate, 4-5 cm thick wood shavings were placed on the surface layer. (wood shavings are steamed for 1 hour before application). In hydroponics, a good result is obtained when large river sand or diorite is used as a substrate. The plant is removed from the test tube, washed in water and planted. For 12-13 days, direct light should not be allowed, and to increase humidity, a film is covered over the substrate at a height of 30-60 cm. Once a day, the film is removed and aired for a few minutes. (At this time, the leaves of the plant should be wet). Watering is carried out 1-2 times a day, depending on the temperature. If the greenhouse is equipped with devices that generate artificial fog, there will be no need to cover the plant with a film. In the first 30-60 days, the root system develops in the upper layer of the substrate. depending on the biological characteristics of the variety and the period of planting, the ripe branches of the plant in the greenhouse reach 0.4-0.5 m. In autumn, the seedlings are dug out of the greenhouse and planted in the open field.

2. The amount of macro and microelements in the roots of Inula helenium was determined and studied using the Optima-2100DV (USA) device and Autodosator S-200 Perkin Elmer device based on the "Inductively coupled argon plasma" optical emission spectrometry method. Inula helenium. the root sample of the plant was finely ground, a sample of 0.1 g was taken using an analytical balance with an accuracy of ± 1 mg. The sample was placed in Teflon autoclaves and filled with 2 ml of nitric acid solution and 1 ml of hydrogen peroxide solution. After the autoclave is well closed, it is decomposed by placing it in a BERGHOF microwave disintegrator with the Speebwave TM MWS-3+ program (12 autoclaves). It is heated for one minute at 25-40 °C and then cooled and heated again to 25-40 °C. After digestion, sample solution Autoclave 5-10 ml of deionized LaboStar PRO UV 4, 1.5 l/min, with water from Evoqua (SG Wasser) machine, rinse 3 times with 50 ml volumetric flask and top up to the mark with deionized water until volume reaches 50 ml has been filled. and the amount of macro and microelements in the

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root of Inula helenium plant was determined in the device based on the optical emission spectrometry method with "inductively coupled argon plasma". After receiving the data from the device, the final processing is done by Win-Lab (offline) hardware.

The device automatically calculates noise, the shape of the solution in the specified places of the studied elements. The standards use a multi-element standard solution. The analysis is repeated 5 times and the arithmetic mean is calculated. The RSD for each element should be between 0.01 and 1.0%. The S-200 Perkin Elmer autodoser was used, the power of the generator is 1500 W, the peristaltic speed of the pump is 1.2 ml/min, the argon flow is 12-15 l/min, the plasma observation-axial point is 0.8 l/min.

CONCLUSION

1. For the introduction of Inula helenium plant, methods of plant reproduction using the in vitro method were created, in the future, good results will be achieved by producing quality exportable products. In addition, creation of a raw material base in the national economy and in obtaining medicines and increasing the number of workers will be brought.

2. When the amount of macro- and microelements in the root of Inula helenium plant was studied by "Inductively coupled argon plasma" optical emission spectrometry method on the Optima-2100DV (USA) device, Autodosator S-200 Perkin Elmer device, it was found that the root of the plant contains 44 macro- and microelements. In the composition of the root of the Inula helenium plant. Compared to other elements, the amount of calcium, potassium, sodium, phosphorus, magnesium, iron, and aluminum elements was found to be high.

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