



**DETERMINATION OF SAFETY INDICATORS OF MEDICINAL PLANT RAW MATERIALS
«RHIZOMES OF YELLOW IRIS» («*Iris pseudacorus rhizomata*»)**

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Yellow Iris (*Iris pseudacorus*)

- perennial herbaceous plant 80-150 cm high
- leaves sword-shaped, broadly linear, up to 12-15 leaves on one plant
- the flowers are large, up to 10 cm in diameter, bright yellow with purple veins on the outer perianth lobes
- a big, branched rhizome up to 40-50 cm long, the length of the links is about 10 cm and 2 cm in diameter
- the fruit is a dehiscent capsule, completely filled with round, flattened seeds

Grows throughout the European territory of Russia, with the exception of the Far North. It is found widely in Europe, Asia, and northern Africa.

- The raw materials of Yellow Iris are rhizomes.
- Contains phenolic compounds (tannins, flavonoids), polysaccharides, saponins, essential oil.
- Included in the collection named to M.N. Zdrenko
- Has long been successfully used in folk medicine for inflammatory diseases of the respiratory, urinary tract, and gynecological diseases.

Purpose:

to establish the main safety indicators for the new plant raw materials «Rhizomes of Yellow Iris».

Aims:

1. Determine the content of heavy metals and arsenic in the rhizomes of Yellow Iris;
2. Determine the content of some pesticides in Yellow Iris raw materials;
3. Determine the content of cesium Cs-137 and strontium Sr-90 in the rhizomes of Yellow Iris;
4. Make a conclusion about the compliance of raw materials with the requirements of the State Pharmacopoeia of the Russian Federation XIV ed. (SP of the RF XIV edit.)

Materials and methods:

Rhizomes of Yellow Iris were collected in the Moscow region.

The studies were carried out according to the methods of the SP of the RF, XIV edition:

- GPA.1.5.3.0009.15 «Determination of the content of heavy metals and arsenic in medicinal plant raw materials and medicinal herbal preparations»
- GPA.1.5.3.0011.15 «Determination of the content of residual pesticides in medicinal plant raw materials and medicinal herbal preparations»
- GPA.1.5.3.0001.15 «Determination of radionuclide content in medicinal plant materials and medicinal herbal preparations»
- GPA.1.2.1.1.0005.18 «Atomic adsorption spectrometry»
- GPA.1.2.1.2.0004.15 «Gas chromatography»

Results:

1. The content of arsenic, cadmium, lead, and mercury in the rhizomes of Yellow Iris was determined. The detected quantities are significantly less than permissible according to the SP of the RF XIV edit.
2. The absence of HCH, DDT, aldrin, and heptachlor in the raw materials of Yellow Iris has been established.
3. The content of cesium Cs-137 and strontium Sr-90 in the rhizomes of Yellow Iris was determined: (0 ± 46.9) Bq/kg and (10.3 ± 26.5) Bq/kg, respectively, which does not exceed the permissible levels of radionuclide content in medicinal plant raw materials and medicinal herbal preparations.
4. The established values of safety indicators for rhizomes of Yellow Iris comply with the requirements of the SP of the RF XIV edit.; raw materials of Yellow Iris, harvested in the Moscow region, are safe.

① The content of heavy metals and arsenic was determined using the AAS method (Atomic absorption spectrometer «KVANT.Z»):

- * Cadmium: $0,047 \pm 0,005$ mg/kg (Maximum permissible content according to SP of the RF XIV edit. – 1,0 mg/kg)
- * Lead: $0,31 \pm 0,06$ mg/kg (MPC – 6,0 mg/kg)
- * Mercury: $0,021 \pm 0,002$ mg/kg (MPC – 0,1 mg/kg)
- * Arsenic: $0,17 \pm 0,03$ mg/kg (MPC – 0,5 mg/kg)

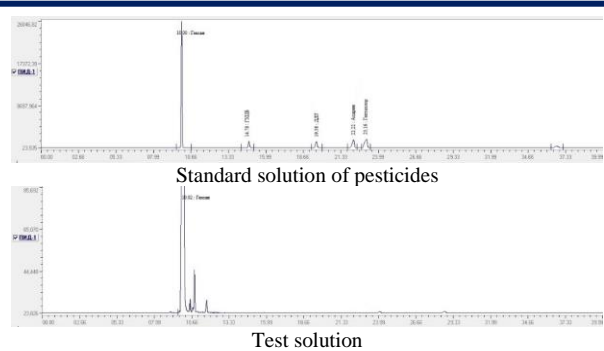
② The content of pesticides was determined by GLC with the standards of HCH, DDT, aldrin, and heptachlor.

Analysis conditions: Gas chromatograph Crystallux 4000 with flame ionization detector, HP-5MS column, length 30 m, diameter 0,25 mm. Carrier gas – nitrogen, column temperature program from 70°C to 300°C in 25 minutes (10°C/min). Injection volume 1 µl.

- ✓ No pesticides detected

③ The content of radionuclides Iris was determined radiometry («PROGRESS» spectrometric complex):

- * Cesium Cs-137: $0 \pm 46,9$ Bq/kg (Maximum permissible specific activity according to SP of the RF XIV edit.: 400 Bq/kg)
- * Strontium Sr-90: $10,3 \pm 26,5$ Bq/kg (Maximum permissible specific activity: 200 Bq/kg)



Conclusion

As a result of determining the main safety indicators for new medicinal raw materials, it was found that Yellow Iris rhizomes meet the requirements of the State Pharmacopoeia of the Russian Federation XIV edit. in terms of the following indicators: content of heavy metals and arsenic, residual pesticides, radionuclides.

Literature:

1. Родионенко Г. И., Дрягина И. В., Гатенбергер П. Ф. Ирисы; под общ. ред. Г.И. Родионенко. – 1981.
2. Алексеева Н. Б. Род *Iris* L. (Iridaceae) в России // *Turczaninowia*. – 2008. – Т. 11. – №. 2. – С. 5-70
3. Kaššák P. Secondary metabolites of the chosen genus *Iris* species / P. Kaššák // *Acta Universitatis agriculturae et silviculturae Mendelianae brunensis*. – 2012. – Т. 60. – №. 8. – С. 269-280.
4. Маевский Ф.П. Флора средней полосы Европейской части России. 11-е изд. / Ф.П. Маевский. – М.: Товарищество научных изданий КМК. – 2014. – 635 с.
5. Павлова М. А., Качур Л. Ю. *Iris pseudacorus* L. в культуре открытого грунта на юго-востоке Украины // *Проблеми екології та охорони природи техногенного регіону*. Донецьк: ДонНУ, 2010. – № 1 (10)