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DETERMINATION OF RADIONUCLIDES IN THE CHOLOGICAL COLLECTION "TRIFLOS" AND DRY EXTRACT "GEPAFLOX"

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Abstract: Studies have been conducted to assess the safety of the choleric collection "Triflos" and the dry extract "Gepafloks". Radionuclides ⁹⁰Sr and ¹³⁷Cs were determined. Studies of the radionuclide composition were carried out on the Radek beta-gamma spectrometer MKGB-01 and the MKSP-01 gamma spectrometer.

Keywords: choleric collection "Triflos", dry extract, toxicants, safety assessment, herbal medicines, regulatory documents

In recent decades, with the development of the nuclear industry and energy, as well as the use of innovative technologies, global pollution of the planet has increased and, as a result, an increase in the overall radioactive background. This is primarily reflected in plants. Modern environmental conditions lead to the accumulation of various ecotoxicants in medicinal plants, among which one of the most dangerous are heavy metals and radionuclides are no less dangerous. The use of herbal medicines increases the overall human consumption of toxic chemical contaminants present in medicinal herbs, foods, and dietary supplements. The most hazardous to health are the isotopes ⁹⁰Sr, ¹³⁷Cs, ¹³¹I. Due to its chemical similarity with calcium, ⁹⁰Sr easily penetrates into bone tissue, ¹³⁷Cs accumulates in muscles replacing potassium, and ¹³¹I accumulates in the human thyroid gland [1-4].

In accordance with modern concepts, the safety assessment of a herbal medicinal product should take into account all potential risk factors specific to this group of drugs. Modern herbal medicines are fundamentally different in terms of the

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safety of their composition. The reasons for these differences may also be new technologies for obtaining extraction products, including those using toxic solvents, potentially hazardous. The drug policy of Uzbekistan provides for the provision of the population with inexpensive, effective and safe medicines. In this regard, and also in order to harmonize the requirements with world quality standards for medicinal plant materials and herbal medicinal products, it would be advisable to additionally include the following General Pharmacopoeia articles in the SP of the Republic of Uzbekistan, I edition: "Determination of the content of heavy metals and arsenic in medicinal plant materials and medicinal herbal preparations" and "Determination of the content of radionuclides in medicinal herbal raw materials and medicinal herbal preparations". Since the safety and harmlessness of the drug directly depends on these indicators too. The General Pharmacopoeia article "Determination of the content of residual pesticides in medicinal plant materials and medicinal herbal preparations" is already included in the SP of the Republic of Uzbekistan, I edition [5-8] excipients in dosage forms, and other environmental conditions.

In the Russian Federation, radiation monitoring of medicinal products is carried out in accordance with the requirements of OFS.1.5.3.0001.15 Determination of the content of radionuclides in medicinal plant materials and medicinal plant preparations. And in Uzbekistan today there is SanPiN No. 0366-19 "Hygienic standards for food safety" standards, which we used [9].

The purpose of the study: determination of radionuclides in the choleric collection "Triflos" and dry extract "Gepafloks" in order to assess their safety and quality for use.

Experimental part.

Materials and methods:

Samples of tansy flowers, chamomile flowers and yarrow grass collected in the Tashkent region of the Bostanlyk district, as well as the dry extract of Gepaflox, obtained on the basis of the above plants at BALZAM LLC, were taken as objects of study. Studies of the choleric collection "Triflos" and dry extract "Gepafloks" for radiological parameters were carried out at the Research and Testing Radiological Laboratory of the Center for the Development of Professional Qualifications of Medical Workers under the Ministry of Health of the Republic of Uzbekistan. The laboratory is certified by the Ministry of Health of the Republic of Uzbekistan and accredited by the Uzbek Agency for Standardization, Metrology and Certification

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according to ISO 17025-2007 (Certificate of accreditation No. UZ.AMT.07.MAI.789, valid 24.02.2025).

The samples received were sent to the laboratory with sampling certificates, which indicated the name of 2 samples of medicinal herbs, the time and date of sampling, the place of sampling - the Republic of Uzbekistan, Bostanlyk district, weight - 0.8 kg. Samples were dry powders with the smell of medicinal herbs, color - from yellow to light brown.

Prior to the start of the spectrometric study, the samples were examined using a dosimeter - radiometer MKS-AT1315 (Verification certificate No. 423/05, valid until February 27, 2022). No excess of background indicators was found.

Studies of the radionuclide composition were carried out on the beta-gamma spectrometer "Radek" MKGB-01 (Certificate No. 0000299, valid until 07.05.2023). Sample preparation and analysis of countable samples were carried out according to a special "Methodology for measuring the specific activity of natural radionuclides, cesium-137, strontium-90 in samples of environmental objects and products of enterprises using a spectrometer-radiometer of gamma and beta radiation MKGB-01 "Radek" and gamma- spectrometer MKSP-01" No. 0794:2019, approved on 07.09.2019 by the Regulatory Commission of the Ministry of Health of the Republic of Uzbekistan.

The "Marinelli Vessel" geometry container was washed with laundry soap, wiped dry, treated with alcohol, weighed with a lid, filled with prepared herbal powder, well tamped, closed with a lid, weighed again and determined the mass of the counting sample. Then the prepared sample was placed in the gamma detector of the spectrometer MKGB-01 "RADEK" for the determination of cesium -137 at 3600 s. The determination of strontium-90 was carried out in the following sequence: the container of geometry "38 ml cylindrical vessel" was treated with alcohol, first weighed empty, then filled with prepared herbal powder, well tamped, weighed again and the weight of the counting sample was determined. The prepared sample with a fixed mass was placed in the beta detector of the MKGB-01 spectrometer for 3600 s.

Modern spectrometers include personal computers that automatically identify and count radioactive elements. This greatly speeds up the procedure for identifying and identifying radionuclides.

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In Uzbekistan today there are no prerequisites for environmental pollution with technogenic radionuclides, as evidenced by the obtained results of medicinal herbs on the content of artificial radionuclides Cesium - 137 and Strontium - 90.

Results and discussions. In the sample of the choleric collection "Triflos", the specific activity for Cesium - 137 was 1.56 Bq / kg, for Strontium -90 - 0.51 Bq / kg. In the sample of dry extract "Gepafloks" specific activity for Cesium-137 was 1.72 Bq/kg, for Strontium-90 - 0.82 Bq/kg (Table 1).

The assessment of the content of radionuclides in the submitted samples was carried out according to SanPiN No. 0366-19 "Hygienic standards for food safety". In Appendix No. 3 "Permissible levels of radionuclides of Cesium - 137 and Strontium - 90" in line under No. 39 "Plant-based herbal instant teas" the maximum permissible specific activities for Cesium - 137 and Strontium - 90 are indicated, which are equal to 200 Bq / kg and 100 Bq/kg, respectively.

Table 1

№	Number and name of the hitch	Cs 137 (Bq/kg)		Sr90 (Bq/kg)	
		Actual values	Norm according to SanPiN	Actual values	Norm according to SanPiN
1	3- choleric collection "Triflos"	1,56	200	0,51	100
2	4- dry extract "Gepafloks"	1,72	200	0,82	100

Conclusion: It has been established that the content of radionuclides in the presented samples of the Triflos choleric collection and the dry extract of Gepaflox are traces of cesium and strontium and is significantly lower than the norm, and therefore meets the requirements of SanPiN RUz No. 0366-19 "Hygienic standards for food safety", application 3.

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