* **Develop ways to reduce radioactivity in the body of animals and livestock products**

Radiological contamination, whether caused by nuclear accidents, industrial emissions, or medical applications, poses a significant threat to human and animal health. The accumulation of radionuclides in living organisms can lead to long-term health complications

* *The presence of radionuclides such as caesium-137 and strontium-90 in the food chain remains a critical environmental and public health concern, particularly when these substances are ingested by humans. Kazakhstan, with its history of nuclear testing, particularly at the Semipalatinsk Test Site, has experienced significant residual contamination from past nuclear explosions. This legacy continues to contribute to the presence of caesium-137 and strontium-90 in the environment, posing potential risks to both ecology and human health. The study, conducted in Kazakhstan and involving sampling of soil, plants, water and animal products, is a key step towards understanding the extent of radionuclide contamination in the region. One of the novel aspects of this study is its holistic approach, which goes beyond the traditional focus on direct food contamination. The study uniquely examines the environmental pathways that facilitate the transfer of radionuclides from soil and plants to animals, thereby providing a deeper understanding of how contamination can spread through the food chain. This multi-scale analysis integrates different environmental matrices, making it one of the first to examine the interconnected dynamics of radionuclide migration through soil, plants, water, and animal products in Kazakhstan. A particularly encouraging finding of this study was the lack of excess activity in milk and meat samples, suggesting that contamination in these specific regions may be within acceptable limits.*

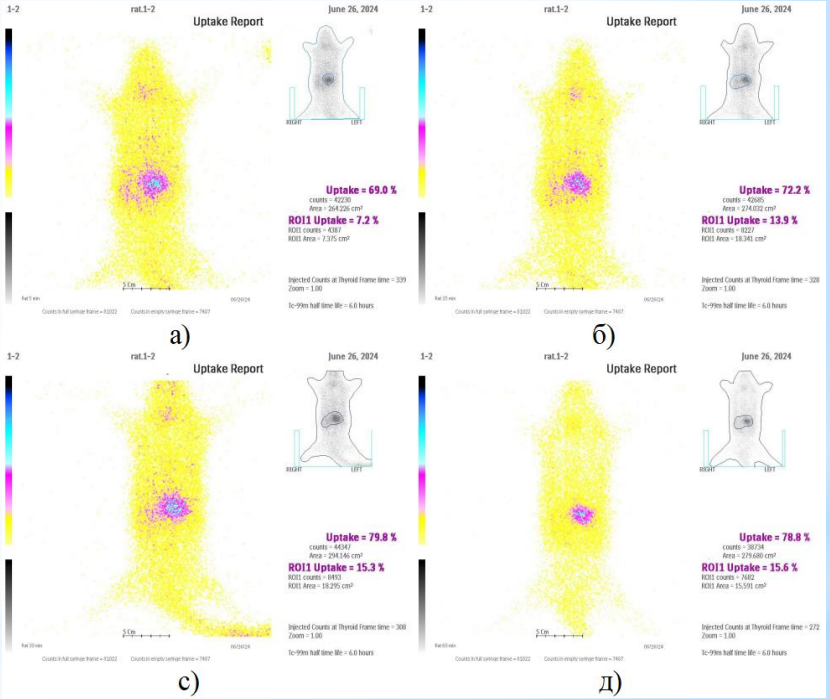
* *However, the novelty of the study lies not only in its results, but also in its emphasis on the importance of ongoing monitoring. Despite the lack of immediate health threats from these specific samples, the study highlights the need for ongoing surveillance to ensure that radionuclide levels remain within safe limits.*

* **The research was carried out with grant funding from the Ministry of Higher Education and Science of the Republic of Kazakhstan [AP19577014 "Develop ways to reduce radioactivity in the body of animals and livestock products"]. The study was conducted at Kazakh National Agrarian Research University within the Department of Veterinary Sanitation, in collaboration with the TOO NPP "Antigen" laboratory. Research was carried out in four main regions of Kazakhstan: Kyzylorda, Turkestan, Almaty, and Abay. These regions were selected based on their distinct soil, climate, and geographical features.**

* *Soil samples: Soil samples were collected from various agricultural fields at a depth of 0-50 cm to analyze the concentration of radionuclides in the soil.*
* *Plant samples: Plant samples were taken from grass growing in a semi-natural habitat. These samples represent the vegetation found in the region to assess the uptake of radionuclides.*
* *Water samples: Water samples were collected from a nearby river, representative of the region's surface waters, and tested for radionuclide contamination.*
* *Milk samples: Milk samples were collected from dairy cows raised in the region to assess the transfer of radionuclides from feed to milk.*

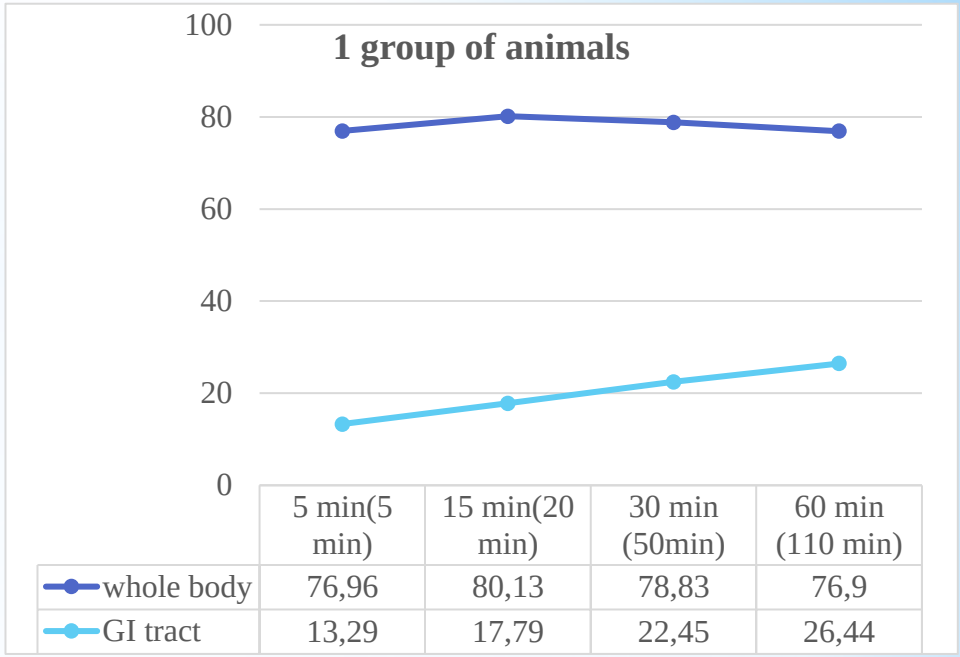
* *After sample preparation, they were placed in appropriate containers (e.g., Marinelli jars for liquid samples such as milk or graduated containers for solid samples such as soil and meat). Then, the samples were subjected to gamma-beta spectrometry using an MKS-AT1315 spectrometer.*

* One of the urgent problems of modern medicine and veterinary science is the search for effective methods of prevention and pathogenetic therapy of radiation animals. The first stage was carried out on 30 laboratory mice. According to the hematological studies of the animals' blood, all blood parameters were within the normal range.

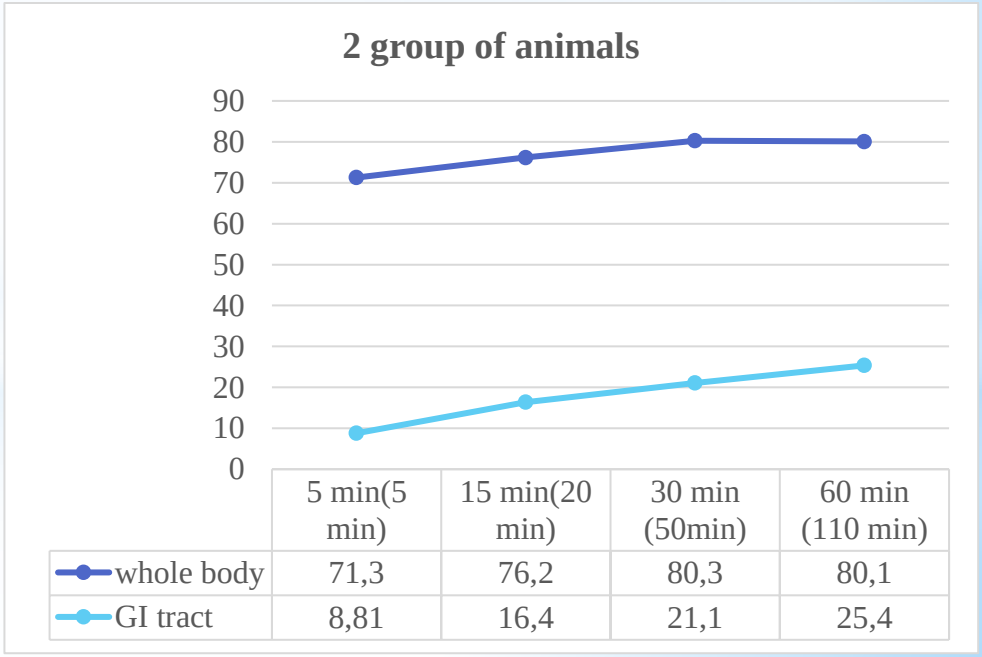


The second stage included an assessment of the effectiveness of sorbents on rats by determining the percentage of radioisotope excretion from the animal body when using the sorbent and determining the dose load from the radioisotope in dynamics (after 5, 15, 30 and 60 minutes) on critical organs (gastrointestinal tract) and its excretion from the rat body. In one group, rats were observed without the use of a sorbent enriched with shungite and bentonite. In another group, on the contrary, rats were included that received the sorbent with food (administered twice with an interval of 8-12 hours). The difference in radiopharmaceutical accumulation in the region of interest (gastrointestinal tract) between the two groups was 4.48% after 5 min (5 min), 1.39% after 15 min (20 min), 1.35% after 30 min (50 min) and 1.04% after 60 min (110 min). The study revealed a significantly higher initial accumulation of radiopharmaceuticals in the gastrointestinal tract of the first group (4.48% after 5 min), with gradually decreasing differences to 1.04% by 60 min, suggesting differences in absorption/metabolism between the groups. Shungite-enriched bentonite demonstrated high efficiency as a radioprotective sorbent, reducing radionuclide-induced damage when administered twice at an interval of 8-12 hours and maintaining chemical stability. Its use has strengthened adaptive regulatory mechanisms for accelerated removal of radionuclides, reducing the risks of radiation-induced pathologies.

These results indicate potential differences in the absorption or metabolism of the preparation in this organ between the two groups. Regarding the use of sorbents, combinations of the two components have obvious advantages over separate use, due to the specifics of their metabolism, and these advantages have a positive effect on the body's condition after radiation, which is especially important. Their combination forms the most effective sorbent for the absorption and elimination of isotopes.



	5 min(5 min)	15 min(20 min)	30 min (50min)	60 min (110 min)
whole body	76,96	80,13	78,83	76,9
GI tract	13,29	17,79	22,45	26,44



	5 min(5 min)	15 min(20 min)	30 min (50min)	60 min (110 min)
whole body	71,3	76,2	80,3	80,1
GI tract	8,81	16,4	21,1	25,4

Thank you