

CAESIUM 137 IN FOOD AND DRINKING WATER IN KASHKADARYA AND THE LIMITS OF DIETARY EXPOSURE INFERENCE

Sarvar Samadov

Dilorom Sheralieva

Valeriya Saipova

Javokhirbek Uktamov

Khojiakbarkhoja Akhrorov

Firuza Yuldasheva

Tashkent State Medical University, Uzbekistan

Abstract

This analytical review considers a reported Kashkadarya dataset comprising 12 plant-food samples, five meat samples and four drinking-water samples. The supplied caesium manuscript reports average Cs-137 activities of 1.7 ± 0.4 Bq/kg in plant foods, 7.1 ± 4.2 Bq/kg in meat and 0.08 ± 0.05 Bq/kg in water. Ratios to the source-listed comparison values were 1.42%, 4.44% and 0.73% respectively. The article separates food concentration from intake and dose, and explains why the observed ordering does not establish biological accumulation. A summary table and ratio chart provide a descriptive comparison. The results justify continued food-specific surveillance, while individual dose estimation requires consumption information, measurement uncertainty and a confirmed exposure model.

Keywords: Caesium 137; dietary exposure; food surveillance; drinking water; secondary analysis; Kashkadarya.

Introduction

The presence of Cs-137 in a food sample is an environmental observation. Its contribution to personal exposure depends on the amount consumed, the time period and radionuclide-specific dose conversion. A concentration study can therefore inform surveillance without demonstrating tissue accumulation or disease. UNSCEAR's recent public-exposure assessment [2] provides a broad context for this distinction.

The aim is to reinterpret the supplied Cs-137 results through an ingestion-pathway framework. The article concentrates on differences among plant foods, meat and water, while identifying the additional evidence needed for dose estimation. This focus is distinct from the dual-nuclide food analysis and from water gross-activity screening.

Source data and review approach

The supplied manuscript by Yuldasheva FU [1] describes 17 food samples and four water samples: 12 plant-food, five meat and four drinking-water observations. Its table reports values using a plus sign; these are reproduced as $\pm$ to preserve the intended accompanying quantity, whose statistical type is not specified. The collection year is not stated, although sampling is described as summer–autumn.





The source attributes Cs-137 determination to gamma spectrometry using an MKGB-01 RADEK spectrometer-radiometer and a documented sample-preparation method. This review did not access laboratory spectra, individual measurements, detection limits or calibration records. It consequently uses only the reported category summaries.

The manuscript is treated as a distinct dataset description, not pooled with the 27-sample food study. Their sampling relationship is undocumented and their group values differ. Descriptive ratios were calculated against the source-listed comparison values of 120 Bq/kg for plant foods, 160 for meat and 11 for water. These ratios are not a shared health-risk scale or an independently verified current legal determination.

Reported concentrations and comparison ratios

Mean Cs-137 activity in meat, 7.1 Bq/kg, was approximately 4.18 times the plant-food mean of 1.7 Bq/kg. This is a ratio of reported averages; it does not imply that every meat sample exceeded every plant-food sample. The broad accompanying quantity for meat, ± 4.2 , also cannot be used as a confidence interval without knowing its definition.

Table 1. Cs-137 summaries and calculated ratios from the supplied manuscript [1]

Category	n	Cs-137, Bq/kg	Source comparison	Mean / comparison
Plant foods	12	1.7 ± 0.4	120 Bq/kg	1.42%
Meat	5	7.1 ± 4.2	160 Bq/kg	4.44%
Drinking-water	4	0.08 ± 0.05	11 Bq/kg	0.73%

The type of $\pm$ quantity and sampling year are unspecified. Comparison values are reproduced from the source.

Mean water activity was 0.08 Bq/kg. Relative to the source-listed comparison values, plant foods represented 1.42%, meat 4.44% and water 0.73%. All category means were below their respective comparison values. Individual compliance cannot be reconstructed from these averages because the highest sample values are unavailable.

The figure normalizes categories only to illustrate the original comparison. Water retains the reported Bq/kg unit; conversion to a volume basis was not performed. A higher category ratio does not automatically identify the largest contributor to dietary dose, since the amount consumed differs among food and water categories.

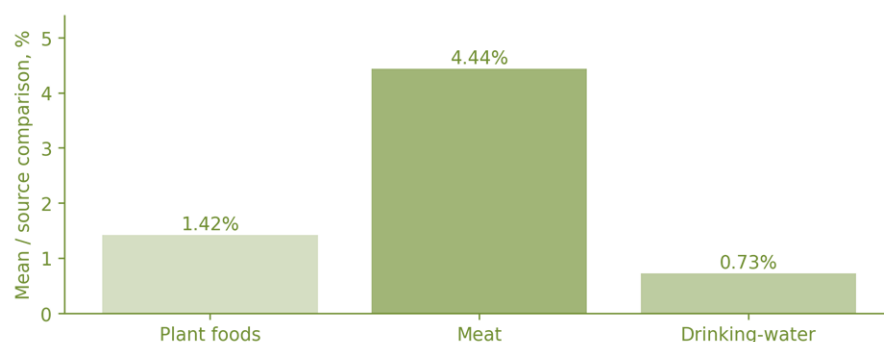


Figure 1. Mean Cs-137 as a percentage of the category-specific source comparison. Ratios do not represent personal dose or risk.



From concentration to dietary exposure

The observed meat-to-plant difference may be consistent with several explanations, including source location, feed characteristics and sampling composition. Demonstrating transfer from soil to vegetation or from feed to meat would require matched measurements and an explicit transfer analysis. The available dataset does not support a causal statement that the difference resulted from prolonged accumulation.

A future ingestion assessment should combine the measured activity of each food with consumption over a defined period. Water intake requires its own source and volume information. Relevant dose coefficients should be applied only after specifying age and radionuclide. Missing inputs cannot be replaced by an assumed “average resident” without transparent justification.

WHO food-and-water resources [3] and drinking-water guidance [4] support treating exposure and water quality as linked but separate questions. The authors propose prioritizing frequently consumed local products, documenting preparation and retaining detection-limit information. This would improve the practical interpretation of low concentrations without inventing a population dose.

Quality-assured sampling is equally important. The IAEA 2025 monitoring guide [5] offers an organizational framework, and ALMERA proficiency-testing resources [6] provide an external analytical check. The next study should record product origin, sample mass, counting conditions and uncertainty, enabling verification and comparison across seasons. No inference about immune, endocrine or cardiovascular effects follows from the reported concentrations.

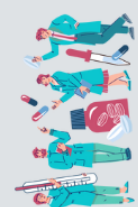
Conclusion

The supplied Cs-137 study reports low category means relative to its stated comparison values, with the highest descriptive ratio in meat. It establishes measurements relevant to surveillance, not individual accumulation or health outcomes. Additional consumption and laboratory data are needed before estimating dietary exposure, and overlap with other food datasets must be resolved before pooling.

References

1. Yuldasheva FU. Caesium 137 in food and drinking-water of Kashkadarya Region, Uzbekistan. Supplied manuscript “Статья Цезий-137”. Unpublished material; sampling year not specified.
2. Niyazova, O. A., Yuldasheva, F. U., & Norqulov, S. J. (2025). SLEEP HYGIENE OF STUDENTS. In Innovate Conferences (pp. 13-16).
3. IAEA. Monitoring for Protection of the Public and the Environment. Safety Standards Series No. GSG-19. Vienna; 2025. doi:10.61092/iaea.i7sy-xqd1.
4. Юлдашева, Ф. (2020). Organization of work universities during the covid 19 pandemic. In International Conference, San Francisco, California, USA.
5. IAEA. Protection of Workers Against Exposure Due to Radon. Safety Standards Series No. SSG-91. Vienna; 2024. <https://www.iaea.org/publications/15711/protection-of-workers-against-exposure-due-to-radon>
6. IAEA. ALMERA Proficiency Tests. IAEA-TERC-2023-01/02 environmental radioanalytical exercises. 2023. <https://analytical-reference-materials.iaea.org/almera-proficiency-tests>





7. Тахиров, М. Т., Бекжанова, Е. Е., & Юлдашева, Ф. У. (1991). К обоснованию ПДК зерновой пыли в атмосферном воздухе. Гигиена и санитария, (8), 14-16.
8. Sherkuzieva, G. F., Salomova, F. I., Samigova, N. R., & Yuldasheva, F. U. (2023). RESULTS OF TOXICITY STUDY OF BIOLOGICAL FERTILIZER" YER MALHAMI. FOR INHALATION CHRONIC EFFECTS.
9. Шеркузиева, Г. Ф., Саломова, Ф. И., Самигова, Н. Р., & Юлдашева, Ф. У. (2023). Результаты изучения токсичности биологического удобрения «Ер малхами» при ингаляционном хроническом воздействии. Журнал новый день в медицине, 5, 55-58.
10. Шеркузиева, Г. Ф., Саломова, Ф. И., & Юлдашева, Ф. У. (2023). Токсичность “Ер малхами” при ингаляционном хроническом воздействии.
11. Sherkuzieva, G. F., Salomova, F. I., Samigova, N. R., & Yuldasheva, F. U. (2023). RESULTS OF TOXICITY STUDY OF BIOLOGICAL FERTILIZER" YER MALHAMI" FOR INHALATION CHRONIC EFFECTS. Central Asian Journal of Medicine,(1), 110-115.
12. Миррахимова, М. Х., Садуллаева, Х. А., & Кобилжонова, Ш. Р. (2022). Значение экологических факторов при бронхиальной астме у детей (Doctoral dissertation, Россия). Рустамова, ХЕ, Нурмаматова, КЧ, & Машарипова, Р. Некоторые аспекты состояния здоровья населения Узбекистана. ББК, 51, 118.
13. Юлдашева, Ф. (2018). Socio-Hygienic Study Of The Health Of Children Born With High Weight. International Scientific Journal ISJ &Applied Scince Philadelphia, USA,(11).
14. Salomova, F. I., Yuldasheva, F. U., Sherkuzieva, G. F., & Sharipova, S. A. (2024). STUDYING THE EFFECT OF IRRATIONAL NUTRITION ON THE STUDENT'S BODY.
15. Sherkuzieva, G. F., Salomova, F. I., & Yuldasheva, F. U. (2023). RESULTS OF STUDYING THE INFLUENCE OF BIO-FERTILIZER “YER MALHAMI” ON THE QUALITY OF WATER BODIES. Central Asian Journal of Medicine,(4), 109-120.
16. Рахимов, Б. Б., Мирсагатова, М. Р., & Садирова, М. К. (2024). ВЛИЯНИЕ МОНИТОРИНГА КАЧЕСТВА ВОЗДУХА НА ОБЩЕСТВЕННОЕ ЗДОРОВЬЕ И ЭКОЛОГИЧЕСКУЮ УСТОЙЧИВОСТЬ В УЗБЕКИСТАНЕ. International Conference on Innovations in Applied Sciences, Education and Humanities.
17. Абдукадилова, Л. К., Юлдашева, Ф. У., & Мирсагатова, М. Р. (2022). Анализ Изучения Состояния Организации Здорового И Доброкачественного Питания В Детских Дошкольных Учреждениях.
18. Юлдашева, Ф., Стожарова, Н., Рустамова, Х., & Зупарова, Д. (2015). Факторы риска развития злокачественных новообразований у детей. In Сборник научных трудов Республиканской научно-практической конференции “Профилактическая медицина: Гигиеническая наука и практика” Ташкент–2015г. С (pp. 87-89).
19. Саломова, Ф. И. (2008). Особенности физического развития школьников с нарушениями осанки. Вестник Санкт-Петербургской государственной медицинской академии им. ИИ Мечникова, (4), 48-50.
20. Imamova, A. (2023). FEATURES AND PROSPECTS OF THE DEVELOPMENT OF CHILDREN'S NUTRITION IN THE PRESCHOOL INSTITUTION.
21. Imamova, A. (2023). Studying the health of frequently ill children of older preschool age and methods for forming a healthy lifestyle.





22. Akhmadalieva, N. O., Imamova, A. O., Niyazova, O. A., Muratbayeva, A. P., & Umarov, B. A. (2023). Hygienic characteristics of harmful factors of working conditions of infectious diseases doctors. *Neo Science Peer Reviewed Journal*, 8, 57-60.
23. Imamova, A. O., & Bobonazarova, M. N. (2022, November). Renewable energy sources as a measure to prevent the depletion of the ozone layer. In *Uzbekistan-Japan International Conference «Energy-Earth-Environment-Engineering»*.
24. Юлдашева, Ф. (2022). Совершенствование работы мобильных бригад в амбулаторно-поликлинических учреждениях системы железнодорожного транспорта в условиях пандемии COVID-19 в Республике Узбекистан. In *Международная научно-практическая конференция «COVID-19 и другие актуальные инфекции Центральной Азии» Шымкент*.
25. Шеркўзиева, Г. Ф., Саломова, Ф. И., & Юлдашева, Ф. У. (2023). Озиқ овқат қўшимчалари ва аҳоли саломатлиги.

