

**Review of the doctoral (PhD) dissertation titled**  
***Investigation of the Geochemical Behaviour and Soil to Food-Chain Transfer of Various***  
***Man-Made Radioisotopes***  
**by *Ganbaatar Tuvshinsaikhan***

The doctoral thesis investigates the behaviour of artificial radionuclides in soils and their transfer through environmental compartments into the food chain. The relevance of this topic is high, as it integrates soil geochemical characterisation with transfer factor measurements, thus offering insight into the mechanisms that govern radionuclide mobility. The study focuses on the Semipalatinsk Test Site (STS), one of the most complex and historically significant nuclear legacy sites worldwide, where long-lived radionuclides continue to pose environmental and radiological challenges decades after nuclear testing.

The thesis is logically structured and well balanced. It consists of abstracts, followed by a clear introduction and a well-defined statement of the research problem. The literature review outlines the fundamental concepts of the subject and provides detailed information on the study area, test conditions, and radioanalytical methods applied. The author demonstrates a solid understanding of radioecological concepts, including radionuclide speciation, mobility, bioavailability, and transfer parameters.

The results are presented in a logical sequence, and conclusions are consistently derived from the presented data. From a formal perspective, the thesis meets the requirements of the Chemical Engineering and Materials Sciences Doctoral School of the University of Pannonia. The language is generally clear and professional, technical terminology is used correctly, and only minor typographical issues are present.

The numbering of figures and tables is logical and easy to follow, and the figures and tables themselves are well designed and support the interpretation of the results. The thesis concludes with a summary of the main findings, followed by a comprehensive bibliography and a list of the candidate's related publications. The quality and quantity of the cited literature are appropriate.

The procedures and analytical methods applied in the research are up-to-date and suitable for achieving the stated objectives. The experimental part of the thesis is clearly structured, with a logical progression of topics, and the graphical elements effectively support data interpretation.

One of the major strengths of the dissertation is the integration of environmental characterisation with controlled animal feeding experiments, allowing a valuable linkage between soil geochemistry and internal radionuclide distribution in livestock tissues.

The discussion demonstrates critical scientific thinking. The author does not merely report numerical results, but places them in the context of existing international literature, highlighting both consistencies and deviations. The conclusions are well supported by the data and have practical relevance for livestock management and food-chain risk mitigation in contaminated regions. The results are applicable beyond the STS and provide insights relevant to other contaminated environments.

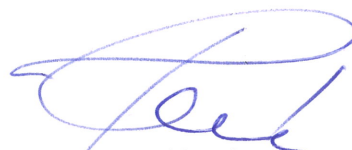
The candidate's related publications further demonstrate his ability to conduct independent, high-quality scientific research. The theses are concise, clearly formulated, and supported by experimental results. *I accept the scientific findings contained therein.*

*Overall, the content and style of the thesis fulfil the criteria of a doctoral dissertation. I consider it suitable for public discussion and, subject to successful defence, I support the awarding of the doctoral degree.*

**Question:**

Do you think that food preparation and cooking methods can significantly influence human exposure resulting from the consumption of contaminated animal products?

Szekszárd, 2025. december 15.



Dr. Radó Krisztián