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Review

Zhanat Baigazinov „ GENERAL METHODOLOGY FOR ASSESSMENT THE CONTENT OF

ARTIFICIAL RADIONUCLIDES IN LIVESTOCK PRODUCTS PRODUCED IN AREAS POLLUTED BY NUCLEAR TESTS”

PhD thessis

Novelty and Relevance of the Dissertation Topic

The topic of this thesis is the repurposing of Kazakhstan’s nuclear test zones for livestock farming. Given that these areas have been subjected to severe radioactive contamination and that the current activity concentration of radionuclides in the soil still reaches millions of units, livestock farming and grazing continue to pose radiological risks. The transfer factors determined in this study help establish which parts of certain native livestock can be consumed without radiological risk.

The thesis is also important because the test zone covers vast areas. The transfer parameters and concentration data set as goals in the thesis are of great significance, as they allow for an easier determination of which animal species can graze in which areas and which parts of the animals are safe for consumption; while also identifying parts whose consumption carries an increased risk of additional radiation exposure.

In this regard, the candidate has done an excellent job, and the data they provided could significantly increase the areas suitable for grazing. For their country, this represents a substantial societal advancement, which could be realized through the candidate's work.

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Structure of the Dissertation

The structure of the dissertation is proportional and well-organized. The thesis consists of the following chapters: after the abstracts in English and Kazakh, a brief introduction and statement of objectives follow. The chapter titled *Historical and Environmental Overview of the STS* illustrates the fundamental concepts of the topic and provides a detailed description of the studied area, i.e., the test zone. There is a comprehensive description of essential topics for the research, such as climate conditions and soil types. The candidate also describes the contamination levels characteristic of the area, covering both vegetation and water.

This is followed by the chapter *Materials and Methods of Research*, which provides information about the research site and the animals involved in the study. The description of the measurement methods includes the explanation of the transfer factor and dose calculations. The candidate thoroughly presents the various research strategies applied to horses and cattle. Additionally, they describe tissue sampling from the organs with accuracy relevant to the research. Subsequently, there is a detailed description of the measurement methods, including the alpha and gamma spectrometry techniques. This chapter also includes the measurements related to soil and the estimates of transfer factors.

A full chapter is dedicated to the thesis's most significant aspect, titled *Transfer of Radionuclides to Livestock and Poultry Tissues*. This chapter presents the results of the measurements on transfer factors, forming an essential and substantive part of the dissertation.

The research results and future perspectives are discussed in the fifth chapter, titled *Assessment of the Possibility of Livestock Farming on the STS*. Finally, the candidate summarizes the entire thesis concisely over four pages.

The structure of the dissertation meets the requirements set by the Doctoral School of Chemical and Materials Science at the University of Pannonia.

The style of the dissertation is appropriate, and the text is clear and logical. After the workplace discussion, the suggested inaccuracies and minor errors were corrected. The numbering of the figures and tables is logical, easy to follow, illustrative, and well-developed, making them easy to understand.

Quality of the Literature Review

The thesis references 131 literary sources, primarily articles from international scientific journals, as well as textbooks/university notes in English and Hungarian, and

relevant domestic and international legislation. The quality and quantity of the referenced literature are appropriate. The appendices attached to the thesis significantly aid in understanding the results presented.

Modernity of the Experimental Section and Quality of Research Results

The procedures and analytical methods used in the research are modern and suitable for achieving the objectives outlined. During the research, the activity of radionuclides in the samples was determined using various measurement methods, including alpha and gamma spectrometry. The experimental section of the dissertation is clearly and proportionally presented, with logical progression in the processing of sample types. The figures and tables contribute to a better understanding of the results.

The formulation of the theses is clear, supported by results, and appropriately concise**.** ***I accept the results presented in the thesis as scientific findings***

Overall Evaluation

In their dissertation, the candidate has demonstrated their ability to conduct independent research and engage in the related publication activities. The candidate has published three papers related to the topic of the dissertation, being the first author on one and a co-author on two. Additionally, they have contributed to 14 conference proceedings, being the first author in 7 cases and presenting orally. Their list of other publications, not directly related to the topic, includes 9 articles. Their publication performance ***meets the minimum requirements*** set by the ***Doctoral School of Chemical and Materials Science at the University of Pannonia***.

The content and format of the dissertation meet the requirements of a doctoral thesis, and I therefore recommend its acceptance. ***I consider the dissertation suitable for public defense, and in the case of a successful defense, I support the awarding of the doctoral degree***.

Data:

07.10.2024 Cluj-Napoca

Signature:

dr. habil. Begy Robert-Csaba

Associated professor