

## Response to Dr. Radó Krisztián's review

I would like to thank the Reviewer for taking the time to review my thesis entitled: "Investigation of the geochemical behaviour and soil to food-chain transfer of various man-made radioisotope".

### Question:

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

Yes, the way food is prepared and cooked can significantly influence human exposure to radioactive contaminants from animal products, though the degree depends on the type of radionuclide and the food processing method.

Animals can absorb radionuclides mainly by eating contaminated feed or drinking contaminated water. These radionuclides then appear in milk, eggs, or meat. Different radionuclides behave differently:  $^{137}\text{Cs}$  spreads through soft tissues like muscle,  $^{90}\text{Sr}$  builds up in bones, and  $^{131}\text{I}$  collects in milk and the thyroid.

Cooking and food processing can change radionuclide levels in animal products. Washing and peeling mostly remove surface contamination, not radionuclides already in tissues. Boiling, simmering, or stewing can make water-soluble radionuclides, like  $^{137}\text{Cs}$  and  $^{131}\text{I}$ , leach into the cooking water—discarding the water reduces exposure. Frying or baking can affect fat-soluble radionuclides, like  $^{210}\text{Po}$ , which may concentrate in fats. Canning, curing, and smoking can bind some radionuclides more strongly to proteins or fats, but many isotopes remain largely unaffected. Fermentation and cheese-making can shift water-soluble radionuclides, such as  $^{131}\text{I}$ , into whey, leaving curds with lower contamination.

The effect of cooking on radionuclide levels depends on several factors. The type of radionuclide matters:  $^{137}\text{Cs}$  and  $^{131}\text{I}$  are more affected by cooking, while  $^{90}\text{Sr}$  is less so. Tissue type also matters, as contaminants in fat, muscle, or bone respond differently. Cooking method and duration are important too—longer boiling or leaching generally reduces water-soluble isotopes more effectively.

Sincerely yours,

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