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The Environmental Science Education for Sustainable Human Health in commemoration of Professor Armen Saghatelyan





Food & Radioactivity

Natural and artificial gamma-emitting radionuclides in food consumed in Yerevan

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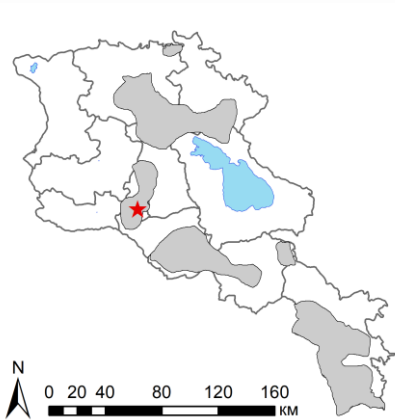
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Motivation

- Presence uranium-bearing regions through Armenia.
- Prevalence of local geology in NORM activity concentration in agricultural soils.
- Existence of Nuclear Power Plant
- Country imports a big portion of foodstuff such as cereals, sunflower oil, butter, milk powder, etc. from the states partly affected by the Chernobyl accident.
- Radiation doses and potential risk to human health due to exposure to NORM and artificial radionuclides via food consumption have never been studied in Armenia



U-bearing regions



ANPP



Import



Aim of the study

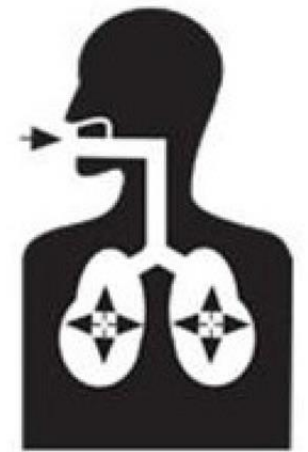
Assessment of human exposure to naturally occurring and artificial radionuclides via food consumption in Yerevan.



External exposure



*Internal exposure:
Ingestion*



*Internal exposure:
Inhalation*





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Methods: Total Diet Study

Dr. Davit Pipoyan



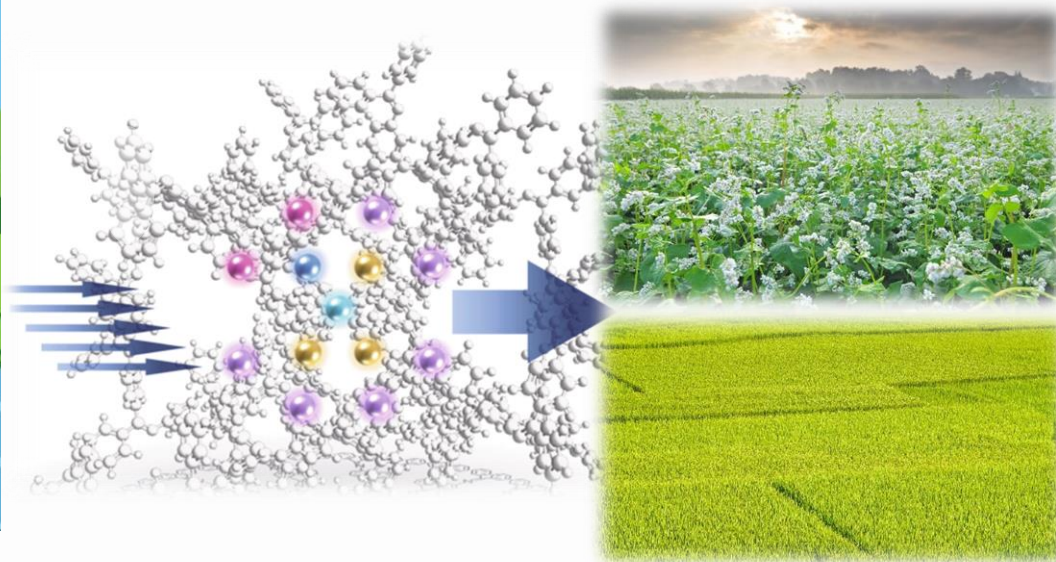
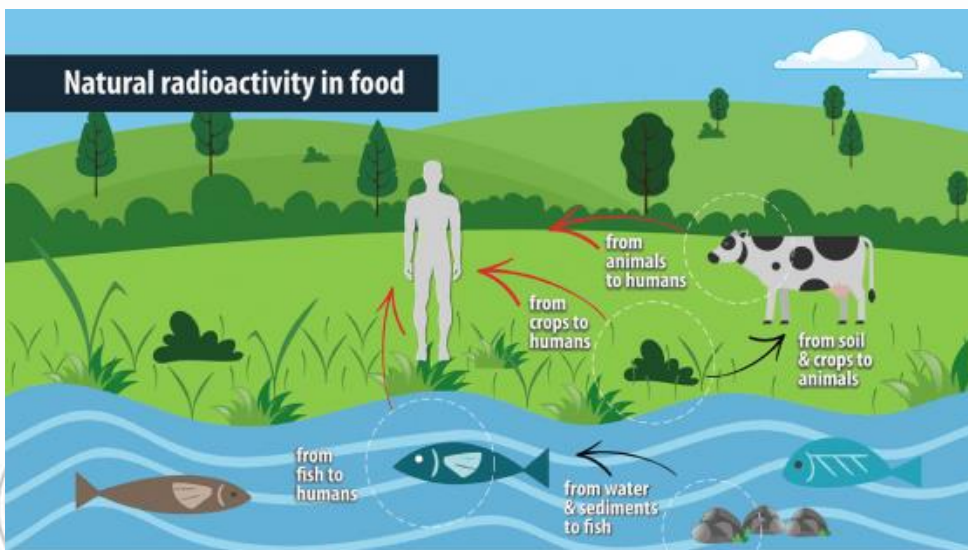
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- A harmonized approach to collect chemical contaminant information
- ✓ establishment of a harmonized list of foods (with respective food preparation instructions)
 - ✓ food consumption surveys data of the population's diet, and representative sampling plans developed accordingly;
 - ✓ defining, where possible, the preparation, storage and analytical requirements (e.g. limit of detection and limit of quantification of the analytical methods) for the harmful and beneficial chemical substances of interest, to be implemented and reported in a TDS.



Objective: to assess the risks to the health of the population of Yerevan caused by exposure to trace elements and radionuclides through consumption of food



Study the peculiarities of food consumption by the population:



Study the presence of heavy metals and radionuclides in food sold in Yerevan:

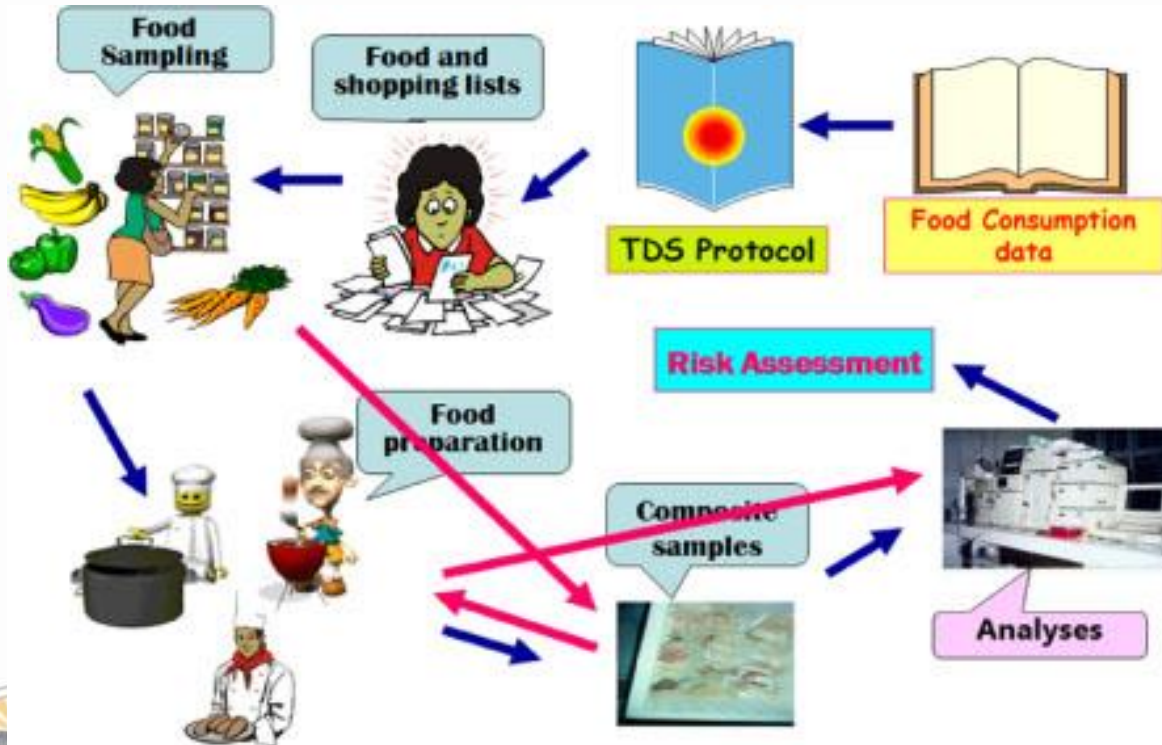


To assess the possible risks caused by chronic exposure to heavy metals and radionuclides:



SCIENTIFIC NOVELTY

For the first time, the application of the methodological approach of TDS

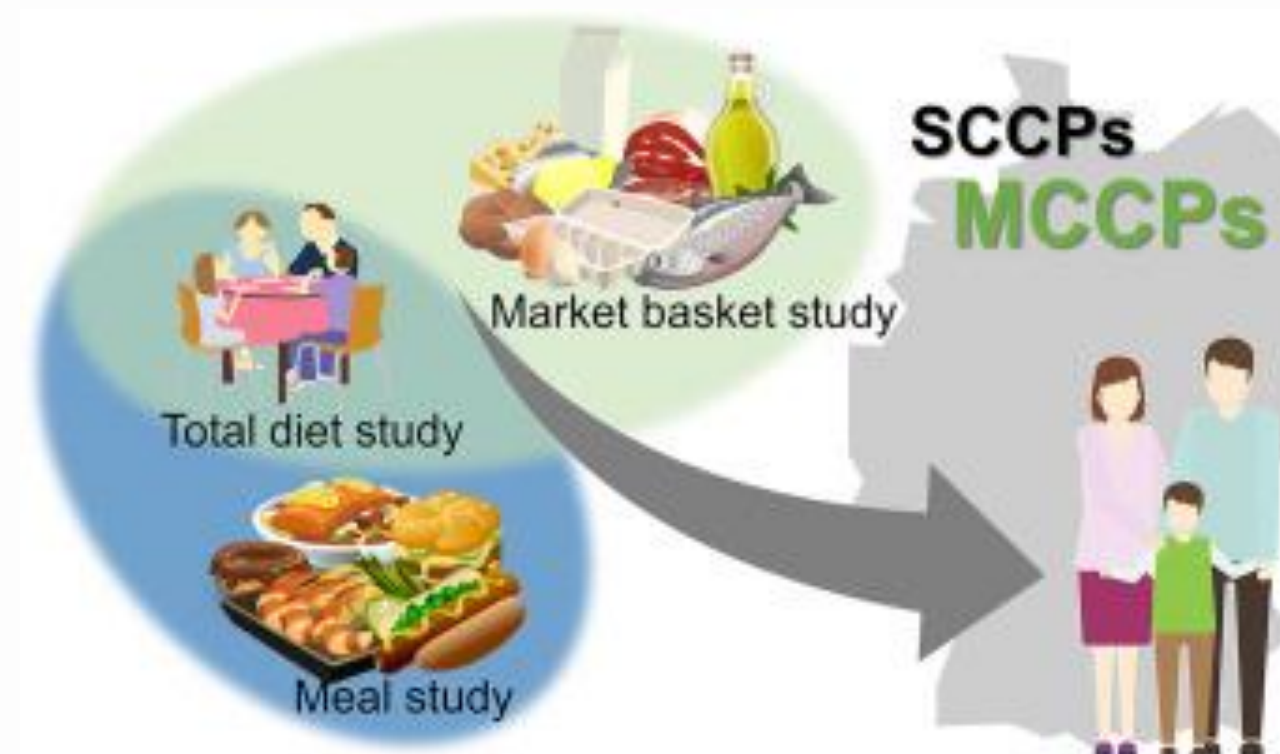
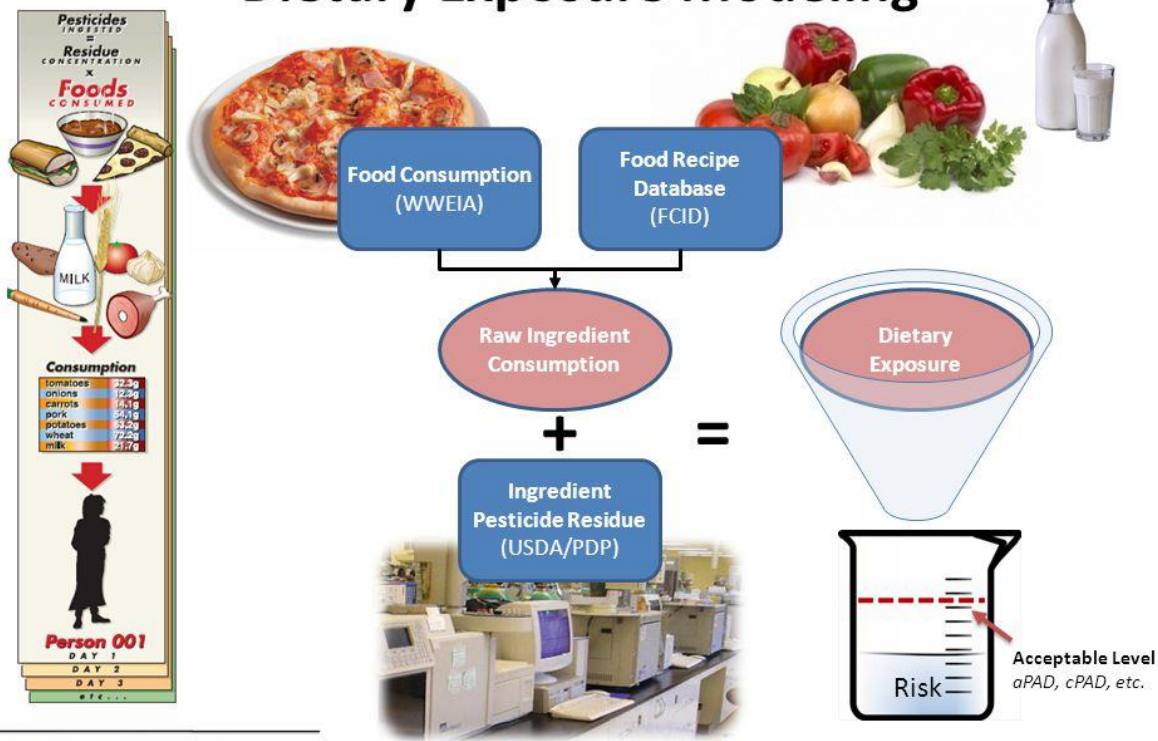


«Risk assessment of heavy metals in food products sold in Yerevan»
(code '18T-4A303) results of work within the framework of the thematic program:



TDS

Dietary Exposure Modeling

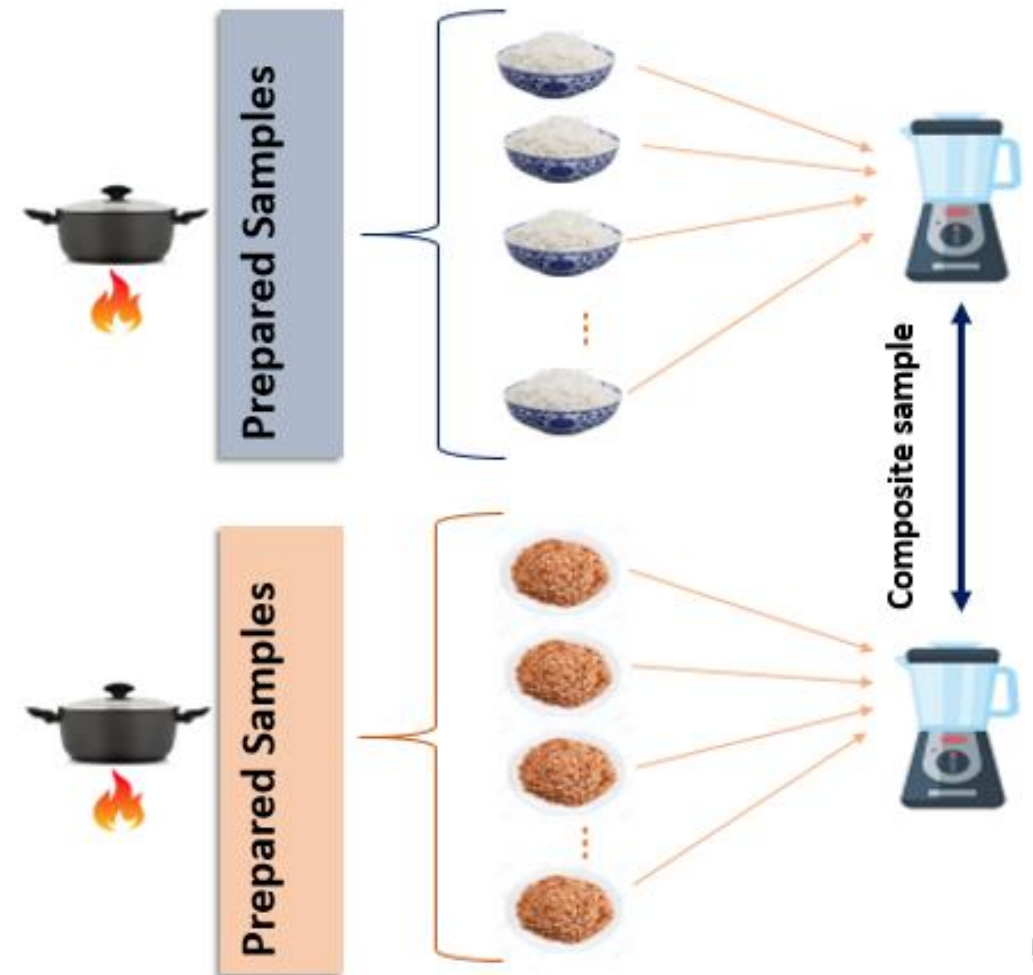


Dietary research

- ❖ 24-hour recall method
- ❖ Survey participants: 1,272 people aged 18 to 70 years:



Sampling and preparation





SAMPLING AND POOLING

Group	Pooled sample	Number of subsamples	Group	Pooled samples	Number of sub
Flour based products	Bread	16	Meat products	Beef	6
	Lavash	16		Pork	4
	Rise	8		Poultry	6
	Buckwheat	8		Sausage products	8
	Groat and emmer	8		Pelmeni and khinkali	4
	Macaroni and vermicelli	8		Fish	4
	Waffles and cookies	10		Egg	Egg
Milk and milk products	Pasteurized milk	8	Fruit-vegetables	Fruits (<i>apple, pear, peach, grape, etc</i>)	14
	Matsun	8		Vegetables (<i>tomato, cucumber, pepper, eggplant, zucchini, ect</i>)	8
	Sour cream	8		Potato	8
	Cheese	8	Coffee	Black coffee	10
	Butter, spread	8	Water	Tap water	12
	Curd	8			

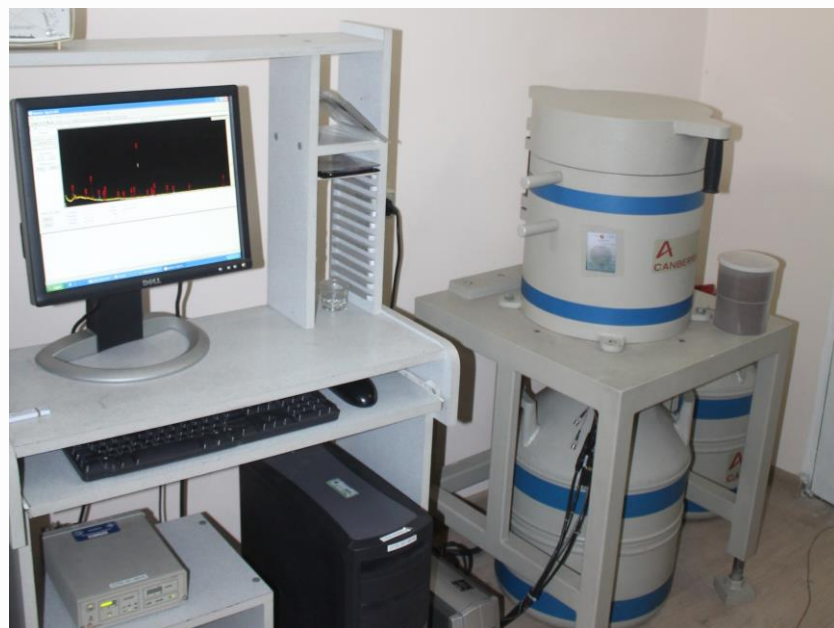


Lab works: Sample pretreatment

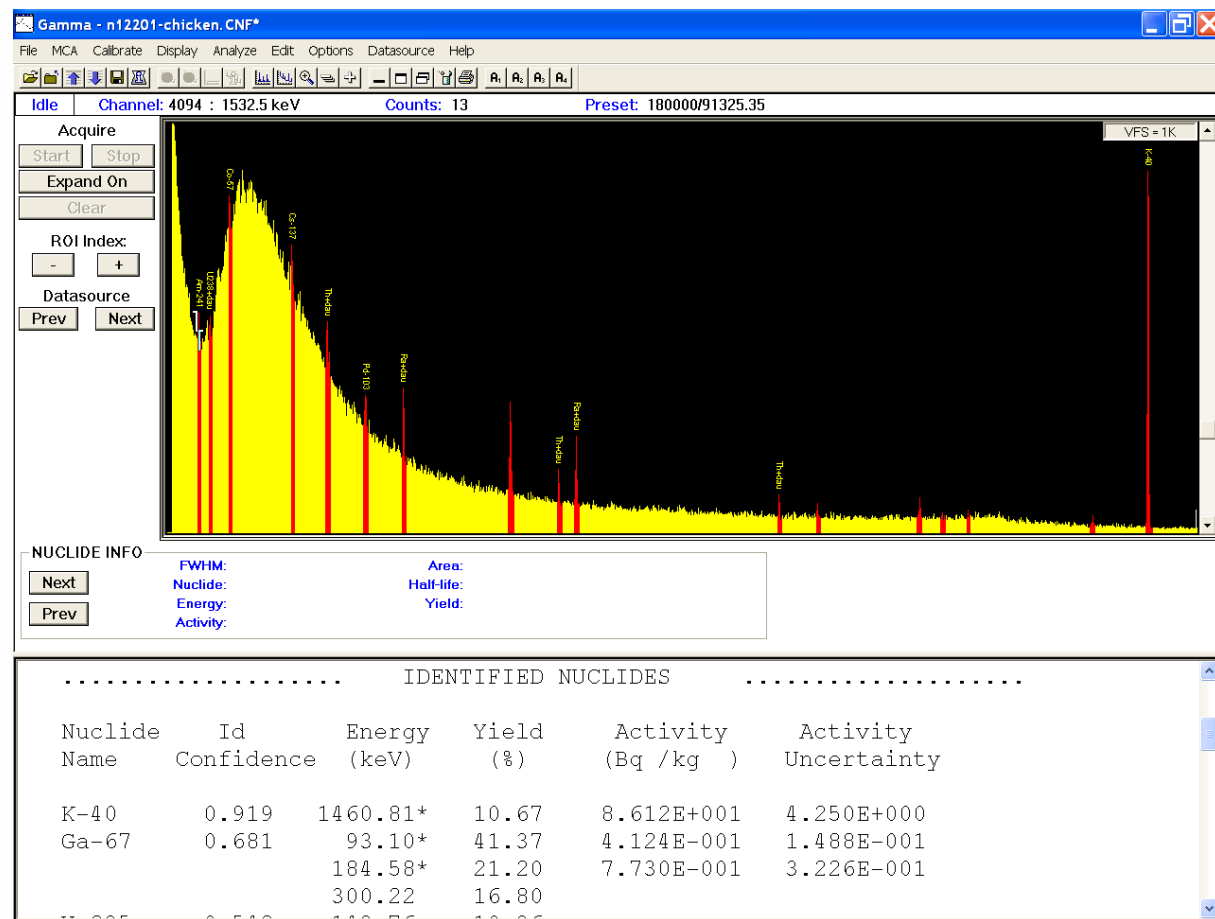
Pooling
 Homogenization



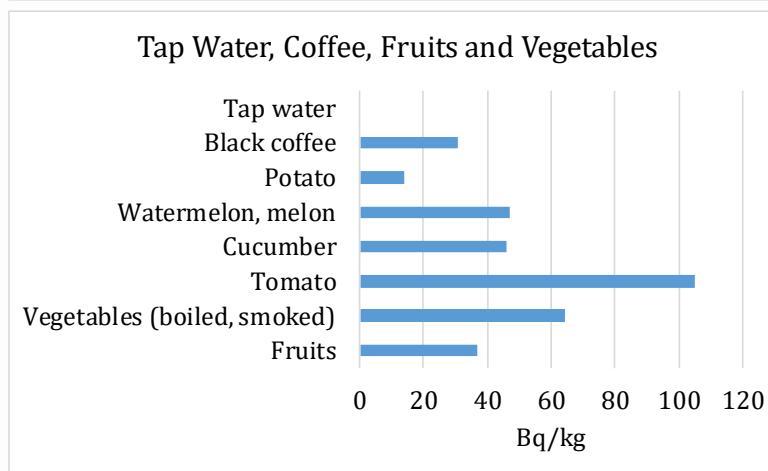
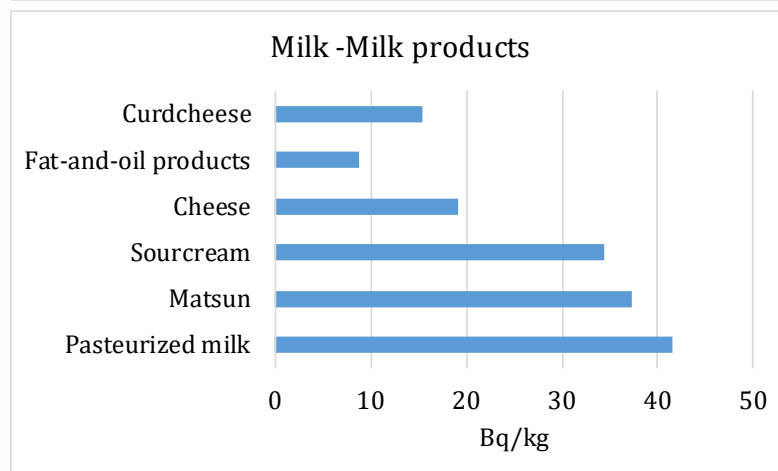
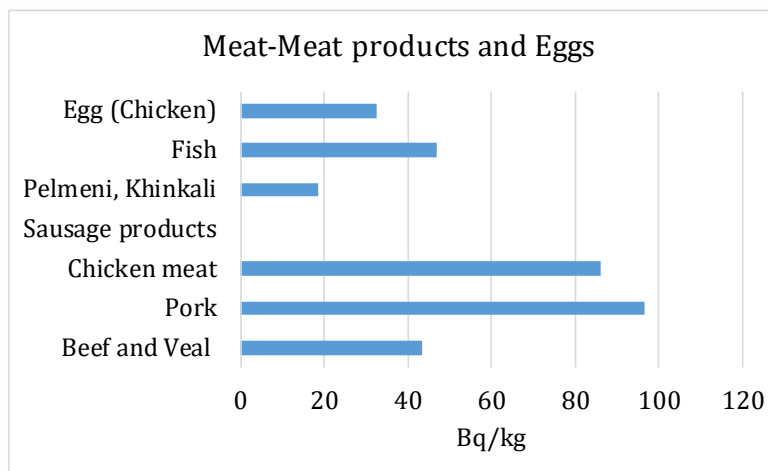
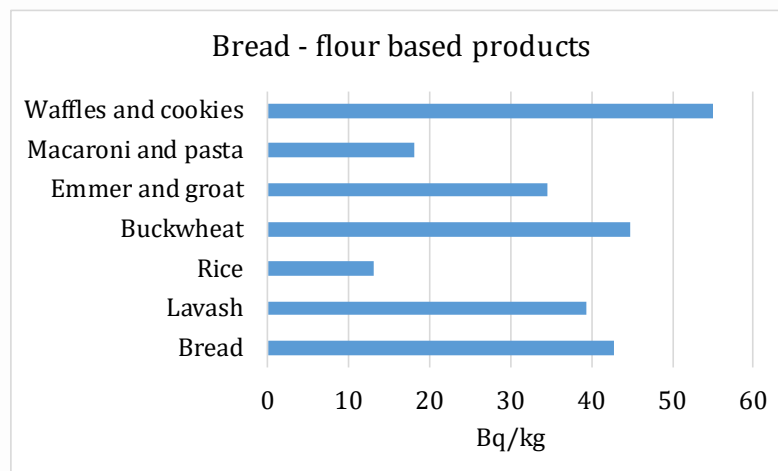
Lab works: Gamma spectrometry



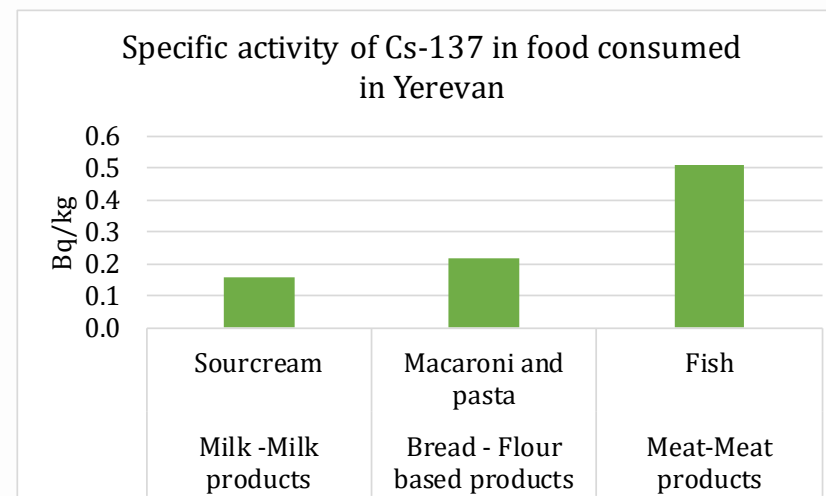
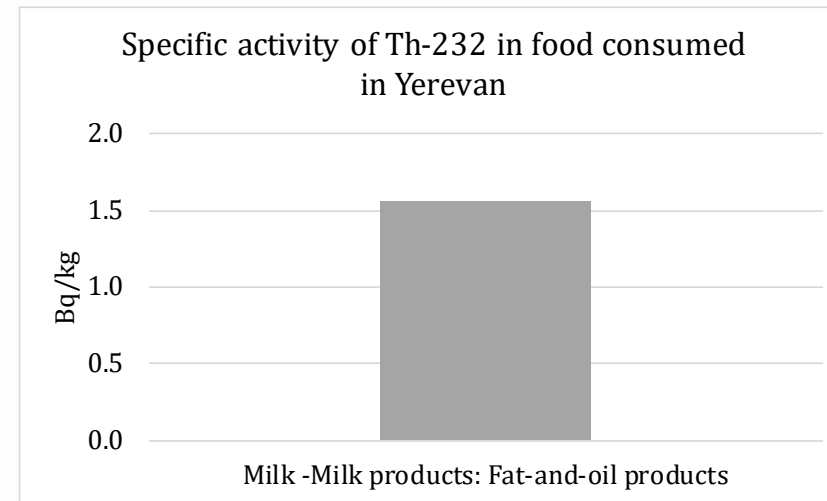
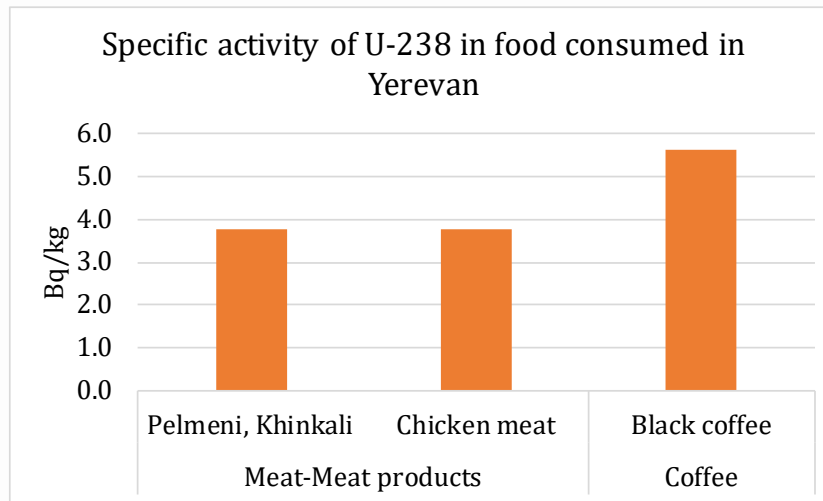
Gamma spectrometry system by CANBERRA
HPGe detector with energy resolution of 1.8
keV FWHM for the 1332 keV energy line of
 ^{60}Co ; DSA-1000 multichannel analyser;
Genie2000 and LabSOCS



Specific activity of K-40 in food consumed in Yerevan



Specific activity of natural U-238, Th-232 and artificial Cs-137 in food consumed in Yerevan





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Thank you for your kind attention!

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