

PRELIMINARY RESEARCH CONCERNING THE RADIOACTIVE CONTAMINATION OF SOME FOOD PRODUCE IN THE BANAT AREA

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Abstract

In this paper we present preliminary results of measurement of α - and β -global activities of some food produce of plant and animal origin from the hill and plain area of the Banat area. Analysis of results shows that, in the absence of radioactive pollutants, the produce we studied have no risk of radioactive contamination.

Keywords: *radioactivity, radioactive contamination, α -global activity, β -global activity, and foods*

Introduction

Radioactive contamination of food produce is the consequence of radioactive contamination of the environment: soil, water, air as a result of nuclear explosions, of the large-scale use of ion radiations of radioactive elements and of nuclear energy (Marcu 1995, Chiosila 1998, Melo 2004).

Taking into account the particularly noxious effects of nuclear energy on the human body, it is very important to know the radioactivity of plant and animal produce destined to population consumption, in order to assess the human body after having ingested them (Manescu 1985, UNSCEAR data 1993, SRRp data 1994).

Now that Romania is in the final stage of joining the European Union, getting information concerning the level of radioactive contamination of the foods because of different human activities that change their natural radioactive fund is a main priority of the food safety and protection programme for the consumers (SR EN 22000/2005).

Starting from these considerations, the authors aim at studying the radioactive content of different food produce from the hill and plain

areas in the Banat region in order to establish their radioactive contamination, as well as to identify potential sources of radioactive pollution.

In order to assess the radioactive level we first took the charge of measuring α -global and β -global activity first; then we shall broaden the range of foods under study and the nature of the nuclides involved in the process of radioactive contamination.

Experimental

In order to carry out the experiment, we sampled and analysed from the point of view of the global radioactive content different food produce of plant and animal origin from the agricultural years 2003-2005 from hill and plain areas in the Banat region.

Measuring α -global and beta global activity was done in accordance with present laws in the field and with recommendations of the Ministry of Public Health at the Public Health Institute in Timișoara (Dumitrescu 1997, Dumitrescu et al. 1997, SR ISO 9696/1996, SR ISO 9697/1996).

In order to measure alpha global activity radioactivity we used a measuring equipment of the α -type TC-256 TENNELEC with semiconductor detector. The device has a relative efficiency of 0.240 (imps/s) and with a minimal detection limit of 0.0025 Bq.

Beta global measurement was done with a ROBOTRON 20050 RFT measuring equipment of the β -type with plastic scintillator with a numbering efficiency of 0.380 (imp/s) and a minimal detection limit of 0.0925 Bq.

Measurements of the radioactivity were done from the extract of ashes resulted from the burning of samples.

Results and Discussions

Experimental results obtained in the measuring of α -global and β -global activities are shown in Table 1.

Data presented in this table show that α -global radioactivity corresponding to the produce we analysed and that include natural radionuclide activity (^{226}Ra , ^{228}Ra , ^{210}Po , ^{210}Pb , U-natural, and Th-natural) have low, sub-unit values. Relatively higher values are in leaf vegetables, eggs, meat, and root vegetables.

The values of β -global radioactivity show important variations depending on the food produce we analysed. The highest values were measured in leaf vegetables, eggs and meat.

As in literature there are no reference values for α -global and β -global activity, the values in radioactive contamination we obtained are more difficult to assess.

Table 1 Average values of α -global and β -global radioactivity in some food produce

Analysed produce	Average values of the radioactivity [Bq/kg, Bq/l]	
	α -global	β -global
Root vegetables	0.200	80.00
Leaf vegetables	0.850	95.00
Fruits	0.055	50.00
Cereals	0.040	56.00
Milk	0.100	40.00
Meat	0.250	90.00
Eggs	0.300	35.00

But, taking into account reference levels of some radionuclide for some food produce groups in Romania (Table 2), we can say that the produce we analysed show no potential risk of contamination (MOR 2002, OM 2002).

Table 2. Orienting values (average values) for the activity of some natural radionuclide in different food produce in Romania (Dumitrescu 1997)

Incorporation	Radioactive contamination [mBq/kg, mBq/l]		
	²²⁶ Ra	²¹⁰ Pb	⁴⁰ K
Water (network)	2.0	11	150
Milk	8.0	13	40700
Dairy produce	44	38	18500
Meat	11	17	92600
Bread-making produce	90	53	37000
Vegetables	19	21	182000
Menus	18	209	53000

Conclusions

Preliminary results obtained in measuring α -global and β -global activity of some food produce from the hill and plain areas of the Banat region show that they have no potential risk of radioactive contamination. Yet, such measurements should be pursued and extended to a wider range of food produce not only to know food radioactivity allowing the assessment of human body irradiation through food ingestion but also to monitor radioactive concentration due to different human activities that change the natural radioactive fund.

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