V.V. Lisova, Master student
Z.M. Shelest, PhD. in. Biol., Ass. Prof., research advisor
S.V. Sukhovetska, language advisor
Zhytomyr State Technological University

THE DEPENDENCE OF INTERNAL EXPOSURE DOSE FORMATION ON THE DIET

The object of the research: the patterns of ^{137}Cs and ^{90}Sr migration in food chain: soil - plant - human body; soil - plant - animal - human body; the features of internal exposure dose formation connected with the consumption of radioactively contaminated food.

The purpose of the research: to determine the diet characteristics of people living in some Ukrainian settlements; to assess the contribution of some food stuffs to the internal exposure dose of consumers.

The method of research is based on: advanced radiometric, dosimetric and radiological techniques for measuring radionuclides activity in samples of plant and animal products; sociological methods of the critical food stuffs detection. The quantitative and qualitative composition of the daily diet was compared with the reference diet. The data were obtained by conducting questionnaire of the residents of the village Bazar (Narodichi district, Zhytomyr region (zone II) and the village Novovolodymyrivka (Kamenetz -Podolsk district, Khmelnitsky region (zone IV).

The research results revealed some differences between investigated and reference diets. The data show that milk, dairy products, bread, bakery and potatoes are the main part of the daily reference ration of the average Ukrainian people (Fig. 1). The basis of the daily diet of people who live in Podillia are: eggs, egg products, milk, dairy products and potatoes (Fig. 2). The consumption level of mushrooms and berries is higher compared to the average consumption level of these products in Ukraine. These products are critical in terms of the internal exposure dose formation but their contribution to the annual effective dose is negligible because of the low levels of radiation contamination in the fourth zone.

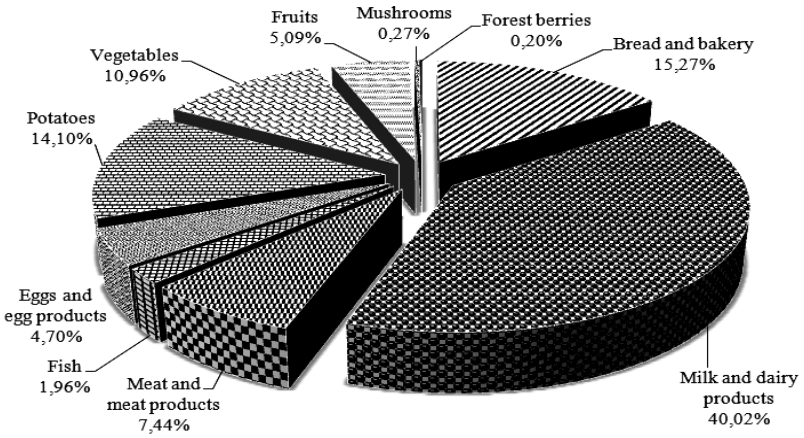

Fig. 1. The reference composition of the average-annual daily diet of adult person

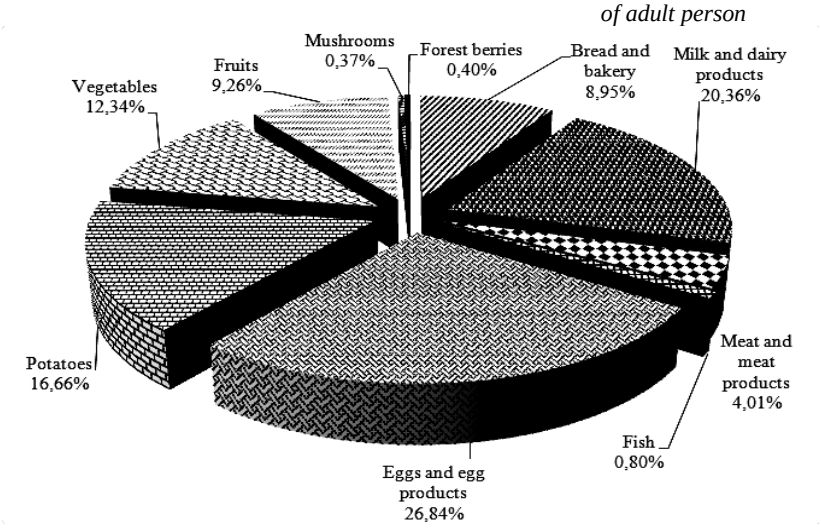

Fig. 2. The structure of the daily diet of the village residents (Novovolodymyrivka)

The daily diet of the residents of the village Bazar consists mainly of milk, dairy products, potatoes, bread and bakery (Fig. 3).

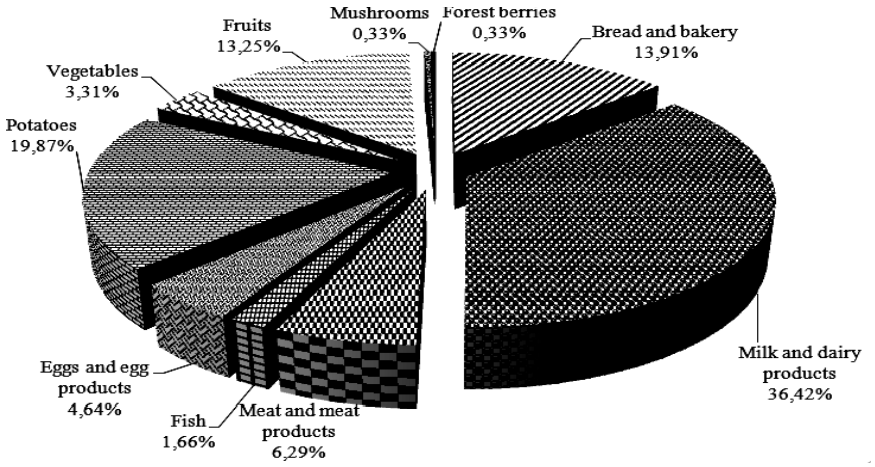

Fig. 3 .The structure of the daily diet of the village Bazar's residents

Table 1

The formation of the internal exposure dose of the residents (village Bazar)

Food stuff	Daily food consumption, kg	Specific activity of radionuclides, Bq/kg		Annual internal exposure dose, mSv/year	
		^{137}Cs	^{90}Sr	^{137}Cs	^{90}Sr
Bread and bakery	0,42	22,3	0,36	0,034	0,0020
Milk and dairy products	1,10	78,0	6,60	0,313	0,0980
Meat and meat products	0,19	28,7	0,375	0,020	0,0010
Fish	0,05	38,8	4,90	0,007	0,0033
Eggs and egg products	0,14	2,5	0,19	0,001	0,0004
Potatoes	0,60	9,6	2,95	0,021	0,0239
Vegetables	0,10	16,1	2,96	0,006	0,0040
Fruits	0,40	4,7	0,80	0,007	0,0043
Mushrooms	0,01	159401	72,00	5,818	0,0097
Forest berries	0,01	4766	59,00	0,174	0,0080
Total				6,401	0,1546
Annual internal exposure dose, mSv/year				6,56	

Mushrooms and berries form a significant part of the internal exposure dose, though their small percentage in diet (Table 1). Milk, meat and potatoes are also critical products in terms of the internal exposure dose formation.

Thus, the research has shown that there is a significant difference between the reference diet and the actual consumption of the food stuffs in some areas. Therefore, it is necessary to use data on the composition of the diet in a particular locality to assess annual effective dose of internal exposure. The assessment of the effective equivalent dose of the internal exposure of residents (village Bazar) showed that the largest contribution to its formation makes consumption of mushrooms, milk, dairy products and forest berries. Such food stuffs are traditional for the region and require a detailed radiological control.