THE ARTIFICIAL RADIOACTIVITY IN BECHET-DABULENI AREA, FIVE YEARS OF SURVEY

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INTRODUCTION

The Bechet-Dabuleni area is placed in the southern part of Romania, in the Danube zone, near the Nuclear Power Plant from Kozlodui (Bulgaria). Here there is a very important agricultural area, with small and also big farms where for irrigation the Danube water is used.

The purpose of the study was the long term surveillance of the artificial radioactivity for the main foodstuffs. It has been investigated the radioactive content of the following foodstuffs from this area : vegetables (potatoes, carrots, onion, etc.), fruits (apples, pears, apricots, peaches) and cereals (wheat, barley). It has also been determinated the radioactive content of the irrigating water from the Danube River.

MATERIAL AND METHOD

Global beta-measurements were performed in order to obtain initial data on the contamination level of the samples. The determination of the Cs-137 and Sr-90 content from the water samples was done by coprecipitation from 50 l water followed by the chemical separation. Cs-137 was concentrated on APM and measured with a beta counter as Cs-hexacloroplatinate and Sr-90 was precipitated as carbonate and after the separation was measured as yttrium oxalate after the radioactive equilibrium.

The beta-measurements were done with a low level anticoincidence beta counter with 14% counting eficiency for Sr-90+Y-90 standard source. For the determination of the specific Cs-137 content from vegetables were used the ashes obtained in a thermoregulating furnace at the temperature of 450°C. The measurements were performed using a multichannel analyser system (4096 channels) type Canberra 40, with a high resolution Ge(Li) detector and with a multichannel analyser system (1024 channels) with a NaI(Tl) detector. The calibration of the equipment was made using internal standards, volume standards from IFA-Magurele and using also the intercomparison samples from activities organized by IAEA-Vienna.

RESULTS

The data obtained during 1989-1993 are synthesized in this study. The results pointed out the low levels of the artificial radioactivity in this area in comparison with the rest of Romania. The values for the radioactive content in the irrigating Danube water are presented in the figure 1.

The Cs-137 content was in the range 0.0013-0.0045 Bq/l and the Sr-90 content in the range 0.0066-0.0121 Bq/l, for the whole period.

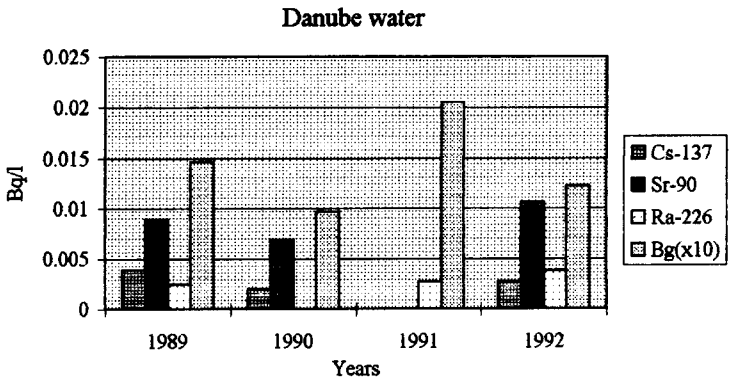

Figure 1. The radioactive content in the Danube water during 1989-1992.
Bg - global beta

In general the radioactive content for fresh vegetables was in the range 0.2-0.6 Bq/kg in Cs-137 and in the range 0.05-1.1 Bq/kg in Sr-90. Particularly Cs-137 had the maximum value (0.6 Bq/kg) in potatoes and minimum value (0.2 Bq/kg) for rest of vegetables (bean,onion,fruits, etc.). For Sr-90 high values were in bean and carrots and low values in potatoes.

The results obtained for vegetables are presented in the figure 2.

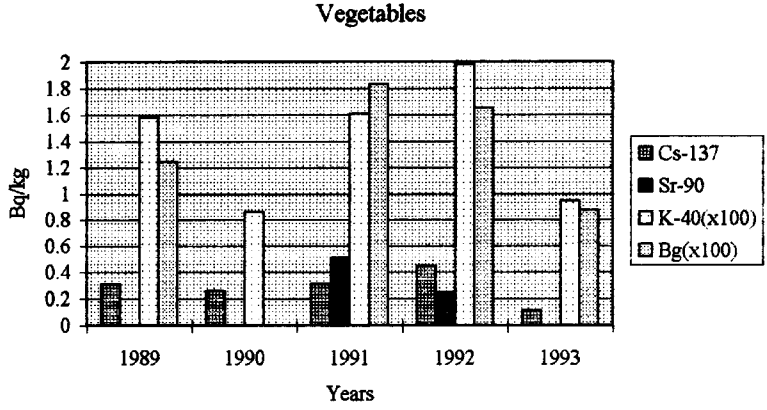

Figure 2. The radioactive content in vegetables.
Bg - global beta

The data obtained for fruits and cereals were frequently near the detection limit.

CONCLUSIONS

The artificial radioactivity content in the foodstuffs analysed from the investigated area (Bechet-Dabuleni) was at a low level and it has had an unsignificant variation in time.

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