

Strontium 90 in dairy milk produced in central Europe during 1957–1960

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The connexion between radioactive fall-out and the fission products was demonstrated by Blifford, Lockhart & Baus (1956), and the connexion between radioactive fall-out and radioactive strontium was reported by Libby also in 1956. Previous to the publication by Santholzer, Macků, Podzimek & Horak (1958) and Santholzer (1959) of records relating to the increased radioactive fall-out in areas in Central Europe (50° 10' N. lat., 15° 50' E. long.) which were not far distant from the area occupied by these University buildings, we had already decided to follow regularly the strontium 90 (⁹⁰Sr) content of cow's milk produced in the area concerned.

Samples of milk were collected daily from two districts—Novy Bydzov and Hradec Králové. The samples were taken from the Central Dairy Reserve tanks and represented average samples of milk produced in the region. The milks were ashed and radioactive strontium isolated after the method of Kooi (1958). The results were recorded as the mean for each calendar month.

The active dry residue on the carrier (SrCO₃) was left for 30 days until radioactive equilibrium was reached between ⁹⁰Sr and yttrium (⁹⁰Y). Then another carrier (Y₂O₃) was added, and the portion of yttrium chemically isolated. Active dry residues of Y(OH)₃ were radiometrically measured twice a day for a period of 5–10 days and the half-life period was determined according to the decay curve of the preparation. ⁹⁰Sr was identified by the absorbing layer as well as the decay curve of ⁹⁰Y. This curve was interpolated up to the moment of separation of strontium from yttrium, and on the basis of the established activity we computed the ⁹⁰Sr content in the sample of milk which is expressed as strontium units (tenths of a unit are expressed as the nearest whole number).

It is clear from Table 1 that during the autumn of 1957 there was a moderate increase in the ⁹⁰Sr content of the milk. This increase was temporary and had practically disappeared in the first half of 1958. During the second half of that year, however, the figures rose again to a very significant level in the later months and continued thus until about the middle of 1959. After this there was a marked fall in the ⁹⁰Sr content of the milk produced throughout the region concerned. In this connexion it is of interest to note that the radioactive fall-out values measured in this country also showed a marked decrease during the second half

of 1959 as compared with the first half of the year. For the first 6-month period of 1959 the cumulative value = 112 mc./km.²/6 months whereas for the second 6-month period it was 16 mc./km.²/6 months. The value for the second 6-month period of 1958 was of the same order as for the first 6-month period of 1959. This is illustrated in Fig. 1. The reduction in radioactive fall-out preceded, to some extent, the decrease found in the ⁹⁰Sr content of the dairy milk.

Table 1. ⁹⁰Sr in dairy milk in strontium units*

Month	Year 1957		Year 1958		Year 1959	
	District Hradec	District Bydov	District Hradec	District Bydov	District Hradec	District Bydov
Jan.	1	—	3	5	7	—
Feb.	3	—	4	4	9	—
Mar.	1	—	3	1	8	—
Apr.	2	—	2	5	6	—
May	2	1	3	9	8	—
June	4	1	6	7	5	—
July	3	2	5	6	2	—
Aug.	4	4	3	8	2	—
Sept.	5	5	6	10	1	—
Oct.	4	3	7	7	3	—
Nov.	6	4	9	14	2	—
Dec.	5	3	12	12	4	—

* The tenths of units are expressed as the nearest whole number.

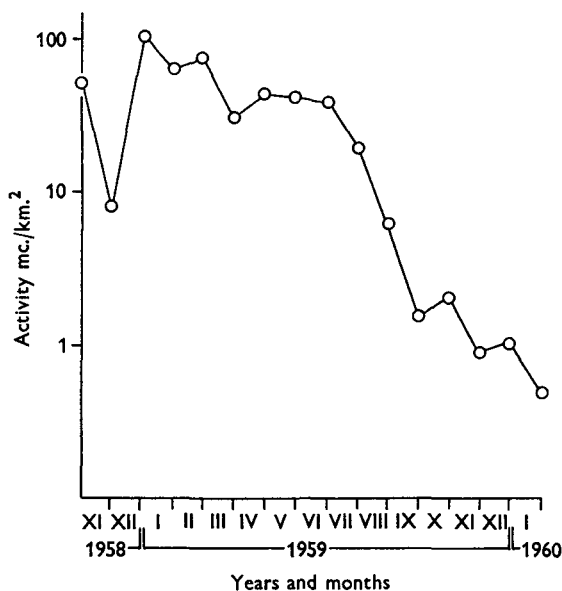


Fig. 1

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