DETERMINATION OF STRONTIUM-90 IN VARIOUS KINDS OF WATER AFTER CHERNOBYL ACCIDENT IN AUSTRIA

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Received 3 December 1986
Accepted 17 December 1986

As a consequence of the reactor-accident of Chernobyl on Tuesday 29 April 1986 the environmental radioactivity in Austria increased for above the level recorded before. Depending on the amount of precipitation the deposition of radioactive fallout showed great differences. Many water samples /rain water, lake water, swimming pool water, drinking water, underground water/ collected /during period of April 29 to May 30/ from Vienna, Lower Austria and Steiermark were analyzed for 90Sr. The following concentrations in /nCi 1^-1/ of 90Sr was found: 8.69±2.3 for rain water, 0.09±0.12 for lake water, 0.08±0.18 for swimming pool, 0.04-0.13 for drinking water, 0.07-0.2 for underground water. The 90Sr concentration was not higher than the maximal permissible /0.004-0.4 nCi 1^-1/ except for rain water.

INTRODUCTION

Strontium is an alkaline earth metal and therefore similar to calcium, barium, and radium. It follows calcium through the food chains from environment to
man but some degree of discrimination exist against strontium. Both strontium and calcium are retained in the body largely in bone\textsuperscript{1,2}.

Since the early days of atmospheric nuclear testing the importance of \(^{90}\text{Sr}\) as a contributor to the radiation exposure of man has been recognized\textsuperscript{3-5}. \(^{90}\text{Sr}\) is a radio-nuclide formed in the process of nuclear fission\textsuperscript{6}. It has a radioactive half-life of 29.1 years and decays by \(\beta\)-emission, its daughter \(^{90}\text{Y}\) is also radioactive with half-life of 64.0 h and decays by \(\beta\)-emission to the stable isotope \(^{90}\text{Zr}\).

On Tuesday 29 April 1986, in the early morning, shortly following the announcement of the reactor accident at the Chernobyl nuclear power plant unit-4 in the USSR the environmental radioactivity in Austria increased far above the level recorded before\textsuperscript{7}.

This paper reviews prevailing results concerning the behaviour of \(^{90}\text{Sr}\) concentration in various kinds of water /rain water, lake water, swimming pool water, drinking water, underground water/ during April 29 to May 30.

**MATERIALS AND METHOD**

15 ml from the water sample was mixed with 1.5 ml of nitric acid /IN/, shaken and extracted with 10 ml /butyl phosphate 820251 Merck/ into toluene /10:90/\textsuperscript{8-10}. The aqueous phase was reextracted with 5 ml from D.B.P. into toluene. The combined organic phase was extracted again with 1 ml \(\text{HNO}_3 /\text{IN}\), for the separation of \(^{90}\text{Y}\) from \(^{90}\text{Sr}\).

\(^{90}\text{Y}\) was measured /E. Max. 2.3 keV/ on a liquid scintillation counter by Čerenkov radiation.