

E2-40: Determination of strontium-90 in milk powder

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Strontium-90 is one of the most hazardous fission products for long term exposure. The most likely route of entry to man is through milk, which is widely used as an indicator food. Particular attention is always paid to Strontium-90, because it moves with calcium into the body and is incorporated into bones and remains as an internal source of radiation for a long period of time. Four samples of milk powder from the local market were analysed to determine the strontium-90 content, in order to evaluate the food contamination by this radioactive species.

Strontium-90 was separated from milk ash by carrying out phosphate and nitric precipitation. The repetition of nitric acid precipitation resulted in the removal of calcium from strontium. During strontium precipitation, barium, radium and iron also precipitates. These were removed using barium chromate and iron hydroxide scavenger precipitation. Strontium was isolated as strontium carbonate. This was left for 14 days for Strontium-90 to come to equilibrium with its daughter product yttrium-90. Yttrium was separated from strontium as oxalate precipitate. The amount of strontium-90 in the precipitate was measured by counting its daughter product yttrium-90 at or near radioactive equilibrium, with the use of calibrated $\alpha\beta$ low background counting system. The samples with a low count for strontium-90 were estimated by direct counting of ⁹⁰Sr.

The concentration of Strontium-90 in the samples of milk powder analysed was found to be in the range 0.5 to 2.5 Bq/kg. These values are much less than the guideline levels (100 Bq/kg) set by the International Atomic Energy Agency.