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129I concentration in breastmilk and its dose to infants' thyroid

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Radiation exposure dose and potential health risks remain a crucial aspect of public health particularly given the use of the linear no-threshold model which postulates any exposure to radiation can result in harm. The concentration of several long-lived radionuclides has increased in the environment through human nuclear activities. Many of these radionuclides are alpha and beta emitters which if ingested in sufficient quantities, may impact human health. This paper demonstrates a reliable and reproducible method for the measurement of 129I in human breastmilk, then assessed it dose to infant thyroid.
The procedure used here was a refinement of a method that already established. the 129I in breastmilk ranged from 1.26x108 atoms/L to 6.64x108 atoms/L with a median of 2.10 x108 atoms/L, and the 129I/127I ratio ranged from 1.27x10-10 to 9.9x10-10 with a median of 2.13x10-10. There results suggest a strong correlation between 127I and 129I concentrations in breastmilk. We noticed the similarity in isotopic ratios between breastmilk and the Canadian cow's milk, indicating that the milk of both cows and humans may be a reflection of the 129I concentration of their local environment and the food ingested.
The results confirm that humans are exposed to the 129I from birth through their mother breastmilk, giving them an average dose of 1.10 x10-4 Bq/year and thyroid dose rate equal to 5.92 x10-10 Sv/year.

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