



Intakes of other radionuclides



Radionuclide	Average individual annual dose, mSv y ⁻¹	Annual collective dose to UK population, man Sv y ⁻¹
Carbon-14 (¹⁴ C)	0.009	600
Potassium-40 (⁴⁰ K)	0.17	11,400
Rubidium-87 (⁸⁷ Rb)	0.002	130
Uranium decay chains	0.08	5,400
Thorium decay chains	0.01	670
Total of these intakes	0.27	18,200

Naturally occurring radioactive materials, or NORM, from the Earth's crust are found in low concentrations in the environment. NORM is found in the ground, air and water, and can be taken up by plants and animals and subsequently be introduced into foodstuffs. Some foods contain higher concentrations of radioactivity than others since natural processes can concentrate materials in some foods, and some foods are grown in areas with high levels of NORM. The most significant naturally occurring radionuclides in relation to dose to the UK population are those from uranium and thoron decay chains especially polonium-210 (²¹⁰Po) and lead-210 (²¹⁰Pb), along with carbon-14 (¹⁴C), potassium-40 (⁴⁰K) and rubidium-87 (⁸⁷Rb). The estimated annual dose to the UK population from the ingestion of NORM is a collective dose of 18,200 man Sv y⁻¹, or an average dose of 0.27 mSv y⁻¹ per person.



Unless otherwise stated, doses were calculated using a number of sources on activity concentrations in foodstuffs, air, and water including Bradley (1993), Ham (1998), Hughes (1999), FSA and SEPA (2000), FSA and SEPA (2001), FSA and SEPA (2002) and Young et al (2002). The estimated average doses from potassium-40 (^{40}K) come from UNSCEAR (2010).

Important radionuclides

Carbon-14 (^{14}C) is produced by the interaction between cosmic rays and nitrogen in the atmosphere. Radioactive carbon-14 is taken up by plants and animals and becomes incorporated in food consumed by humans. The average dose received per person per year is estimated to be approximately 0.009 mSv.

Potassium is a necessary part of a healthy diet. A very small fraction of potassium is radioactive potassium-40 (^{40}K) which becomes incorporated into foodstuffs and contributes an estimated annual dose per person in the UK of approximately 0.17 mSv. Radioactive rubidium-87 (^{87}Rb) behaves in a similar way to potassium and contributes an estimated dose of 0.002 mSv per year.

Products of uranium and thoron decay chains are present in low concentrations in foodstuffs and contribute an average annual dose per person of 0.08 mSv and 0.01 mSv, respectively.

References

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