

Transfer of radioactivity from seaweed to terrestrial foods and potential radiation exposures

Area of research interest: [Chemical hazards in food and feed](#)

Study duration: 2006-09-01

Project code: R04003

Background

Routine monitoring by the Food Standards Agency has indicated that some radionuclides released from Sellafield can be biologically accumulated by certain types of seaweed. In parts of Scotland seaweed is routinely used as a soil conditioner and also consumed by farm animals grazing on the foreshore. These pathways represent potential routes by which radionuclides released could enter the food chain.

Research Approach

Information on farming practices, animal husbandry and food consumption were gathered from participating local land users from sites around Scotland. Samples of seaweed and seaweed-treated soil were collected and analysed for Technetium-99 (^{99}Tc). All the information was used to assess the potential radiation dose from consuming the foodstuffs produced on land treated with seaweed.

Results

The results from this study gave no cause for concern. Concentrations of radionuclides in sampled foodstuffs were very low, often below the detection limits of the sensitive analytical techniques used. The calculated radionuclide doses were very small, much lower than the dose limit for members of the public. The magnitude of the doses from ingestion estimated in this study does not justify a major programme of continuous monitoring of this exposure pathway.

Additional Info

Radionuclides are discharged into the Irish Sea from the Sellafield nuclear licensed site in Cumbria under an authorisation from the Environment Agency. Routine monitoring conducted along the North and West coast of Scotland by the Food Standards Agency has indicated that some radionuclides released from Sellafield can be biologically accumulated in small doses by certain types of seaweed. Seaweed is traditionally used as a soil conditioner in the West and North of Scotland on land used to grow crops. It is also consumed by farm animals grazing on the foreshore. These pathways represent potential routes by which radionuclides could enter the food chain. This study aimed to improve our understanding of the extent to which seaweed was being

used in food production in these areas, and whether this practice could transfer radionuclides to foods at levels which could lead to exposures of individuals. The radionuclide of interest in this study was Technicium-99 (99Tc), which is the most important component of high level radioactive wastes. A cautious approach was adopted in all measurements so that doses would not be underestimated. The study was carried out in conjunction with the Scottish Environment Protection Agency (SEPA).

Information as to where seaweed was being used was obtained from farming and crofting organisations which enabled the areas requiring detailed study to be defined. Through further initiatives, a number of participants were identified from along the west and north coasts of Scotland, the offshore islands and on Orkney and Shetland. Information was gathered on the amounts and frequency of any seaweed applied to crops and whether any prior treatment of it was carried out. They were also asked about the crops that they grew on land treated with seaweed, including those to be used as animal fodder, and also whether they kept any animals that grazed directly on seaweed. Samples of the seaweed they used and soil from the treated land were collected and analysed.

A radiological assessment of potential exposures from radionuclides in the diet requires information on the amounts of foodstuffs consumed as well as the amounts of radionuclides that they contain. All participants were therefore asked to estimate the quantities of foods they ate and how much was produced on seaweed-treated land. The amounts estimated were in many cases much greater than those assumed in generic assessments. The information on the amounts of food consumed was combined with the measured activity concentrations of radionuclides in the foodstuffs, to assess the radiation dose from consuming the food produced on land treated with seaweed.

This study indicated that concentrations of radionuclides in sampled foodstuffs produced on land treated with seaweed were very low and, in many cases, below the detection limits of the sensitive analytical techniques used. In all cases where animals grazed seaweed on the beach, the concentrations of the radionuclide of interest (99Tc) in meat and offal were below detection limits. In all cases, the calculated doses were very small, the highest values being 1000 times lower than the dose limit for members of the public. The results do not give cause for concern. The final report is also available from the Health Protection Agency (HPA) and SEPA websites (entitled HPA-RPD-059 – Transfer of radioactivity from seaweed to terrestrial foods and potential exposures to members of the public – a Health Protection Agency report).

Research report

PDF

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