

Technetium 99 availability to marine foodstuffs from contaminated sediments

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

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Conducted by: The Centre for Environment, Fisheries and Aquaculture Science - Lowestoft

The amount of Tc-99 in the Irish Sea was calculated and a model developed to calculate concentrations in seafood.

[Back to top](#)

Background

Technetium-99 has been discharged into the Irish Sea from the nuclear reprocessing plant at Sellafield for some time. These discharges have been significantly reduced since the introduction of abatement technology in 2005. Significant amounts of technetium-99, however are believed to be attached to sediments in the Irish Sea. Work has been carried out to ascertain the amount attached to sediment, how much may be released into the sea in the future and the consequences of this for consumers of sea foods, especially crabs and lobsters, from the Irish Sea.

[Back to top](#)

Research Approach

Core Samples were taken from a range of areas in the Irish Sea. These samples were analysed to determine the amount of technetium, which has become attached to the sediment and the proportion that would become available for uptake by sea foods in the future. The data obtained was used to develop a model to assess the future radiation doses to consumers of sea foods from historic discharges of technetium.

[Back to top](#)

Results

The sub tidal inventory of Tc-99 is estimated to be approximately 37 terabecquerels. A model was used to predict the rate and extent of re-dissolution of the nuclide into the seawater and hence to man via seafood. The model predicts the impact of the historic discharges up to 2050

A model to predict doses to man via the consumption of seafood. Two Scenarios were considered for Cumbrian Waters and Western Irish Sea Respectively: Scenario one modelled the impact of discharges of post 2005 level up to 2012, when it is planned that the plant in question will stop discharges – discharges of zero; Scenario two modelled the impact of an extension of the life of the plant until 2020, with much reduced discharges of 500 gigabecquerels from 2012 to 2020.

The maximum predicted dose to man via the seafood was, for the Cumbrian Area, 17 microsieverts per year, for 1996, when the plant came online, in both scenarios. The maximum predicted dose to man via seafood from the Western Irish Sea was 1 microsievert, again for both scenarios. This compares favourably to the annual dose constraint for a member of the public of 300 microsieverts

Research report

PDF

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