Radioiodine transfer from seawater into seaweed

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Introduction

A small and controled amount of ^{129}I has been released into the Pacific Ocean from the Japanese first commertial nuclear fuel reprocessing plant of JNFL which is located in Rokkasho, Aomori prefecture, Japan. Although the radiation dose from the released ^{129}I was negligebly small, the prediction of behavior of the ^{129}I is an important theme for public acceptance of the plant. Iodine takes various chemical forms in seawater and different behaviors depending on the chemical forms. It is important for better understanding the transfer of ^{129}I from seawater to organisms to know the transfer rate coefficient of ^{129}I in each chemical form in seawater. We exprimentally obtained the transfer rate coefficients of I^- and IO_3^- for a green and a brown alga by using ^{125}I tracer and report the results here.

Materials and method

A green alga (*Ulva prolifera*) and brawn alga (*Sargassum horneri* (Turner) C. Agardh) were exposed to $^{125}I^-$ or $^{125}IO_3^-$ in a closed cultivation system. A part of the alga was sequentially sampled, and measured for ^{125}I concntration. The concentration of $^{125}I^-$ and $^{125}IO_3^-$ in seawater in the system was monitored during the experiment period.

Results

Concentration of ^{125}I in the samples of both algae exposed to $^{125}I^-$ or $^{125}IO_3^-$ was alomostly saturated within 2 d with the higher maximum ^{125}I concentration in the samples exposed to $^{125}I^-$ than that exposed to $^{125}IO_3^-$. Since the concentrations of $^{125}I^-$ and $^{125}IO_3^-$ in seawater were more or less changed with time during the experiment period excluding $^{125}IO_3^-$ exposure to the green alga, the results were analyzed with a compartment model. The transfer rate coefficients of $^{125}I^-$ from seawater to the seaweeds were generally larger than those of $^{125}IO_3^-$, while those of both $^{125}I^-$ and $^{125}IO_3^-$ for the brawn alga were greater than corresponding values for the green alga.

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