**Review of the marine radioecology of tritium in Japanesse coastal waters**

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For better uderstanding for the behaviour of tritium in marine ecosystem, the published of the waters around Japan were examined and evaluated radio-ecologically. After 1960, tritium radioactivity, originated to the atmospheric nuclear bomb tests, was monitored in the marine environment around Japan. Special and vertical distribution of tritium was clarified in seswaterof the Pacific Ocean (Miyake et al., 1968; 1969; 1970; 1971; Shimada et al., 1972; 1973; 1975). After the last Chinese atmospheric nuclear bomb test in 1981, the tritium radioactivity concentration in seawater decreased, due to the radioactivity decay (Miyamoto, 2022). After 1990, Tritium radioactivity levels appeared to be stable, being approximately 1.0 Bq l-1 in surface water in Japanese coasts, whereas showing variation of the level which was caused by nuclear facility operation and terrestrial freshwater (or underground water) contribution. Since the European nuclear fuel reprocessing plant operation was known as substantial supply source to adjacent waters (Masson et al., 2005; Hunt 2010; Fiévet et al., 2021), tritium measurement were intensively deployed, especially of seawater and biota in front water off Rokkasho Aomori, where the nuclear fuel reprocessing plant was constructed. As a result, tritium radioactivity in seawater and fish increased during the active test operation of March 2006 – October 2008 (MERI, 2019). Concentration ratio (CR) of Tissue Free Water Tritium (TFWT) for fish increased several times greater than the usual CR 1.1 of the back ground value. The CR of Organically Bound Tritium (OBT) increased slightely. The ratio of the OBT to total tritium (THWT+OBT) was considered to be 0.25 by radioactivity observed as maximum cases. With regard to off Fukushima waters, the tritium radioactivity increased to several tens of Bq l-1 after the accident of the Fukushima Dai-ichi Nuclear Power Station (F1NPS). Due to the management of aftermath of the accident and the dilution to oceanic water, the tritium radioactivity decreased after 2018, not only in surface water but also in fish (MERI, 2019). After 2023, due to the public concern about the release of the water treated by the multi-nuclide removal equipment of Advanced Liquid Processing System (ALPS), the measurement of radioactivity levels of tritium in marine algae, additionally to seawater and fish, were deployed around coastal water of F1NPS by Tokyo Electric Power Company Holdings (TEPCO). The TEPCO also carried out aquarium experiment of rearing marine algae, invertebrate and fish using the ALPS treated water (Shibata et al., 2022; 2024). In suumary, the overall accumulated data from 1960s-2020s was explainable by the experiment derived transfer parameters of tritium between seawater and biota, and was compatible to the scientific understanding of previous studies (Fiévet et al., 2021;Tani et al., 2023).

Reference

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