

## **Development of stable Sr isotopes ratio analytical method for biological concentration factor of radiogenic Strontium**

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The accident at Fukushima dai-ichi Nuclear Power Plant (FNPP) caused the elevation of the levels of anthropogenic radioactivity in the marine environment of the western North Pacific from atmospheric fallout and direct discharges of highly radioactive waters. The security of food safety of marine products is a great concern for the people in the world and especially for those involved in the fisheries industry. Radiogenic Strontium is concentrated into fish by bio-concentration. Concentration factors and transfer rates are very important for understanding the bioaccumulation of Radio-Sr. Generally, this test used a radiotracer such as <sup>85</sup>Sr. It is a very difficult experiment due to the time needed which may be over one year. We constructed an experiment of tracer study using stable Sr isotopes (<sup>86</sup>Sr and <sup>87</sup>Sr) substitution radiotracer for solving the problem of the lengthy experiment period. For this study, an analytical method for Sr isotope ratio using Multi-collector ICP-MS was developed, and applied to bio-concentration experiments.

For analysis, matrix elements such as Na, K, Mg, Ca, and Rb, which is isobaric interference to Sr, required separation from Sr. Sr-spec resin with Dowex anion resin for pre-separation widely used for this separation. As we wish to separate Rb from Sr, multi step separation was required. We used chelate resin (CH-3 GL science inc.). With this resin it was easy to separate Rb from Sr, because, at over pH. 8 condition, only Sr was absorbed. MC-ICP-MS (Nu plasma-HR) was used for Sr isotope analysis. Using this instrument, Sr isotope ratio (86/88, 87/88) was determined about 0.005 % accuracy. The measured <sup>86</sup>Sr/<sup>88</sup>Sr and <sup>87</sup>Sr/<sup>88</sup>Sr values were normalized to NIST.SRM987.

Olive flounder (*Paralichthys olivaceus* Temminck and Schlegel) (1 y old) were kept in seawater containing <sup>86</sup>Sr for 1 to 24 weeks. Each tissue sample (muscle and bone) was measured for Sr isotope. Total concentration of Sr in samples was constant, in other words the Sr isotope ratio was increased day by day. This result was clearly shown by the Sr bioconcentration.