International Journal of Applied Science & Environmental Engineering – IJASET 2018

Volume 1 : Issue 1 Publication Date : 28 December, 2018

An atomic fuel production through accumulation of specific radioisotopes by fish in offshore Fukushima, Japan

AUTHOR NAME
KATSURA Hidemitsu *1, *2, *3,
CORRESPONDING AUTHOR

Family Name: KATSURA

Given Name: Hidemitsu *1, *2, *3,

*1: Coimbatore Institute of Technology (CIT), COIMBATORE, TAMIL NADU 641014, INDIA

*2: Department of Ocean Sciences, Faculty of Marine Science, Tokyo University of Marine Science and Technology, Konan 4-Chome, Minato-Ku, Tokyo 108-8477, Japan

*3: Institute of Product Design & Manufacturing (IPROM), Universiti Kuala Lumpur (Uni.KL), 119 JALAN 7/91, TAMAN SHAMELIN PERKASA, 3.5 MILES CHERAS, 56100 KUALA LUMPUR, MALAYSIA;

ABSTRACT

The Tokyo Electric Power Company's, Fukushima Dai-ichi nuclear power plant in Fukushima-Ken (Fukushima Prefecture), Japan, was destroyed in March 2011 by a massive magnitude 9 earthquake (centred offshore to the northeast of Honshu Island) and by the subsequent historic tsunami of March 11, 2011. Because of the nuclear meltdown, hydrogen-explosion damage to the buildings that housed the reactors, and the contamination of the cooling water from the reactor cores, large quantities of radioisotopes were emitted into the atmosphere and adjacent seawater. Fishing is currently restricted off the coast of Fukushima-Ken because intermittent surveys have found part of the fishery products still contain high levels of radioisotopes. The Tokyo University of Marine Science and Technology has measured radioisotope levels in fishery species off Iwaki-Shi(Iwaki City), Fukushima-Ken(located south of the former nuclear power plant); these data could be used to understand the relationship between the accumulation of specific nuclides (radioisotopes) and certain species of fish, as follows:
#1#

The Total Fish Weight % of *Okamejei kenojei* (English Name: Common-skete; Japanese-Name:KOMON KASUBE) spp. and *Sebastes cheni* (Japanese rock fish, Japanese sea perch; SHIRO MEBARU) in this sampling in offshore Fukushima-ken,Japan were 26.6824 Weight% and 13.700005 Weight%, respectively; additionally, the fish bodies of *Okamejei kenojei* spp. and *Sebastes cheni* had 49.322578 becquerel% and 33.037159 becquerel% of 134Cs, respectively, and had 50.479187becquerel% and 31.779293 becquerel% of 137Cs, respectively. Therefore, *Okamejei kenojei* spp. has ability to accumulate 1.8485 times of their weight % for 134Cs and 1.92168 times of their weight% for 137Cs. However, *Sebastes cheni* has the ability to accumulate 2.411 times of their weight% for 134Cs and 2.3195 times of their weight% for 137Cs.

#2#

It is possible to accumulate or separate specific nuclides (134Cs and 137Cs) by combining ***Sebastes cheni*** and ***Kareius bicoloratus*** (Stone flounder; ISHIGAREI), and ***Ditrema temmincki temmincki*** (Surfperch; UMITANAGO) and ***Cynoglossus joyneri*** (Red tongue sole; AKASHITA BIRAME).

#3#

There are differences in 134Cs and 137Cs accumulation between adult fish and fry of ***Paralichthys oli***vaceus (Bastard halibut; HIRAME).

Therefore, some fish species have the ability to accumulate a specific nuclide (radioisotope). To date, ultra-centrifugation and diffusion methods have been used to accumulate specific nuclides for atomic fuel. However, if we could use the ability of some fish species to accumulate specific nuclides, we would have additional methods to concentrate nuclides.