Doctoral Thesis

Spatial distribution of radiocesium contamination
using a specific moss, *Hyophila propagulifera*
(Pottiaceae. Bryophyta) after Fukushima Daiichi
Nuclear Power Plant accident

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ABSTRACT

Extensive studies were conducted on plants and soils to understand the mechanism of radionuclides uptake from the environment after the Fukushima Daiichi Nuclear Power Plant (FDNPP) accident. It is essential to measure and monitor the magnitude of radiation contamination on the environment to effectively and efficiently plan for radiation recovery. Bryophyte can be very precise and sensitive bio-indicators for heavy metal contaminations, while it can be a long-term monitoring tool if they are tolerant to the contamination. Therefore, it is important to investigate and understand the natural potential of bryophyte to control this radiation disruption. In my research, I studied the trend of radiocesium accumulation in a bryophyte, *Hyophila Propagulifera* Musci, as a bio-measuring tool focusing on the area of northeastern region of Fukushima Prefecture. *Hyophila propagulifera* was selected because of their wide distribution ranges, their ability to accumulate the radiocesium, their tendency to grow around all seasons of year and their ability to survive in dry weather or highly polluted area. Since they are commonly found on the surface of rock and roadside wall, we can minimize the influence of the soil factor, which enhance the variation of radiocesium contamination. The study may help in the monitoring field and decontamination practice effort as it can provide quick estimation of contamination by considering its relationship between the accumulation in the plant bodies and environmental factors of the surrounding. Such data can extensively help in determining the level of contamination of restricted area and understand other environmental factors that involve in radiocesium accumulation in the plant bodies.

This study will also investigate on how radiocesium contamination level detected by *H. propagulifera* correspond to air-dose rate measured by the expert group such as research group by JAEA (Japan Atomic Energy Agency). The methodology included comparing and analyzing the spatial distribution between air-dose rate and radiocesium contamination in the *H. propagulifera*, considering the different of environmental factors. The result of this study has shown the difference in spatial distribution and identified the significant influence of environmental factors between two different measurement approaches. A soil removal study (removal of soil from plant body) was conducted to determine the accuracy of the radiocesium accumulation in the plant bodies and to ensure the efficiency of washing procedure in producing consistent and reliable result in the study. All the results have presented the positive potential of *Hyophila propagulifera*, Musci as a monitoring tool to represent the contamination level in the environment.

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論文目録

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学位論文
　　論文題目　Spatial distribution of radiocesium contamination using a
　　　　　　　specific moss, Hyophila propagulifera (Pottiaceae. Bryophyta)
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　参考論文

　　　論文題目

Publication 1
Author : Nabihah, S., Okuda, T., Yamada, T. & Endo, S.
Title　　:Spatial analysis of radiocesium concentrations in *Hyophila
　　　　　propagulifera* (Pottiaceae, Bryophyta) within 50 km of Fukushima
　　　　　Daiichi Nuclear Power Plant.
Journal ː Hikobia (Hikobia botanical society)
Volume :17, No.2. 101–107. 2016

Publication 2
Author : Nabihah, S. and Okuda, T.
Title　　: Estimation of spatial distribution pattern of air dose rate level after
　　　　　Fukushima Diichi Nuclear Power Plant explosion using moss *Hyophila
　　　　　propagulifera*, (Pottiaceae, Bryophyta).
Journal ː Hikobia (Hikobia botanical society)
Volume : Vol.17, No.4 (2018) (accepted).

Publication 3
Author : Nabihah, S. and Okuda, T.
Title   : The effect of soil removal on radiocesium measurements of the moss
samples from Fukushima prefecture, Japan.
Journal : Hikobia (Hikobia botanical society)
Volume : 17, No.3.201–205. 2017

備考
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