**Influence of humification on bioavailable radiocesium concentrations in fallen leaves of Fukushima broadleaf forests**

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In the forests of Fukushima, which have not been decontaminated since the Fukushima Daiichi Nuclear Power Plant accident in 2011, radiocesium (137Cs) is currently considered to be in a steady state due to translocation. Under such conditions, the organic layer of the forest floor (i.e., A0 layer) is the source of bioavailable 137Cs in the forest ecosystem. Therefore, understanding the migration of bioavailable 137Cs from the A0 layer and its translocation to organisms is key to predicting the pollution status of forest resources at different locations and times.

The bioavailability of 137Cs in the A0 layer depends on the leaching potential of 137Cs from the A0 layer into the aqueous phase (rainwater or soil pore water). Since A0 layer is composed of fallen leaves (L layer) and two types of humus (F and H layers), which are products of decomposition of fallen leaves by humification, the leaching potential of layer A0 is expected to vary depending on the degree of humification of the fallen leaves. However, because the F and H layers of the actual forest floor may contain clay minerals that immobilize 137Cs, information on bioavailable 137Cs concentrations in fallen leaves with different degrees of humification (i.e., L, F, and H layers) was limited. In this study, to clarify the effect of humification on bioavailable 137Cs concentrations in fallen leaves, fallen leaves of deciduous broadleaf trees were fed to beetle larvae and the resulting excrement was prepared as clay-free humus, and water extraction and NH4+ exchange experiments were conducted to determine the bioavailable 137Cs concentration in fallen leaves and artificially prepared humus.

The concentration ratio of total exchangeable 137Cs (i.e., sum of water-extracted and NH4+ exchanged 137Cs+ concentrations/total 137Cs concentration in the sample) was the same for fallen leaves (51 ± 9 %) and humus (59 ± 6 %), indicating that humification did not affect the total exchangeable 137Cs concentration. On the other hand, the concentration ratio of water-extracted 137Cs to total exchangeable 137Cs in fallen leaves slightly decreased from 38 ± 3 % to 27 ± 2 % by humification. Since the change in the ratio can be attributed to differences in the degree of competitive reactions of 137Cs+ with proton, cation (e.g., K+), and anion (e.g., dissolved organic matters) that leached into aqueous phase, the effect of humification may be explained as differences in leaching of components that react or compete with Cs+. In the presentation, the factors determining the ratio of exchangeable to non-exchangeable 137Cs+ in fallen leaves and humus will be also discussed from relation to the chemical compositions of fallen leaves.