



Transfer of radio-caesium from forest soil to woodchips using fungal activities

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Radio-caesium released to terrestrial ecosystems by nuclear accidents is known to accumulate in forest soil and organic layer on the soil. Forests in Japan are not exceptions. Practically it is impossible to decontaminate large areas of forests. However, there is a strong demand from local people, who have been using secondary forests (Satoyama) around croplands in hilly areas, to decontaminate radio-caesium, because those people used to collect wild mushrooms and edible plants, and there are active cultures of mushrooms using logs and sawdusts. These natural resource uses consist of a substantial part of their economical activities. Therefore it is needed to decontaminate some selected parts of forests in Japan to local economy. Clear cutting and scraping surface soil and organic matter are common methods of decontamination. However the efficiency of decontamination is up to 30% reduction of aerial radiation, and the cost to preserve contaminated debris is not affordable.

In this study we used wood chips as a growth media for saprotrophic fungi which are known to accumulate radio-caesium. There are many studies indicated that mushrooms accumulated radio-caesium from forest soil and organic layer. It is not practical to collect mushrooms to decontaminate radio-caesium, because biomass of mushrooms are not enough to collect total contaminants. Mushrooms are only a minor part of saprotrophic fungi. Fungal biomass in forest soil is about 1% of dead organic matter on forest floor. Our previous study to observe Cs accumulation to decomposing leaf litter indicated 18% absorption of total soil radio-Cs to litter during one year field incubation (Kaneko et al., 2013), and Cs concentration was proportional to fungal biomass on litter. This result indicated that fungi transferred radio-caesium around newly supplied leaf litter free of contamination. Therefore effective decontamination will be possible if we can provide large amount of growth media for saprotrophic fungi, and the media can be removed from forests with fungal bodies. We covered forest floor using wood chips, and observed Cs accumulation, and found that up to 50% of soil radio-caesium was transferred from soil to wood chips after 6-month of field incubation. Therefore this method is effective to decontaminate forest using ecological process.

Kaneko N, Huang Y, Nakamori T, Tanaka Y, Nonaka M. Radio-caesium accumulation during decomposition of leaf litter in a deciduous forest after the Fukushima NPP accident. *Geophysical Research Abstracts*. 2013;15(EGU2013):7809.