Impact of an ex-situ treatment for cesium decontamination on soil bacterial communities

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In frame of the DEMETERRES project, an innovative technology has been developed for cesium removal from soil and rehabilitation of contaminated agricultural areas such as in Fukushima [1]. This method is based on the extraction of clay particles with a flotation foam process [2, 3]. The fate of the treated soils is a key point in the rehabilitation process. After ex situ treatment, the decontaminated soil must be reusable and reapplied on the agricultural plots. Soil bacteria are abundant and highly diverse. They play key roles in many soil processes and are essential for soil health, especially for plant cultivation. They also establish close relationships with soil particles on which they form biofilms. It is therefore crucial to assess the impact of the flotation foam process on soil bacterial communities and soil fertility. To this end, we used 16S high-throughput sequencing to monitor the modification of the bacterial communities between treated and untreated soil for 3 months after treatment. The effect of tillage was also simulated with a mixture of 50 % - 50 % w/w treated and untreated soil. Our results show that treatment has a strong impact on the diversity and structure of bacterial communities. However, in the simulated plough samples, the community tends to recover after 3 months indicating that the treated soil could be safely reapplied to agricultural plots after treatment.

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