

Radioactive fallout removal from the surface soils by enhancing vertical transport.

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Fukushima nuclear power plant damaged by the East Japan Great Earthquake caused radioactive fallout around the Tohoku region. Because radioactive fallout was positively charged, it was reported to be adsorbed to soil surface. Surface soil scraper and deep plowing would be, therefore, effective for the removal of radioactive materials. However, these techniques were available for flat and wide land like school yard or farm land. Field survey revealed that correlation between EC and radioactive dosage were significant, which meant radioactive fallout did not immediately adsorb to soil surface but stayed as exchangeable ion for a while and was transported with surface water.

Thus we applied artificial macropores to effectively remove radioactive fallout from the surface soil. Artificial macropore filled with bamboo fiber was made in soils (Field: d=1cm length=50cm, Lab: d=0.6cm, length=20cm). Zeolite was placed at the bottom of the macropores (Field: 5cm, Lab: 3cm) to absorb transported Cesium. Four treatments were prepared such as macropore, macropore with ammonium sulfate, no macropore and no macropore with ammonium sulfate. 400mm artificial rainfall was applied in one month.

Results showed artificial macropore effectively transported radioactive Cesium to deeper profile while ammonium sulfate enhanced the amount of Cesium delivered to the deeper profile. No radioactive Cesium was observed from the drainage water.

Field experiment showed significant reduction in macropore plots than no-macropore plots, however, it is not significant for ammonium sulfate plots.

Keywords: radioactive fallout, infiltration, macropore