

Thesis Title	Effects of rain upon radionuclide and nutrient mobility in soil
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Abstract

The aim of this research was to study how the simulated groundwater and the acidity of rain affected the mobility of Cs-134 and Co-60 in soil, and the physical and chemical properties of the soil.

This was a column experiment, in which soil was packed in a series of columns, and 5 cm of top soil was contaminated with radionuclides. The columns were kept standing in water manually maintained at a level of 3 cm for 120 days. During this time, for columns subjected to both groundwater and rain application, soil was supplied from the top with artificial acid rain, with a controlled pH of either 6, 4.5 or 3, with the application rate of 80 ml/day. Soil samples were collected every 30 days. Samples from 6 depths along the soil profile were collected to determine parameters including: total and extractable radioactivity, CEC, exch. H^+ and TEB (exch. Na^+ , exch. K^+ , exch. Ca^{2+} and exch. Mg^{2+}).

The results show that radionuclide migration is enhanced by rain, but not its acidity. The migration of Co-60 was greater than Cs-134. Extractable radioactivity was found at 0-10 cm, whilst at 35 cm for total radioactivity. In soil with low moisture content, more Cs-134 was extracted than Co-60, whilst for moist soil the situation was reversed.

The acidity of the rain had no significant effect on the physical and chemical properties of soil, except for a small increase in exch. H^+ . However, CEC and mineral nutrients in the soil decreased with the order: exch. $Na^+ > exch. Ca^{2+} \approx exch. Mg^{2+} > exch. K^+$.

Keywords : acid rain / migration / total radioactivity / extractable radioactivity / Cs-134 / Co-60