EFFECT OF LONG-TERM SOIL AMENDMENTS ON SPECIATION OF FALLOUT ^{90}Sr AND STABLE Sr IN A CULTIVATED SOIL

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The present study examined speciation of fallout ^{90}Sr and stable Sr in a cultivated soil with different soil managements for three plots over 60 years: (1) F-plot, (2) FC-plot and (3) FCL-plot, where F, C and L represented chemical fertilizers, compost and lime, respectively. Four fractions of ^{90}Sr and stable Sr in the soil samples were individually extracted by means of 1M CH_3COONH_4 (E2, exchangeable ions), 0.04M $NH_2OH\cdot HCl$ in 25% CH_3COOH (E3, E2 + bound to Fe-Mn oxides), H_2O_2 oxidization and then added 3.2M CH_3COONH_4 in 20% HNO_3 (E4, E3 + bound to organic matter), and 6M HCl after igniting at 450ºC (E5, E4 + residue). The pHs of the water extractant in the F-, FC- and FCL-plots were 4.1, 4.7 and 6.2, respectively, and acidification of the soils in F- and FC-plots was enhanced by long-term applications of chemical fertilizers without liming. The ^{90}Sr concentrations of E5 fraction (total content) in the F-, FC- and FCL-plots were 0.21, 0.89 and 1.8 Bq kg^{-1}, respectively. The ^{90}Sr contents in the four fractions decreased with acidification, and the application of compost inhibited the desorption of ^{90}Sr in the soil. The ^{90}Sr concentrations in the fractions increased in order of E2<E3<E4 for the F- and FC-plots, however, those in the E3 and E4 fractions in the FCL-plot were similar to the E5 fraction. Consequently, the concentration of ^{90}Sr in the cultivated soil varies with the type of soil amendments, and the distribution of the ^{90}Sr concentration in the fractions is also changed. The concentration of ^{90}Sr in each fraction had a good correlation with that of stable Sr, and the ratio of ^{90}Sr to stable Sr in the fractions will be discussed.
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