

Cs - 137 and K - 40 Concentration in Soil, their Transfer to Plant and their Impact on the Food Chain

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Abstract

A total number of 780 samples of soil collected over Greece and measured with gamma-rays spectroscopy, sixteen years after the arrival of the Chernobyl "cloud" and its fallout all over the country. An analysis for the long-lived isotope of ^{137}Cs and the natural exist ^{40}K has been performed. It seems that still ^{137}Cs presents a remarkable geographical variability and an inversely proportionality with the natural ^{40}K concentration of soil. According to the present data regarding the ^{137}Cs deposition on Greece, the uneven spotted distribution has been confirmed.

Follow up representative measurements for soil contaminations have indicated minor migration of ^{137}Cs beyond to 5 cm from the surface layer. The insignificant in depth (beyond 5 cm) radiocesium contamination in Greek soils it was expected knowing the composition of these soils, the majority of which are rich in clay and silt, and contain in excess exchangeable potassium. The radioactivity range varies from 0.4 to 14.4 kBq/m². The transfer of ^{137}Cs from soil to corn plant was investigated 16 years after a similar work done soon after the Chernobyl accident. Correlations were made between ^{137}Cs transfer factors and (i) ^{40}K in plant and soil, (ii) pH of water and KCl. (iii) Exchangeable K, Ca and Mg. The uptake of ^{137}Cs by corn plant in 1998 seems to be unchanged when compared to the situation in 1988.

Key words: radioactivity, soil, plant, transfer factor (TF)

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