

Distribution Coefficient (Kd) of Stable Cesium in Agricultural Soil in the Rabat Region, Morocco

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The presence of radioactive cesium (Cs) in soil poses a significant risk to both human health and the environment. Plant uptake is an important pathway for the migration of Cs to the human food chain. Therefore, determining the concentrations of ¹³³Cs in soil solutions is crucial for monitoring and predicting the uptake of radiocesium by soils and plants. The mobility and availability of Cs in soil can be measured by using distribution coefficient, Kd value. The soil was taken from Rabat region and characterized in terms of granulometric distribution, organic matter, carbonates content, pH, and electrical conductivity. Batch experiments were carried out for determination of distribution coefficient, Kd, of cesium in aqueous suspensions. Six experiments were carried out by suspending about 2.5 g of soil particles in 50ml of 1M CaCl₂ solution and spiking with different amounts of stable Cs, from 22 to 476 µg/L. The suspensions were kept under shaking for almost five days and then centrifuged to separate particles from liquid. Cesium concentration was measured by ICP-MS in the aqueous phase. Distribution coefficients were determined as the ratio of the amount of Cs adsorbed on solids to that contained initially in the aqueous phase. The preliminary findings indicated that Kd values were increasing almost asymptotically as Cs concentration increased. This work is part of an international research coordinated project led by the International Atomic Energy Agency.

Keywords : Distribution coefficient ; cesium; soil; ICP-MS