

SEQUENTIAL EXTRACTION PROCEDURES TO ASCERTAIN THE ROLE OF ORGANIC MATTER IN THE FATE OF IODINE IN SOILS.

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In the assessment of the radiological impact on man of radioactive substances the fate of the long-lived ^{129}I in soils is of special interest. In order to predict the behaviour of iodine in the environment the knowledge of soil parameters which are responsible for its sorption is necessary. Sequential extraction techniques were performed to investigate the degree of binding of iodine with soil components and more specifically with the different constituents of soil organic matter (humic acid, fulvic acid, humin) which are liable to change with time. A speciation scheme was especially developed to study the role of organic matter in iodine retention and complexation. In the first steps, several mineral fractions of iodine were extracted: water soluble (H_2O), exchangeable (1M MgCl_2), carbonate bound (0.01N HCl), bound to Fe-Mn oxides ($0.5\text{M NH}_4\text{OH, HCl}$ adjusted to $\text{pH}=2$ with HNO_3). After these preliminary steps, the extraction of organic matter was carried out with neutral pyrophosphate ($\text{Na}_2\text{H}_2\text{P}_2\text{O}_7/ \text{K}_4\text{P}_2\text{O}_7$ 1/1 0.1M $\text{pH}=7$) to determine iodine bound to organo-mineral complexes and sodium hydroxide (0.5M NaOH) to quantify iodine bound to humic substances. For these extracts, the distribution of iodine between humic and fulvic acids was studied. Iodine bound to residual and insoluble organic matter (humin) was extracted with H_2O_2 30% adjusted to $\text{pH}=2$ with HNO_3 . In the last step, iodine bound to the residual soil was extracted by wet digestion (H_2SO_4). In this scheme, all the traditional organic reagents (acetate, acetic acid,..) were removed and replaced by mineral reagents to allow the monitoring of organic carbon in the soil extracts.