B-53: Speciation of cadmium in sewage sludge and arable soils in North Eastern Scotland

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Sewage sludge is the insoluble residue resulting from waste water treatment. Application of sewage sludge to agricultural land and in forestry is becoming important. Composition and speciation of cadmium in sludge show a wide variation. The objective of this study was to fractionate different species of cadmium present in Scottish soil and sewage sludge produced in NE Scotland.

Bulk samples of sewage sludge were collected from Persely sewage treatment works, Bucksburn. Aerohic digestion of liquid sludge samples was performed in the laboratory.

Soils were collected from University farm at Craibstone and were air dried and sieved. In the fractionation procedure, extraction with neutral 1M magnesium nitrate, 0.7M sodium hypochlorite, 0.1M hydroxylamine hydrochloride, 0.2M ammonium oxalate/ oxalic acid mixture and the same with ascorbic acid and acid digestion was carried out to fractionate water soluble, exchangeable, organically bound, manganese oxide bound, amorphous and crystalline FeO bound and residual fractions respectively.

Results indicated that, most of the Cd (28.4%) in sewage sludge used in this study was associated with the exchangeable fraction followed by 15.7% with the amorphous FeO. Similar proportions (13%) were held in organic substances and

manganese oxides. The rest was bound to crystalline FeO and residual fractions in equal proportions.

About 48% of total Cd in the soil was bound to manganese oxide fraction. Amorphous and crystalline FeO held as much as 40% of total Cd. The proportion of Cd associated with organic substances and exchangeable pool was 8% and 4% respectively.

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