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Properties of 21 Urban Agricultural Soils in Seoul, Korea

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The number of urban agriculture practitioners has been increasing rapidly in Korea like many other urbanized countries recently. The Korean government enacted a law for promoting urban agriculture in 2011. However, urban soil environment can be potential sources of many toxic contaminants including heavy metals making people concern about the safety of the agricultural products from the urban agriculture. The accumulation of heavy metals in soil and plant by overuse of compost from animal waste was one of the raised concerns. This study was carried out to find out properties and total and phytoavailable (1.0 M $NH4NO_3$ extractable) contents of heavy metals (Cd, Pb, Cu, Zn) in 21 urban agricultural soils in Seoul. On the average, the investigated urban soils showed pH1:5 6.89, EC1:5 0.14 dS m-1, organic mater 2.22%, available P2O5 139 mg kg-1, cation exchange capacity (CEC) 11.36 cmolc kg-1 and total nitrogen 0.15%. The average exchangeable-Ca, -Mg, -K and -Na of the 21 samples were 6.71, 1.44, 1.06 and 0.30 cmol+ kg-1, respectively. Total heavy metal concentrations (Cd 0.97–3.17 mg kg-1, average 1.89 mg kg-1; Pb 8.10–46.27 mg kg-1, average 19.96 mg kg-1; Cu 8.97–133.40 mg kg-1, average 38.37 mg kg-1; and Zn 38.97–180.06 mg kg-1, average 97.73 mg kg-1) in urban agricultural soils were lower than those of the warning standard in the area 1 according to the Soil Environmental Conservation Act of Korea. Phytoavailable-Cu, -Pb, and -Zn concentrations of the samples showed 0.02-0.28, N.D-0.09 and 0.01-0.43 mg kg-1, respectively. Phytoavailable-Cd was not detected. The average phytoavailable-Cu concentration from this study was similar to that from the previous phytoavailable-Cu of the highly contaminated soils from nearby abandoned mines, which might be resulted from overuse of compost from animal waste. Results showed a necessity of long-term monitoring of soils for sustainable urban agriculture in Korea.