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Immobilization of Cd in contaminated soil with organic amendments from municipal solid wastes

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Incubation experiments were conducted to observe the effects of organic amendments, which were produced from sewage sludge and food waste through pyrolysis, composting and drying processes, on immobilization of cadmium (Cd) in contaminated soil. The results show that concentrations of acid extractable Cd were significantly decreased (5.9-7.6 percentages) with application of 50 g.kg-1 pyrolytic products and composting products during 60 d incubation period, while were increased (0.9-3.0 percentages) with drying products application under the same condition. Concentrations of Fe-Mn oxides bound Cd were decreased and concentrations of organic bound and residual Cd were increased by different levels with application of all amendments. The performances of Cd immobilization with various sludge derived products as amendment presented in following order: Pyrolytic product>composting product>drying product. The performances of Cd immobilization with various food waste derived products as amendment presented in following order: Composting product>pyrolytic product>drying product. Soil pH, cation exchange capacity (CEC) and organic matter were also changed by different levels with application of all amendments. According to the result of correlation analysis, there was significant correlation between soil pH and Cd fractions. Therefore, it could be speculated that soil pH change is one of the main factors in charge of Cd forms distributions in soil with application of organic amendments from sludge and food waste. Based on experiment results, it can be concluded that different processing techniques result in distinguishing properties of organic amendment from same matrix and thus impact its performance of Cd immobilization in soil. As far as environmental effects and risks to be concerned, biochar produced from sewage sludge and food waste through pyrolysis processing could be a promising organic amendment for Cd contaminated soil remediation.

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