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**Effects of Hydroxyapatite on Leaching of Cadmium and Phosphorus and Their Availability
under Simulated Acid Rain**

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ABSTRACT:

Hydroxyapatite (HAP) has been applied in the soil to immobilize heavy metals in the contaminated soil. However, little information is available on the leaching loss of heavy metals and phosphorus (P) under acid rain. Therefore, the leaching behavior of cadmium (Cd) and P, and their availability in a Cd spiked soil were evaluated with application of 0.5% HAP under simulated acid rain (SAR). Results showed HAP increased effluent pH by 0.3–1.5 units than the control, but effluent total P was 1.25–3.55 times the Class Five limit (0.4 mg/L) mandated by the Chinese National Quality Standards for Surface Waters (GB 3838–2002). HAP decreased the leaching loss of Cd and soil CaCl₂-, TCLP-extractable and exchangeable fraction of Cd. Eluviations decreased resin-P and HCl-P, and increased Olsen P and residual-P for the HAP treated soils, but no effects were observed for the untreated soil. Results indicated that HAP decreased the Cd leaching and enhanced soil available P. However, concerns should be taken on the high leaching of P from high application rates of HAP since it may result in the P-induced eutrophication risk.

Keywords: Hydroxyapatite; Simulated acid rain; Leaching; Cadmium; Phosphorus; Availability

1. Introduction

Cadmium (Cd) is a highly bioactive and toxic element with the potential for accumulation in the human body. Typically, Cd concentrations in soils range from 0.01 to 30 mg/kg [1]. Soils are at risk of

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