

有机肥非水溶性分解产物对铜、镉吸附及解吸的影响

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Effects of insoluble decomposition products of manures on adsorption and desorption of copper and cadmium

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摘要 研究了稻草、紫云英和猪粪淹水培养的非水溶性分解产物、两种土壤(红壤、潮土)与这3种有机肥共同淹水培养后的非水溶性产物(水溶性物质被除去)对铜、镉的沉淀、吸附及解吸作用的影响。结果表明,当铜初始浓度为 10^{-4} mol/L, pH < 6时有机残渣促进铜的沉淀;当pH > 6时则抑制了铜的沉淀。当铜初始浓度降为 10^{-5} mol/L时,有机残渣对铜沉淀的促进作用加强。3种有机残渣均促进镉的沉淀,但促进程度比铜低。与有机肥共同培养的红壤,在相同的pH条件下,提高对铜、镉的吸附;在不调节pH条件下,由于有机肥料有提高pH的作用,进一步提高对铜、镉的吸附。与有机肥共同培养的潮土,在相同的pH条件下,对铜、镉吸附的影响很小;在不调节pH时,提高了潮土对铜的吸附,但对镉吸附的影响则较复杂。上述结果表明,有机肥的非水溶性分解产物主要通过提高体系的pH值、与铜、镉形成不溶性的络合物而影响铜、镉的吸附。与有机物料共同培养的红壤所吸附的铜、镉的解吸率均不同程度降低。

关键词: 有机肥 非水溶性分解产物 铜 镉 吸附 解吸 有机肥 非水溶性分解产物 铜 镉 吸附 解吸

Abstract: The effects of the insoluble decomposition products of three manures (rice straw, pig manure and Chinese milk vetch) and the insoluble residues of two soils after being incubated under submerged conditions with the three manures on deposition, adsorption and desorption of Cu and Cd were studied. When the initial concentration was 10^{-4} mol/L, the deposition of Cu was promoted in low pH range (<6), while inhibited in higher pH range (>6) by the insoluble decomposition products. When the initial concentration was 10^{-5} mol/L, the deposition was promoted with a greater degree. All the three organic decomposition products enhanced the deposition of Cd with a smaller degree than that of Cu. At the same pH, larger amount of Cu and Cd was adsorbed by the red soil incubated with the manures than that incubated without them. The pH values of the red soil were raised by the incubation with the three manures, then the adsorption was promoted further. As for the fluvo-aquic soil, the pH raising effect of the incubation with the manures was the main cause for promoting the adsorption of Cu. It was concluded that the pH raising effect and the complexation enhancing effect was the major cause for the insoluble decomposition products free or incorporated with the soils to promote the deposition or adsorption of Cu and Cd. The re-solution of the insoluble products in higher pH range may lead to a reduction of the deposition of Cu and Cd. The Cu and Cd adsorbed by the red soil incubated with the manures was desorbed more difficultly than that incubated without manures.

Keywords:

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