

论文

不同肥料对栽参土壤中Cr、Cu、Pb和Zn全量及有效态的影响

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摘要:

为了解施肥对农田栽参土壤重金属的影响,利用ICP-OES方法对多功能微生物制剂基肥(A)、多功能微生物制剂激活后作基肥(B)、多功能微生物制剂激活后花期施入(C)、鹿粪(D)、EM菌肥(E)、猪粪(F)和对照(ck)7个施肥处理土壤中Cr、Cu、Pb和Zn含量进行了测定。结果表明:随鹿粪和猪粪施入量增加,土壤中重金属Cr、Cu和Pb含量增加,在4.05 kg/m²施入水平下显著高于1.35 kg/m²施入水平,施肥后土壤中重金属Cr、Cu、Pb和Zn的含量均在国家一级标准限值内,栽参土壤质量良好;不同肥料对4种重金属有效态含量有一定的影响,土壤中Cr和Cu的全量和有效态之间存在显著的相关性($P < 0.05$),有机肥改良栽参土壤的同时也增加了重金属的含量,值得警惕。施肥在一定程度上增加了土壤中重金属全量含量,对土壤重金属有效态亦有一定的影响,适宜肥料种类及用量可以降低重金属有效态含量。

关键词: 农田栽参 肥料 重金属 有效性

Effects of Different Manure Treatments on Heavy Metals Content (Cr, Cu, Pb and Zn) and Their Availability in Ginseng Cultivated Soil

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Abstract:

The effects of different manure treatments on the content of heavy metals in cultivated ginseng soil were studied, and the content of heavy metals (Cr, Cu, Pb and Zn) in soil was determined by ICP OES (Inductively Coupled Plasma Optical Emission Spectrometry) in seven treatments, such as multi microbial organic treatment as base fertilizer(A), activated multimicrobial organic treatment as base fertilizer(B), activated multimicrobial organic treatment by foliage application(C), deer manure (D), EM microorganism manure(EM), pig manure(F) and no fertilizer treatment(ck). The results showed that: The content of Cr, Cu and Pb increased with the increase of deer manure and pig manure and the content was higher in the 4.05 kg/m² than in the 1.35 kg/m²; The content of heavy metals(Cr, Cu, Pb and Zn) was lower than the first level of State Soil Environmental Standards(SSES) and the soil was well for cultivated ginseng; The availability of heavy metals was affected by different fertility treatments in the cultivated ginseng soil, suitable fertilizer treatment could reduce heavy metals availability. The total content of Cr and Cu had notable correlation with their availability, it posed the highest potential risk for ginseng quality. Soil heavy metals content and their availability increased by fertilizer treatment in a certain extent, and selecting suitable fertilizer and content could effectively decrease soil heavy metals availability content.

Keywords: ginseng cultivated soil fertilization heavy metal availability

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