

论文

淮南煤矸石山周边土壤中蚯蚓对重金属的富集特征

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摘要:

为研究蚯蚓对煤矸石周边土壤中重金属的富集作用, 从不同堆积年限煤矸石山周边土壤采集蚯蚓, 分析了蚯蚓中 Zn, Pb, Cd, Ni, Cr, V, Cu与土壤中相应重金属浓度关系。结果表明: 随煤矸石堆积时间的增加, 蚯蚓体内 Pb, Cd, Cu含量增加, Ni, Cr, V含量先增加再降低, 而Zn含量变化规律不明显; 蚯蚓体内Zn和Cd含量可较准确反映煤矸石周边土壤中重金属浓度, 而蚯蚓体内Ni, Cr, V含量可在距离上显示与煤矸石山远近关系; 蚯蚓只对 Zn和Cd产生富集效应(富集系数大于1), 且对Cd富集作用最大。蚯蚓可作为煤矸石山周边土壤Cd和Zn的指示生物。

关键词: 煤矸石山; 土壤; 蚯蚓; 重金属; 生物富集系数

The characteristics of heavy metal accumulation in earthworms in the vicinities of the coal waste rock piles in Huainan

Abstract:

Aiming to investigate the characteristics of heavy metal accumulation in earthworms around coal waste rock piles, some earthworm samples were collected from the vicinities of coal waste rock piles of different ages in Huainan. The concentration of Zn, Pb, Cd, Ni, Cr, V, Cu in earthworms and soils were analyzed by ICP-OES. The results show that the concentration of Pb, Cd, Cu in earthworm increases with the increased accumulation time of coal waste rock pile, while the concentration of Ni, Cr, V in earthworm increases first then decreases with the increased accumulation time. However, the concentration of Zn in the earthworm appears no significant trend with the accumulation time changing. Through the analysis of correlation and regression, the concentrations of Zn and Cd in earthworms can accurately indicate the corresponding concentration of Zn and Cd in soils, while the concentration of Ni, Cr, V can denote the distance between the earthworm sampling site and the coal waste rock pile. As the bioconcentration factors of Zn and Cd in earthworms are higher than 1, and the bioconcentration factors of Cd is the highest, it manifests that the earthworms can accumulate Zn and Cd in soils. Therefore, earthworms can be used as a biological indicator of Cd and Zn in soils in the vicinity of coal waste rock pile.

Keywords: coal waste rock pile; soil; earthworm; heavy metal; bioconcentration factor

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