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雪玉洞表土有机氯农药的分布及来源研究

OCPs distribution and possible sources in the surface soil of Xueyu Cave

关键词: [有机氯农药](#) [表土](#) [分布](#) [组成](#) [来源](#) [雪玉洞](#)

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摘要: 为研究有机氯农药(OCPs)在重庆丰都雪玉洞表土中的水平分布趋势、组成特征和来源,采用气相色谱-微池电子捕获检测器(GC- μ ECD)分析了10个代表性表层土样中18种OCPs.结果表明,研究区表层土壤中18种OCPs除 α,p' -DDD、 ϵ -HCH、艾氏剂和狄氏剂外均有不同程度的检出,其中,HCH、DDT、七氯和甲氧滴滴涕的检出率高达100%,是主要的污染物.土壤中总有机氯农药的含量范围为 $1.24\sim 750.56\text{ ng}\cdot\text{g}^{-1}$,平均值为 $79.57\text{ ng}\cdot\text{g}^{-1}$.DDTs和HCHs可能分别来自于工业DDTs和林丹的非法使用,并且近期可能有新的输入.通过相关分析得出,研究区10个采样点有机氯农药基本具有相同的来源,并且土壤有机碳是影响有机氯农药分布的重要因素.对比中国的土壤质量标准(GB15618-95)发现,研究区土壤中HCHs和DDTs的残留均处于较低水平.由于岩溶地区地表土层厚度分布不连续,且地下岩溶形态较为发育,有机氯农药可能通过裂隙或落水洞进入地下河系统,对洞穴滴水 and 地下水造成潜在的污染风险.

Abstract: Ten typical surface soil samples were taken on the top of Xueyu Cave, and 18 OCPs were analyzed by gas chromatography equipped with $\text{miro}^{63}\text{Ni}$ electron capture detector. The purpose of this study was to investigate the horizontal distribution and composition of organochlorine pesticides (OCPs) in the surface soil of Xueyu Cave, and to further identify their sources. The results showed that most OCPs, except for α,p' -DDD, ϵ -HCH, aldrin and dieldrin, were detected in the soil samples. Moreover, 4 OCPs, including HCH, DDT, heptachlor and methoxychlor, were detected in all samples, which composed the predominant contaminations. The OCPs concentrations of surface soils ranged from 1.24 to $750.56\text{ ng}\cdot\text{g}^{-1}$ with a mean value of $79.57\text{ ng}\cdot\text{g}^{-1}$. The ratio of OCPs isomers implied that the unlawful using of lindane and industrial DDTs caused HCHs and DDTs pollution, and a new contamination source can be observed. Correlation analysis between 10 samples indicated that OCPs in the study area generally had the same source, and soil organic carbon was an important factor in the distribution of OCPs. Compared with the Environmental Quality Standard for Soils of China GB15618-95, the concentrations of HCHs and DDTs in these samples stayed in a low pollution level. However, due to heterogeneous distribution of the surface soil in karst region and highly developed karstification in this area, OCPs could easily transport via karst fissures or dolines into groundwater system, which posed a potential risk for dripping water and groundwater in Xueyu Cave.

Key words: [organochlorine pesticides](#) [surface soil](#) [distribution](#) [composition](#) [source](#) [Xueyu Cave](#)

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