

# 青山水库表层沉积物重金属污染特征及生态风险评价

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Pollution characteristics and ecological risk assessment of heavy metals in surface sediments of Qingshan Reservoir in Lin'an City, Zhejiang Province of East China.

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## 摘要

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## 摘要

在位于浙江省临安市的青山水库采集了具有代表性的8个样点的表层沉积物样品,分析比较了样品中As、Cr、Cu、Ni、Mn、Pb、Zn等7种重金属总量的差异,采用BCR连续提取法对重金属不同形态(酸提取态、可还原态、可氧化态、残渣态)进行分析.采用地积累指数法( $I_{geo}$ )和Hakanson潜在生态风险指数法,对青山水库不同采样点表层沉积物中重金属的污染程度和潜在毒性与生态风险进行评价.结果表明:青山水库表层沉积物重金属污染程度存在明显的空间差异,流经城区和工业园区的青山水库支流入库河口附近的表层沉积物重金属含量明显高于其他采样点.青山水库表层沉积物7种重金属中,Mn主要以酸提取态存在;Cu和Pb主要以可还原态形式存在;As主要以残渣态形式存在.流经城区的支流入库河口附近表层沉积物还原态和酸提取态重金属比例较高,对水生生物有一定的毒性风险.8个样点的表层沉积物7种重金属中,以As污染程度最高,潜在生态风险最大,其次是Cu、Ni、Mn、Pb和Zn,均处于轻度污染状态,而Cr处于清洁水平,潜在生态风险较低.不同采样点比较发现,分别流经城区的锦溪和工业园区的横溪入库河口附近表层沉积物重金属污染程度和潜在生态风险明显高于其他采样点.

关键词: 青山水库 沉积物 重金属 化学形态 潜在生态风险

## Abstract:

A total of 8 representative surface sediment sampling sites were collected from the Qingshan Reservoir in Lin'an City of Zhejiang Province to investigate the differences in the total concentrations of As, Cr, Cu, Ni, Mn, Pb, and Zn among the sampling sites. The different forms of the heavy metals, *i.e.*, acid soluble, easily reducible, easily oxidizable, and residual, were determined by BCR sequential extraction method, and the pollution degrees and potential ecological risks of the heavy metals in the surface sediments at different sampling sites of the Reservoir were assessed by using geo accumulation index ( $I_{geo}$ ) and Hakanson potential ecological risk index. There existed obvious spatial differences in the total concentrations of the heavy metals in the surface sediments of the Reservoir. The sampling sites nearby the estuaries of the tributaries flowing through downtowns and heavy industrial parks to the Reservoir had obviously higher heavy metals concentrations in surface sediments, as compared to the other sampling sites. In the sediments, Mn was mainly in acid extractable form, Cu and Pb were mainly in reducible form, and As was mainly in residual form. The surface sediments at the sampling sites nearby the estuaries of the tributaries flowing through downtowns to the Reservoir had higher proportions of acid extractable and reducible forms of the heavy metals, which would have definite potential toxic risk to aquatic organisms. Among the 7 heavy metals in the surface sediments, As showed the highest pollution degree, followed by Cu, Ni, Mn, Pb, and Zn, which were at moderate pollution degree, while Cr was at non-pollution degree, with relatively low potential ecological risk. Through the comparison of the sampling sites, it was observed that the surface sediments at the sites nearby the estuaries of Jinxi River and Hengxi River flowing through downtowns and heavy industrial parks to the Reservoir showed obviously higher heavy metals pollution degree and potential ecological risk.

Key words: Qingshan Reservoir sediment heavy metal chemical forms potential ecological risk.

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- [3] 张晓梅<sup>1,2</sup>,周毅<sup>1</sup><sup>\*\*</sup>,王峰<sup>1,2</sup>,刘鹏<sup>1,2</sup>,刘炳舰<sup>1</sup>,刘旭佳<sup>3</sup>,杨红生<sup>1</sup>. 山东荣成天鹅湖矮大叶藻种群的生态特征[J]. 应用生态学报, 2013, 24(7): 2033-2039.
- [4] 王英丽<sup>1</sup>,林庆祺<sup>1</sup>,李宇<sup>1</sup>,杨秀虹<sup>1,2</sup>,王诗忠<sup>1,2</sup><sup>\*\*</sup>,仇荣亮<sup>1,2</sup>. 产铁载体根际菌在植物修复重金属污染土壤中的应用潜力[J]. 应用生态学报, 2013, 24(7): 2081-2088.
- [5] 胡岫,王晓春<sup>\*\*</sup>,杨金艳. 伊春西林铅锌矿区兴安落叶松年轮中重金属元素含量的年际变化[J]. 应用生态学报, 2013, 24(6): 1536-1544.
- [6] 能凤娇<sup>1,2</sup>,吴龙华<sup>2</sup><sup>\*\*</sup>,刘鸿雁<sup>1,3</sup>,任婧<sup>1</sup>,刘五星<sup>2</sup>,骆永明<sup>2,4</sup>. 芹菜与伴矿景天间作对污泥农用镉污染土壤化学与微生物性质的影响[J]. 应用生态学报, 2013, 24(5): 1428-1434.
- [7] 陈卫平<sup>\*\*</sup>,吕斯丹,王美娥,焦文涛. 再生水回灌对地下水水质影响研究进展[J]. 应用生态学报, 2013, 24(5): 1253-1262.
- 杨煜曦<sup>1,2</sup>,卢欢亮<sup>1,3</sup>,战树顺<sup>1,2</sup>,邓腾灏博<sup>1,2</sup>,林庆祺<sup>1,2</sup>,王诗忠<sup>1,2</sup><sup>\*\*</sup>,杨秀虹<sup>1,2</sup>,仇荣亮<sup>1,2</sup>. 利用红麻复垦多金属污染酸化土壤[J]. 应用生态学报,