

研究报告

## 冶炼厂污灌区土壤铜和锌污染与土壤酶活性

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### 摘要

通过对冶炼厂污灌区土壤和水稻中Cu、Zn含量分析以及土壤酶活性的测定,研究了距冶炼厂不同距离土壤Cu、Zn含量状况、水稻对它们的吸收和分配以及土壤酶活性的变化.结果表明,冶炼厂造成了周围农田土壤的Cu、Zn污染,其中Cu污染较严重,距离冶炼厂100 m处的全量和提取态Cu分别为182.45和81.91 mg·kg<sup>-1</sup>,是对照的10<sup>3</sup>和35倍.污灌区水稻各器官Cu、Zn的分布规律是,Cu:根>茎叶>米;Zn:茎叶>根>米.Zn在水稻体内的移动能力大于Cu,Cu主要累积在水稻根部,根可作为一种屏障阻碍Cu向地上部分迁移,使地上部分免受其害.水稻茎叶Cu含量和土壤中Cu的浓度密切相关.对蔗糖酶、过氧化氢酶和脲酶活性测定表明,脲酶活性变化最显著,其活性与土壤中Cu的浓度显著相关,建议用脲酶活性作为污灌区Cu污染指标.

关键词 [土壤-水稻系统](#); [重金属](#); [土壤酶](#)

分类号

## Cu and Zn pollution and soil enzyme activities in sewage irrigation area near smeltery

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### Abstract

This paper studied the Cu and Zn status in soil and rice plant as well as the soil enzyme activities in the sewage irrigation area near a smeltery. The results showed that the soils near the smeltery were polluted. The soil total and extractable Cu contents at the distance of 100 m were 182.45 and 81.91 mg·kg<sup>-1</sup>, respectively, 9.3 and 34 times higher than the control. The Cu concentration in different parts of rice was in order of root>leaf and stem> grain, while the Zn concentration was in order of leaf and stem>root>grain. Zn was more mobile than Cu which was likely to accumulate in rice root. It was considered that root could act as a barrier which retarded the upwards transport of Cu and protected the above ground parts of rice from toxication. The Cu contents of rice stem and leaf had a significant correlation with soil Cu contents in the sewage irrigation area. Among the three test enzymes, urease was the most sensitive one to Cu, and its activity had a significant correlation with soil Cu content. Therefore, it is feasible to use soil urease activity as an indicator of soil Cu pollution in sewage irrigation area near the smeltery.

**Key words** [Soil-rice system](#), [Heavy metal](#), [Soil enzyme](#)

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