

黄土沟壑区小流域不同地形条件下土壤锰的形态分布及其有效性

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Fraction distribution and availability of soil manganese as affected by landforms in the Loessial Gully Region

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摘要 黄土高原复杂的地形条件因改变了土壤的基本性质而成为影响土壤锰素有效性的主要原因, 本文研究了黄土沟壑区不同地形条件对锰的形态分布及其有效性的影响。结果表明, 研究区土壤有效锰的含量因地形条件不同差异很大, 有效锰在土壤剖面呈下降趋势, 在塬面土壤含量最高, 沟道土壤含量最低。交换态锰在塬面、梯田土壤含量较低, 在坡地和沟道土壤含量较高; 塬面、梯田和坡地土壤碳酸盐结合态和有机结合态锰的含量高于沟道土壤, 氧化物结合态锰的含量显著低于沟道土壤; 矿物态锰以塬面土壤最低, 沟道和梯田土壤较高, 坡地土壤居中。土壤交换态锰是有效锰的直接来源, 但因其含量低而对锰的有效性贡献很小; 有机结合态锰是有效锰的潜在来源, 对锰的有效性贡献最大。

关键词: 黄土沟壑区 锰 形态 有效性 地形 黄土沟壑区 锰 形态 有效性 地形

Abstract:

Landform is a major factor influencing the availability of manganese (Mn) in soils because of its effects on soil properties and soil water conditions. This study was therefore conducted to investigate the relationship between landforms and Mn fraction and availability in a loessial gully region. The results showed that available Mn in soils varied greatly with landforms in the study area. Available Mn decreased with depth in soil profile. The highest available Mn was observed in plateau land while the lowest available Mn was observed in gully bottom. The content of exchangeable Mn was higher in sloping land and gully bottom than in plateau and terrace lands. Compared with gully bottom, plateau, terrace and sloping lands led to higher Mn in carbonate and organic matter bound fractions but lower Mn in oxide bound fraction. The mineral bound Mn was higher in gully bottom and terrace land than in plateau land. In spite of the direct source of available Mn, exchangeable Mn contributed little to Mn availability due to its low content in soils. Organic matter bound Mn, however, acted as the main source of available Mn and contributed largely to Mn availability.

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