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长期定位施肥对亚热带丘陵地区红壤旱地质量的影响Ⅰ.酸度

Effect of long-term stationary fertilization on upland red soil quality in subtropical hilly regions Ⅰ. Acidity

中文关键词:长期定位施肥 红壤 酸度 有机质

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中文摘要:

本文研究了中科院红壤生态实验站长期定位施肥试验5种不同施肥处理对土壤pH、土壤交换性氢、铝的影响，及其与土壤有机质之间的相关性。结果表明，长期不同施肥处理均提高了土壤pH值，降低了土壤交换性氢和交换性铝含量，改良了红壤的酸性。施用有机肥（M），有机肥+菌剂（BM），有机肥+菌剂+微量元素（BMT）显著优于施用化肥（F）和化肥+微量元素（TF）的处理。添加微量元素和有效菌剂后土壤交换性氢、铝含量略有提高。土壤有机质与土壤pH呈显著正相关，与交换性铝含量呈显著负相关，而与土壤交换性氢含量的相关性不显著。随着土壤有机质含量的增加，土壤交换性氢占总交换性酸度比例越大。长期施用有机肥、提高土壤有机质含量是改良红壤酸度和减轻铝毒较好的农艺措施。

英文摘要:

A long-term stationary field experiment consisting of 5 fertilization treatments was carried out in the Red Soil Ecological Experiment Station of CAS to study effects of fertilization on pH and exchangeable H+ and Al3+ in soil and analyze relationships of organic matter (OM) content with soil pH, and contents of exchangeable H+ and Al3+. Results show that fertilization in all treatments increased soil pH and decreased contents of exchangeable H+ and Al3+. Treatment M (organic manure), Treatment BM (organic manure + microbial agent) and Treatment BMT (organic manure + microbial agent + microelement fertilizer) were significantly superior to Treatment F (chemical fertilizer) and Treatment TF (chemical fertilizer + microelement fertilizer) in reducing soil acidity. Addition of microelements and microbial agent increased the contents of exchangeable H+ and Al3+ slightly. Soil OM content was significantly correlated positively with soil pH value, and negatively with exchangeable Al3+ content, but not significantly related with exchangeable H+ content. With rising soil OM content, the proportion of exchangeable H+ increased in exchangeable acidity of soil. Long-term application of organic manure to increase soil OM content is a good agronomic practice to reduce acidity and aluminum toxicity in red soil.

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