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植物保护—研究报告

紫色土中联苯菊酯残留对土著微生物的影响

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摘要:

为了阐明紫色土农药残留的生态环境效应特征及土壤微生物响应机理，以三峡库区具代表性的紫色土为材料，通过玉米盆栽模拟试验和平板计数法，研究了残留态联苯菊酯对紫色土土著微生物数量的影响。结果表明，低浓度联苯菊酯对土著细菌和放线菌有显著的促生效应，依联苯菊酯浓度从低到高，土壤细菌和放线菌数量随时间逐次出现最高峰值：第6天，LB-L处理下的细菌和放线菌数分别达9.02×106 个/g和2.77×106 个/g，约为相应对照的9倍和3倍；第11天，LB-M的细菌数约为对照的77倍，达到5.19×107 个/g；第16天时，LB-H的细菌数为1.71×107 个/g，LB-M和LB-H处理下的放线菌数分别为4.04×106 个/g、4.35×106 个/g。其次，联苯菊酯残留对土著真菌有显著且迅速的抑制作用，即使在2.50 mg/kg残留水平下，真菌数量也会在施加联苯菊酯后第2天发生显著降低。再次，紫色土中3种土著微生物类群对残留态联苯菊酯均表现出一定的生态适应性，但表现有所不同：土著细菌的生态响应存在阈值，土著放线菌表现为较长时期内稳定的促生效应，土著真菌则表现为可恢复的抑制效应。试验表明，土壤微生物数量等生物因素可作为联苯菊酯对紫色土根际微生态影响的重要评价指标。

关键词: 微生态效应

Effect of the Bifenthrin’s Residue in Purplish Soil on Indigenous Microorganism

Abstract:

In order to clarify the entironment’s effect characters of the pesticide’s residue in the purplish soil and the soil microorganisms’ response mechanism, using purplish soil, which is the most representative soil types in the Three Gorges Reservoir Areas, as experimental material, through pot-cultured maize and CFU method, the influences of bifenthrin’s residue on indigenous microbes quantity were researched. The results showed that, the low level of bifenthrin’s concentration had a significant promoting effect on indigenous bacteria. Different bifenthrin’s concentrations from low-level to high-level, the numbers of soil bacteria and actinomycetes had successive peak values over time: in the 6th day, the numbers of bacteria and actinomycetes of LB-L treatment reached 9.02×106 and 2.77×106 per gram soil respectively, which were about 9 and 3 times to the corresponding contrasts. In the 11th, the numbers of bacteria under LB-M treating were about 77 times to the control, reaching 5.19×107 per gram soil. In the 16th, bacterial numbers of LB-H treatment reached 1.71×107 per gram soil. Meanwhile, the numbers of actinomycetes of LB-M and LB-H treatments were 4.04×106 and 4.35×106 per gram soil respectively. Secondly, the residual bifenthrin in purplish soil showed a significant and rapid inhibition effect on indigenous fungi, even under the 2.50 mg/kg bifenthrin level, the numbers of fungi would significantly decrease after bifenthrin applied in the following day. Thirdly, the main three groups of indigenous microorganisms in purplish soil showed the certain ecological suitability to the residual bifenthrin. But the representations were quite different: there was a bifenthrin’s concentrational threshold level to ecological response of indigenous bacteria, while indigenous actinomycetes showed a long and stable promoting effect. However, indigenous fungi showed a recoverable and inhibitory effect. The results of experiment showed that, soil microbes and other biological factors could be used as the important evaluation index for the bifenthrin’s contaminated rhizosphere microecology of the purplish soil.

Keywords: microecology effect

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