

微生物有机肥结合土壤改良剂防治烟草青枯病

Control of tobacco bacterial wilt with biomanure plus soil amendments

中文关键词:烟草青枯病 微生物有机肥 微生物区系分析 连作土壤 土壤改良剂

Key words: Tobacco bacterial wilt Bio-fertilizer Microflora Continuous monocropping Soil amendments

基金项目:“十二五”公益性行业(农业)科研专项经费(201103004)、中国烟草总公司重点项目(11020100219)和

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中文摘要:

盆栽试验设置了五个处理:对照(T1)、施用普通有机肥(T2)、施用SQY-7号微生物有机肥(T3)、石灰处理土壤后施用SQY-7号微生物有机肥(T4)、石灰和碳酸处理土壤后施用SQY-7号微生物有机肥(T5),用DGGE和平板计数法研究了根际土壤微生物群落的多样性,旨在探讨微生物有机肥及微生物有机肥结合土壤改良剂对烟草青枯病的防治效果和对烟草根际土壤细菌群落多样性的影响。结果表明:连作土壤中,施用普通有机肥(T2)不仅不能防治烟草青枯病,还提高了烟草青枯病的病情指数,而施用微生物有机肥处理(T3、T4和T5)对烟草青枯病的防治效果达66.7%~87.9%;施用微生物有机肥可显著改变根际微生物区系结构:T2处理的根际土壤细菌和放线菌数量较T1处理略有增加,真菌数量则较T1处理增加了1.1倍;T3和T4处理的根际土壤细菌分别较T1处理增加了3.5倍和6.1倍,同时,放线菌数量分别增加了3.7倍和3.5倍,而真菌数量分别下降了66.2%和70.1%;T5处理的根际土壤细菌和放线菌数量较T1处理分别增加了13.6倍和5.1倍,真菌数量下降了75.0%;各处理的细菌群落多样性均较T1处理增加。初步研究表明,连作病害土壤用石灰和碳酸预处理后再施用SQY-7号微生物有机肥能有效防控烟草青枯病和减缓连作生物障碍,其作用机制主要通过改变微生物区系和降低病原菌数量实现。

英文摘要:

A pot experiment, designed to have five treatments, was carried out in greenhouse to investigate effects of bio-organic fertilizer(BOF) and BOF plus soil amendments on tobacco bacterial wilt and on microflora in rhizosphere soil. The five treatments were set as follows: T1, the control; T2, the pot soil was applied with common organic fertilizer; T3, the pot soil was applied with the BOF; T4, the pot soil was treated with lime before the application of the BOF; T5, the pot soil was treated with lime and bicarbonate before the application of the BOF. DGGE and plate counting were used to investigate microflora in the rhizosphere soils. Results show that T2 not only had no control effect against tobacco bacterial wilt, but also increased the disease index, while the control effects against tobacco bacterial wilt of T3, T4 and T5 varied in the range of 66.7%~87.9%. All the organic fertilizer treatments had some influence on microflora in the rhizosphere, increasing the number of bacteria by 3.5 and 6.1 times and the number of actinomycetes by 3.7 and 3.5 times, but decreasing the number of fungi by 66.2% and 70.1%, respectively in T3 and T4, and increasing the number of bacteria and actinomycetes by 13.6 times and 5.1 times, respectively, but decreasing the number of fungi by 75.0% in T5. The preliminary study found that a combined treatment of the soil with lime and bicarbonate before application of the BOF could control tobacco bacterial wilt effectively by altering composition of the microflora in tobacco rhizosphere, and decreasing the number of pathogens.

王丽丽,石俊雄,袁赛飞,吴凯,蔡刘体,刘艳霞,杨兴明,冯勇刚,沈标,沈其荣.微生物有机肥结合土壤改良剂防治烟草青枯病[J].土壤学报,2013,50(1):150-156.Wang Lili,Shi Junxiong,Yuan Saifei,Wu Kai,Cai Liuti,Liu Yanxia,Yang Xingming,Feng Yonggang,Shen Biao and Shen Qirong.Control of tobacco bacterial wilt with biomanure plus soil amendments[J].Acta Pedologica Sinica,2013,50(1):150-156

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技术支持：北京勤云科技发展有限公司京ICP备09084417号