

强化拮抗菌有机肥在连作大棚草莓上的应用效果研究

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Effects of organic fertilizer with antagonistic bacteria on strawberry in continuous cropping greenhouse

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摘要

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摘要 采用室内平板培养、气候箱内土壤处理及盆栽和大棚试验相结合的方法,研究了以腐熟中药渣堆肥为原料制备的液体肥料在强化了拮抗微生物前后对草莓枯萎病菌生长的抑制作用及对病害的防治效果,结果表明:普通液肥和两种强化液肥对两种草莓病原真菌的生长都有不同程度的抑制作用;三种液肥经辐照灭菌后均丧失了对病原真菌的抑制作用;两种强化液肥处理土壤10~15d后能显著抑制土壤中草莓枯萎病菌的生长繁殖而降低土壤中病原菌的数量。盆栽试验表明:普通液肥辅助灭菌后对草莓枯萎病仍有一定的防效,但显著低于没灭菌的液肥;两种强化液肥对草莓的盆栽防效显著高于普通液肥。大棚小区试验显示:施用有机液肥的三个处理的草莓产量显著高于常规对照,而发病率显著低于常规对照;分别强化了两种拮抗菌的液肥对病害的防效均好于未强化的液肥;施用液肥对根际土壤酸化和盐分积累有一定的修复效果,使小区草莓增产达93~110%,畸形果率降低23.5%,并对草莓品质有一定程度的改善。强化了拮抗菌的有机液肥对草莓连作障碍的防治效果显著提高。

关键词: 有机液肥 草莓 土传病害 拮抗微生物

Abstract: Mycelium growth in plate, soil treatment in artificial climate chest, pot and field experiments were carried out to study inhibition effect of liquid fertilizer(LF) resulted from liquid fermentation with composted herbal residue on soil-borne plant pathogens of strawberry, *Fusarium axysporum* f. sp. *fragariae* fluctuation in soil, bio-control of strawberry diseases in the pot experiment, and on strawberry growth in greenhouse. The results show that there are growth inhibition effects on two plant pathogens in the plates under both no-fortified and fortified LFs with antagonistic bacteria, and the inhibition effects are lost in the three kinds of LFs after the Co 60 radiation. Propagation of *Fusarium axysporum* f. sp. *fragariae* in soil is restrained strongly after soils are treated with two fortified liquid fertilizers for 10– 15 days separately. Compared with that of no-radiated LF, the no-fortified liquid fertilizer, even after being radiated by Co60, still has growth inhibition effects, but inhibition rate is decreased. Biocontrol effects of strawberry fusarium wilt of the two fortified liquid fertilizers are higher than those of the no-fortified fertilizer in the pot test. The field experiment of the application of three LFs on strawberry for soil-borne disease suppression was conducted in the plastic greenhouse. The results show that the strawberry fruit yields of the LFs treatments are significantly higher than that of the control, while the disease incidences are obviously lower than that of the control. The biocontrol effects of LFs fortified with two different antagonistic bacteria separately are better than those of the no-fortified LFs. The effect of LF fortified with antagonistic bacteria2 is better than that of LF fortified with antagonistic bacteria1. The application of LFs appears effective remediation on soil acidification and salt accumulation in strawberry rhizosphere. The strawberry yields of LF the treatments are increased by 93– 110% since the LF treatments reduce the disease incidences significantly. The malformed fruit rate is reduced by23.5% in the treatment of LF, and the fruit quality is improved. Biocontrol effects of fortified LF with antagonistic bacteria on strawberry growth in greenhouse are increased significantly.

Keywords: liquid fertilizer strawberry soil-borne disease antagonistic microorganism

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