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不同原料堆制的有机无机复混肥对辣椒产量和土壤生物性状的影响

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Effect of different organic–inorganic mixed fertilizer application on pepper yield and soil microbial properties

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摘要 通过田间试验，研究了施用以菜粕堆肥、猪粪堆肥和中药渣堆肥制成的3种有机无机复混肥对辣椒产量、土壤矿质态氮和土壤微生物量碳、氮以及微生物多样性的影响。结果表明：1）各施肥处理辣椒果实产量为2451.1～3301.5kg/hm^2，均显著高于对照（CK，1700.8 kg/hm^2）；3种原料堆制的有机无机复混肥的辣椒果实产量为2851.3～3301.5kg/hm^2，显著高于单施化肥CF，增产率为16.3%～34.7%。2）与CF和CK处理比较，3种原料堆制的有机无机复混肥处理明显提高了土壤矿质态氮含量，改善了土壤供氮能力，增加了土壤微生物量C、N含量。3）对各处理土壤DNA条带采用邻接法分析(Eighbor Joining)表明，5个处理土壤样品共分为3大族群，CF与CK为一种族群，菜粕堆制的有机无机复混肥（RCC）为另一种族群，猪粪堆制的（PMC）和中药渣堆制的有机无机复混肥（CMC）又属另一种族群。说明施入外源有机物质(菜粕、猪粪与中药渣)可能改变土壤的细菌群落结构，而施入化肥对土壤的细菌群落结构影响较小。

关键词： 有机无机复混肥 辣椒 产量 矿质态氮 微生物生物量 有机无机复混肥 辣椒 产量 矿质态氮 微生物生物量

Abstract:

A field experiment was carried out to study the effect of organic-inorganic mixed fertilizer application on pepper yield, soil mineral nitrogen, soil microbial biomass carbon and nitrogen and microbial diversity. Rapeseed cake compost (RCC), pig manure compost (PMC) and Chinese medicine residue compost (CMC) were mixed with chemical fertilizers (nitrogen, phosphorus and potassium). All the treatments except the CK received the same rate of nitrogen application. The following results were obtained: 1) All fertilization treatments had higher yields than CK(1700.8 kg/ha). Compared with CF (2451.1 kg/ ha), the pepper yield at the three organic-inorganic mixed fertilizer application treatments ranged from 2851.3–3301.5 kg/ha and the increased percentage was 16.3%–34.7%.2) All organic-inorganic mixed fertilizer treatments could improve the capability of soil nitrogen supply, and increase soil microbial biomass carbon and nitrogen content relative to CF and CK. 3) Eighbor Joining analysis indicated that bacteria in the five treatment soils could be classified into three clusters. Soil bacterial communities of CF and CK belonged to the same cluster, while RCC was the second cluster. The soil bacterial communities of PMC and CMC were in the third cluster. Application of organic fertilizers could alter soil bacterial communities, while the application of CF had little effects on soil bacterial communities.

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