

施用玉米秸秆堆肥对盆栽芥菜土壤酶活性和微生物的影响

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Impacts of applying corn-straw compost on microorganisms and enzyme activities in pot soil cultivated with mustard

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摘要 研究了施用玉米秸秆堆肥对盆栽芥菜土壤微生物和土壤酶活性的影响。结果表明, 与对照和单施无机肥相比, 施用堆肥能够提高芥菜生物量, 增加根际土壤细菌、放线菌和真菌的数量, 各处理微生物数量均在收获期达到最大值; 同时, 施用堆肥能够显著提高芥菜根际土壤脲酶、蔗糖酶、过氧化氢酶和纤维素酶的活性。各土壤酶在芥菜的生长期变化趋势不同, 脲酶活性在收获期达到最高; 化肥与堆肥配施蔗糖酶活性在整个生长期内较稳定, 其他处理均在收获期最低; 过氧化氢酶活性在前期比较稳定, 收获期有较大幅度下降; 纤维素酶活性在旺长期较高, 而苗期和收获期较低。相关性分析表明, 部分土壤酶活性之间呈显著或极显著正相关; 酶活性与土壤微生物数量之间呈显著或极显著正相关, 表明土壤酶活性与微生物能够较好地反映土壤肥力水平。

关键词: 堆肥 芥菜 土壤微生物 土壤酶活性

Abstract: A pot experiment planted with mustard was conducted for investigating impacts of compost of corn straw on soil microbial community and enzyme (urease, sucrase, catalase and cellulase) activities. Results show that the compost application could increase the biomass of mustard and numbers of bacteria, fungi and actinomycetes which are higher than those of the control and inorganic fertilizer treatments. Numbers of these three group microorganisms are highest during the harvest stage of mustard in all treatments. Activities of soil enzymes (urease, sucrase, catalase and cellulase) are significantly increased in the compost treatments compared with the control or inorganic fertilizer treatments. However, the change trends of the activities are different at the growth stages of mustard. The maximum value of urease activity occurs during the harvest stage, while the value of sucrase is lowest at this stage except the compost and inorganic mixed fertilizer treatment. The catalase activity is stable before the harvest stage and then is declined obviously after the stage. The maximum value of cellulase activity appears at the bloom stage, while lower at the seedling and harvest stages. Significant positive correlations are found among part of the soil enzyme activities. Furthermore, there are significant positive correlations between part of the soil enzyme activities and numbers of microorganisms, and these results indicate that soil enzyme activities and microorganisms could be considered as good indicators of soil fertility level.

Keywords: compost mustard soil microorganism soil enzyme activity

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