

连年翻压绿肥对植烟土壤微生物量及酶活性的影响

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Effects of consecutive turnover of green manures on soil microbial biomass and enzyme activity

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摘要

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摘要 通过3年田间定位试验, 研究连年翻压绿肥对植烟土壤微生物量碳、氮及酶活性的影响。结果表明, 连年翻压绿肥能提高土壤微生物量碳、氮及土壤脲酶、酸性磷酸酶、蔗糖酶、过氧化氢酶的活性, 且随翻压年限的增加而增加。整个生育期, 翻压3年绿肥的处理与对照相比微生物量碳、氮分别提高31.0%67.1%、23.0%145.1%; 土壤脲酶、酸性磷酸酶、蔗糖酶、过氧化氢酶活性分别提高34.4%51.9%、11.0%18.6%、58.0%172.7%、24.0%50.0%, 表明翻压绿肥后土壤生物过程活跃, 利于有机物质的转化和烤烟正常生长所需的营养供应。动态变化特征表明, 翻压绿肥1、2、3年的各处理微生物量碳、氮均在团棵期出现峰值, 土壤脲酶、酸性磷酸酶、过氧化氢酶均在旺长期出现峰值。在出现峰值时翻压3年的处理与对照相比微生物量碳、氮分别提高67.1%、60.7%; 土壤脲酶、酸性磷酸酶、过氧化氢酶活性分别提高51.9%、14.2%、30.6%。此时正值生育旺期, 利于烟株生长发育, 说明连年翻压绿肥后培肥土壤效果显著。土壤微生物量C、N和酶活性能灵敏反映土壤肥力的变化, 可作为评价土壤质量的生物学指标。

关键词: 绿肥 土壤微生物量碳 土壤微生物量氮 土壤酶活性

Abstract: A consecutive 3-year field experiment was conducted to study the effects of incorporation green manure on soil microbial biomass carbon, microbial biomass nitrogen and soil enzyme activities. The results showed that incorporation green manure could increase soil microbial biomass C, N and the activities of soil urease, acid phosphatase (ACP), sucrose, and catalase with the increasing of the returning age. Compared with the control, the contents of soil microbial biomass C and N were increased by 31.0%-67.1% and 23.0%-145.1%, and the activities of soil urease, ACP, invertase and catalase by 34.4%-51.9%, 11.0%-18.6%, 58.0%-172.7%, and 24.0%-50.0% after three years' consecutive turnover of green manure, respectively, suggesting that the turnover of organic matter was facilitated and more nutrients were released to meet the demanding of crop growth. The dynamical changes of soil microbial biomass C, N and the enzyme activity within tobacco development period showed that the maximum of microbial biomass C and N was observed at the roset stage, while the peak of soil enzyme activities was appeared at the busy stage of flue-cured tobacco. Compared with the control, the maximum of soil biomass C, N increased 67.1% and 60.7% after tree years' consecutive turnover of green manure, respectively. The peak of soil urease, ACP, catalase activity increased 51.9%, 14.2%, 30.62%, respectively. Our results proved that incorporation green manure had a positive effect on soil fertility, microbial biomass C and N, and also indicated that the enzyme activities might be used as biological indices for soil quality due to their high sensitivity to soil fertility change.

Keywords: turnover, green manure soil microbial biomass carbon soil microbial biomass nitrogen; soil enzyme activity

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