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长期有机无机肥配施对褐土微生物生物量碳、氮量及酶活性的影响

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Effects of long-term inorganic fertilizer combined with organic manure on microbial biomass C、N and enzyme activity in cinnamon soil

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摘要 通过对山西省寿阳长期定位试验田0—20 cm和20—40 cm的土壤测定和分析，探讨了长期有机无机肥配施下褐土微生物生物量碳、氮和酶活性的变化以及相关性。结果表明，褐土微生物生物量C、N变化基本一致。褐土微生物生物量碳、氮从0—20 cm到20—40 cm土层均呈减少趋势；长期单施高量有机肥、有机无机肥合理配施都能提高褐土微生物生物量碳、氮；不同用量的长期单施化肥处理不能使微生物生物量C、N显著增加。脲酶和碱性磷酸酶活性从0—20 cm到20—40 cm土层呈减少趋势；长期单施高量有机肥和有机无机肥合理配施可使褐土脲酶及碱性磷酸酶活性增加。脲酶活性随单施化肥量的增加有变大趋势，而碱性磷酸酶活性则呈变小趋势。土壤微生物量碳氮、土壤酶活性及土壤养分之间的显著相关性表明，微生物生物量C、N和土壤酶活性可以判断褐土土壤有机质和N素状况，可作为评价褐土土壤肥力水平和土壤培肥效果的生物学指标，同时也可为提高褐土土壤肥力水平和土壤培肥效果提供依据。

关键词： 长期施肥 褐土 微生物生物量 土壤酶活性 有机无机肥配施 长期施肥 褐土 微生物生物量 土壤酶活性 有机无机肥配施

Abstract：

The soil of long-term experimental field（0-20 cm and 20-40 cm）was collected and analyzed in Shouyang county, Shanxi province. The changes of microbial biomass C, N and soil enzyme activity in cinnamon soil and the correlation among them were both explored. The results were as follows: The changes of microbial biomass C, N in cinnamon soil were basically consistent. The amount of B_C and B_N in cinnamon soil both decreased from 0-20 cm layer to 20-40 cm layer. B_C and B_N in cinnamon soil could both increased through long term application of organic fertilizer only, inorganic fertilizer combined with organic manure in a right way. B_C and B_N in cinnamon soil could not both be observed to increase through long term application of different dosage of inorganic fertilizer only. The activity of Urease and Alkaline phosphatase in cinnamon soil both decreased from 0-20 cm to 20-40 cm layer, too. Urease and Alkaline phosphatase activity in cinnamon soil could also be increased by long-term application of organic fertilizer or inorganic fertilizer combined with organic manure in a right way. Urease activity in cinnamon soil tended to increase with long term application of inorganic fertilizer; however, the changing tendency of Alkaline phosphatase activity was just opposite to Urease's. The apparent positive correlation was found between the contents of organic matter and the four kinds of soil quality indicators—microbial biomass C, microbial biomass N, Alkaline phosphatase and nitrate reductase, which was also found to be positively correlated with total N content. The contents of organic matter and total N could be estimated using microbial biomass C, N and soil enzyme activity, which could be used as biological indices in the evaluation of soil fertility, and provided the basis of how to improve soil fertility.

Keywords：

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