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研究报告

淹水培养条件下土壤微生物生物量碳、氮和可溶性有机碳、氮的动态

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摘要 以洞庭湖区2个典型水稻土(红黄泥和紫潮泥)为对象，研究了25 ℃、淹水培养条件下稻草硫铵配施和单施硫铵处理土壤微生物生物量碳、氮(SMBC、SMBN)和可溶性有机碳、氮(SDOC、SDON)的动态变化. 结果表明，SMBC、SMBN和SDOC、SDON在培养前期达到峰值，之后降低，并趋于稳定. 添加底物后，2种土壤不同处理土壤微生物生物量碳与有机碳(SMBC/TC)和土壤微生物生物量氮与全氮(SMBN/TN)的平均值都在2%～3%之间变化；可溶性碳与全碳(SDOC/TC)的平均值为1%左右，可溶性氮与全氮（SDON/TN)平均值为5%～6%. 2种土壤中SMBC峰值单施硫铵处理最大，但与稻草 硫铵配施处理差异均不显著；SMBN、SDOC和SDON峰值稻草 硫铵配施最大. 稻草-硫铵配施与单施硫铵处理中，低肥力红黄泥的SMBN、SDOC和SDON峰值差异显著;而高肥力紫潮泥SMBN和SDOC峰值差异不显著. 前7 d, SMBC/ SMBN＜10；14 d后，同一时刻单施硫铵处理SMBC/SMBN＞稻草-硫铵配施. 不同处理的SDOC/SDON 3 d时最大，28 d时最小.

关键词 土壤微生物生物量碳 土壤微生物生物量氮 土壤可溶性有机碳 土壤可溶性有机氮 水稻土

分类号

Dynamics of soil microbial biomass and dissolved organic carbon and nitrogen under flooded condition

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Abstract

With reddish yellow soil (RYS) and alluvial purple soil (APS), the two typical paddy soils in the Dongting Lake floodplain of China as test soils, an incubation test was conducted at 25 ℃ to study the dynamic changes of soil microbial biomass and dissolved organic carbon and nitrogen under flooded condition. Three treatments were installed,*i . e . *, control (CK), ammonium sulfate (N), and rice straw powder plus ammonium sulfate (S-N). The results showed that during incubation , soil microbial biomass carbon (SMBC), soil microbial biomass nitrogen (SMBN), soil dissolved organic carbon (SDOC), and soil dissolved organic nitrogen (SDON) reached their maximum initially, decreased thereafter, and tended to be stable. After amending the substrates to the two soils, the averages of SMBC to soil total carbon,SMBN to soil total nitrogen, SDOC to soil total carbon, and SDON to soil total nitrogen were 2%～3%, 2%～3%, 1% or so, and 5%～6%,respectively.In the two soils, the peak values of SMBC in treatment N and those of SMBN, SDOC and SDON in treatment S-N were the highest, while thaose of SMBC in treatments N and S-N had no significant difference. The peak values of SMBN, SDOC and SDON in RYS were significantly different between treatments N and S-N,while significant difference was observed between the peak values of SMBN and SDOC in APS, because the fertility of RYS was lower than that of APS. In the first 7 days of incubation, SMBC/SMBN ratio was ＜10, while after 14 days of incubation, this ratio was higher in treatment N than in treatment S-N at the same time in the same soil. The SDOC/SDON ratio in all

treatments was the highest at the 3rd d, and the lowest at the 28th d of incubation.

Key words Soil microbial biomass carbon Soil microbial biomass nitrogen Soil dissolved orgnic carbon Soil dissolved organic nitrogen Paddy soil

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