

研究报告

秸秆施用及蚯蚓活动对土壤活性有机碳的影响

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摘要 在连续6年稻麦轮作的小区试验中, 研究了施用秸秆(表施或混施)和接种蚯蚓对农田土壤有机碳(SOC)和不同活性有机碳的影响. 结果表明: 施用秸秆6年后, 土壤有机碳含量显著增加, 且表施秸秆比混施秸秆更有利于土壤有机碳含量增加, 在不同的秸秆施用条件下, 接种蚯蚓未对土壤有机碳含量产生显著影响. 表施秸秆和混施秸秆均能使土壤活性有机碳含量增加或显著增加, 混施秸秆较表施秸秆更有利于热水提取态碳(HWEC)、可矿化碳(PMC)、酸提取态碳(AEC)、易氧化态碳(ROC)、颗粒有机碳(POC)和轻组有机碳(LFOC)含量增加, 而可溶性有机碳(DOC)和微生物生物量碳(MBC)的变化与秸秆施用方式关系不大. 在施用秸秆条件下, 接种蚯蚓使不同活性有机碳的响应各异, 不同处理中的土壤有机碳活性表现为秸秆混施+蚯蚓>秸秆混施>秸秆表施>秸秆表施+蚯蚓>对照. 秸秆的施用方式是影响土壤有机碳与活性有机碳的主要因素, 而蚯蚓活动则并非对所有的土壤活性有机碳有显著影响.

关键词 [秸秆](#) [蚯蚓](#) [土壤有机碳](#)

分类号

Effects of straw application and earthworm inoculation on soil labile organic carbon

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Abstract

A six-year field plot experiment of rice-wheat rotation was conducted to study the effects of straw application and earthworm inoculation on cropland soil organic carbon and labile organic carbon. Five treatments were installed, *i. e.*, CK, straw mulch (M), straw mulch plus earthworm inoculation (ME), incorporated straw with soil (I), and incorporated straw with soil plus earthworm inoculation (IE). The results showed that soil organic carbon content increased significantly after six years straw application, and treatment I was more efficient than treatment M. Earthworm inoculation under straw application had no significant effects on soil organic carbon content. Straw application, whether straw mulch or incorporated straw with soil, increased the content of soil labile organic carbon, and incorporated straw with soil was more beneficial to the increase of the contents of hot water-extractable carbon, potentially mineralizable carbon, acid-extractable carbon, readily oxidizable carbon, particulate organic carbon, and light fraction organic carbon. There was a little relationship between the quantitative variations of soil dissoluble organic carbon and microbial biomass carbon and the patterns of straw application. Among the treatments, the activity of soil organic carbon was decreased in the order of IE>I>M>ME>CK. Straw application pattern was the main factor affecting soil organic carbon and labile organic carbon, while earthworm inoculation was not universally significantly effective to all kinds of soil labile organic carbon.

Key words [straw](#) [earthworm](#) [soil organic carbon](#)

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