

堆肥制作中微生物侵染秸秆的环境扫描电镜(ESEM)观察

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Environmental Scanning Electron Microscope(ESEM) Observation of Microbial Colonization Process in Straw Composting

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摘要 为了探索堆肥制作中木质纤维素类物质的生物降解过程,在堆肥进程中取不同分解阶段的秸秆样品,利用环境扫描电镜(ESEM)观察微生物的分布情况,并从机械作用的角度探讨了微生物在秸秆分解过程中的作用。结果表明,堆肥制作前新鲜秸秆表面未发现微生物分布,堆肥制作前期微生物开始附着在秸秆表面,随着堆肥进程,秸秆表面微生物密度有所增加,秸秆分解时产生的裂缝中发现也有微生物分布。堆肥制作中,参与秸秆分解的微生物以群落形式分布,从个体形态来看,这些微生物主要由球菌和丝状菌组成,但不同形态微生物个体大小差异较大。分析认为大型丝状菌通过秸秆分解产生的裂缝侵入秸秆内部时所产生的机械作用可促进秸秆的崩解。

关键词: 堆肥 微生物 秸秆 环境扫描电镜

Abstract: To understand the biodegradation processes of rice straw in composting, samples of the straw were taken at different composting stages for observation on the environmental scanning electron microscope(ESEM) to explore distribution of microorganisms in the straw and their effects in decomposing the straw from the angle of mechanical action. Results show that no microorganisms were found on the surface of raw straw, and they began to appear on the surface of straw at the initial stage of composting. With the composting proceeding, the microorganisms grew dense on the surface and were also found in cracks formed on the straw in decomposing. Microorganisms participating in decomposing of straw were distributed in colonies, and dominated with cocci and hyphomycete, which varied sharply in individual size. The observation reveals that large-sized hyphomycetes intrude into cracks formed in the straw being composted creating mechanical action that helps break down the straw.

Keywords: compost microorganism straw environmental scanning electron microscope(ESEM)

Received 2011-04-26;

Fund:

国家自然科学基金(22677047); 农业部农业公益性行业科研专项(201103004)

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引用本文:

朴哲, 李玉敏, 马帅, 陈德莹, 梅丽娟, 殷士学. 堆肥制作中微生物侵染秸秆的环境扫描电镜(ESEM)观察[J] 生态与农村环境学报, 2011, V27(5): 98-100

PIAO Zhe, LI Yu-Min, MA Shuai, CHEN De-Ying, MEI Li-Juan, YIN Shi-Xue. Environmental Scanning Electron Microscope(ESEM) Observation of Microbial Colonization Process in Straw Composting[J] Journal of Ecology and Rural Environment, 2011, V27(5): 98-100

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