Actinobacteria play a key role in plant residue decomposition

Yuanyuan Bao

Jan Dolfing

Zhiying Guo

Ruirui Chen

Meng Wu

Zhongpei Li

Xiangui Lin

Youzhi Feng

Video Byte

Keywords: Actinobacteria, straw decomposition, DNA-SIP, shotgun metagenomic sequencing, CAZymes, soil fertility, ecophysiology, bacteria, rice paddy, Microbiome

Posted Date: October 14th, 2021

DOI: <https://doi.org/10.21203/rs.3.rs-968272/v1>

License: This work is licensed under a Creative Commons Attribution 4.0 International License.

[Read Full License](#)

Abstract

Actinobacteria are some of the most widely distributed bacteria in soils and are well known for their ability to degrade plant residues in pure culture in the laboratory. Yet, despite the importance of microbe-driven decomposition to carbon sequestration in terrestrial systems, their importance and specific activity across diverse environments in the field are unknown. Researchers recently evaluated the ecophysiological roles of Actinobacteria in rice straw residue decomposition in a series of field and microcosm experiments. They found that although Actinobacteria represented only 4.6% of the total bacterial abundance, they encoded 16% of the total carbohydrate-active enzymes (CAZymes) involved in the breakdown of carbohydrates. The researchers also found that Actinobacteria taxonomic and functional compositions were relatively stable during straw decomposition and that the importance of Actinobacteria in decomposition increased as soil fertility decreased. Although further research into other aspects of actinobacterial ecophysiology across multiple systems is needed, these findings indicate that, even when not dominant in the terrestrial bacterial community, Actinobacteria play a key role in plant residue decomposition and may thus have important effects on the global carbon cycle.