

Microbial Characteristics of the Leachate Contaminated Soil of an Informal Landfill Site

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INTRODUCTION

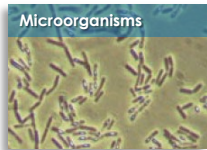
Increasing MSW Production in China

- In 2020, MSW production in China reached 2.42×10^8 tons

MSW Production in China

Informal Landfilling Contaminated the Environment

- In China, most of the simple landfills established in the early period of rapid economic development were informal landfills (1990s~)
- Gradual destruction of anti-seepage structures will lead to the contamination of surrounding soil



Microorganisms as Indicators of Soil Health

- Microorganisms are key factors affecting soil fertility



Insights Provided by Keystone Taxa

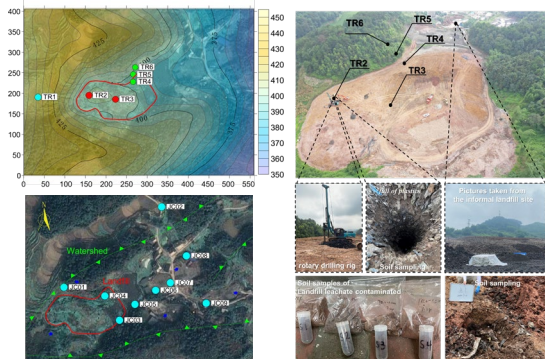
- Microbial community and keystone taxa of leachate contaminated soil can provide potential remediation strategies

OBJECTIVES An informal landfill was selected as the target of this study

- To investigate the microbial compositions and keystone taxa in leachate contaminated soil and the environmental ecological function changes

METHODOLOGY

- Soil sampling and groundwater sampling



- 16S rRNA analysis

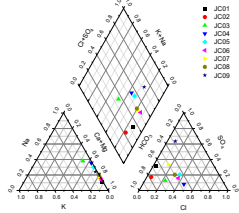


RESULTS

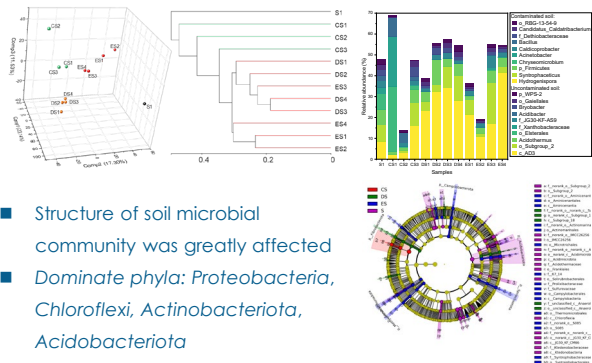
Groundwater Pollution of the Informal Landfill Site

The diffusion pathways of pollution caused by landfill leachate:

- Vertical downward migration /affect deep soil and groundwater/
- Horizontal migration /mitigate with rainwater/

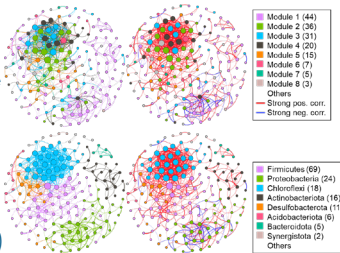


Microbial Structure of Landfill Leachate Contaminated Soil

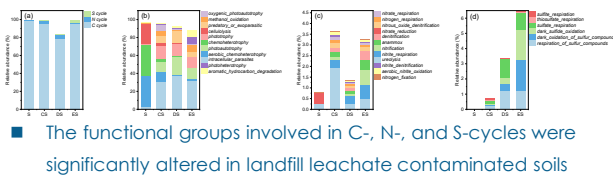


Keystone taxa

- Keystone taxa mainly are Firmicutes (69 genera)
- Proteobacteria (24 genera)
- Acinobacteriota (18 genera)
- Chloroflexi (16 genera)
- Actinobacteriota (11 genera)



Environmental ecological function change



CONCLUSION

- The microbial communities in background and contaminated soils were found to be significantly different, in terms of alpha diversity and beta diversity
- Bacilli*, *Clostridia*, and *Thermacetogeniazai* of phyla *Firmicutes* played an important role in maintaining the stability of microbial co-occurrence networks and were the keystone taxa in leachate contaminated soils
- The C-, N-, and S-cycles of contaminated soils varied greatly compared to the background soil.