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Effects of adding trace elements on rice straw anaerobic mono-digestion: Focus on changes in microbial communities using high-throughput sequencing

Yafan Cai¹, Binbin Hua¹, Lijuan Gao², Yuegao Hu¹, Xufeng Yuan¹, Zongjun Cui¹,

Wanbin Zhu¹, Xiaofen Wang^{1,*}

(¹ College of Agronomy and Biotechnology, China Agricultural University, Beijing 100193, China

² Beijing Centre for Physical and Chemical Analysis, Beijing, 100089, China)

Abstract: Although trace elements are known to aid anaerobic digestion, their mechanism of action is still unclear. High-throughput sequencing was used to reveal the mechanism by which adding trace elements affects microbial communities and their action. The results showed that the highest methane yields, with addition of Fe, Mo, Se and Mn were 289.2, 289.6, 285.3, 293.0 mL/g volatile solids (VS), respectively. The addition of Fe, Mo, Se and Mn significantly ($P < 0.05$) reduced the level of volatile fatty acids (VFAs). The dominant bacteria and archaea were *Bacteroidetes* and *Methanosaeta*, respectively. Compared with the proportion of *Methanosaeta* in the control group, treatment with added trace elements increased *Methanosaeta* by as much as 12.4%. Microbial community analysis indicated that adding trace elements changed the composition and diversity of archaea and bacteria. Methane yield was positively correlated with bacterial diversity and negatively correlated with archaeal diversity for most treatments.

Keywords: trace element, microbial community, high-throughput sequencing, anaerobic digestion.

1. Introduction

* Corresponding author. Tel.: +86 10 62733872; fax: +86 10 62731857.
E-mail address: wxiaofen@cau.edu.cn (X. Wang).

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