

Accepted Manuscript

Improving the methane yield of maize straw: Focus on the effects of pretreatment with fungi and their secreted enzymes combined with sodium hydroxide

Xiaoling Zhao, Kai Luo, Yue Zhang, Zehui Zheng, Yafan Cai, Boting Wen, Zongjun Cui, Xiaofen Wang

PII: S0960-8524(17)31725-X
DOI: <https://doi.org/10.1016/j.biortech.2017.09.160>
Reference: BITE 18988

To appear in: *Bioresource Technology*

Received Date: 7 August 2017
Revised Date: 21 September 2017
Accepted Date: 22 September 2017

Please cite this article as: Zhao, X., Luo, K., Zhang, Y., Zheng, Z., Cai, Y., Wen, B., Cui, Z., Wang, X., Improving the methane yield of maize straw: Focus on the effects of pretreatment with fungi and their secreted enzymes combined with sodium hydroxide, *Bioresource Technology* (2017), doi: <https://doi.org/10.1016/j.biortech.2017.09.160>

This is a PDF file of an unedited manuscript that has been accepted for publication. As a service to our customers we are providing this early version of the manuscript. The manuscript will undergo copyediting, typesetting, and review of the resulting proof before it is published in its final form. Please note that during the production process errors may be discovered which could affect the content, and all legal disclaimers that apply to the journal pertain.



1 **Improving the methane yield of maize straw: Focus on the effects of**
2 **pretreatment with fungi and their secreted enzymes combined with sodium**
3 **hydroxide**

4 Xiaoling Zhao^a, Kai Luo^a, Yue Zhang^a, Zehui Zheng^a, Yafan Cai^a, Boting Wen^b, Zongjun Cui^a,
5 Xiaofen Wang^a *

6 (^a College of Agronomy and Biotechnology, China Agricultural University, Beijing 100193,
7 China;

8 ^b Institute of Food Science and Technology, Chinese Academy of Agricultural Sciences,
9 Beijing 100193, China)

10 **Abstract:** In order to improve the methane yield, the alkaline and biological pretreatments on
11 anaerobic digestion (AD) were investigated. Three treatments were tested: NaOH, biological
12 (enzyme and fungi), and combined NaOH with biological. The maximum reducing sugar
13 concentrations were obtained using Enzyme T (2.20 mg/mL) on the 6th day. The methane
14 yield of NaOH + Enzyme A was 300.85 mL/g TS, 20.24% higher than the control. Methane
15 yield obtained from Enzyme (T + A) and Enzyme T pretreatments were 277.03 and 273.75
16 mL/g TS, respectively, which were as effective as 1% NaOH (276.16 mL/g TS) in boosting
17 methane production, and are environmentally friendly and inexpensive biological substitutes.
18 Fungal pretreatment inhibited methane fermentation of maize straw, 15.68% was reduced by
19 T + A compared with the control. The simultaneous reduction of DM, cellulose and
20 hemicellulose achieved high methane yields. This study provides important guidance for the
21 application of enzymes to AD from lignocellulosic agricultural waste.

22 **Keywords:** fungal pretreatment; enzymatic pretreatment; NaOH pretreatment; maize straw;

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

Download English Version:

<https://daneshyari.com/en/article/7068896>

Download Persian Version:

<https://daneshyari.com/article/7068896>

[Daneshyari.com](https://daneshyari.com)