

Accepted Manuscript

Insights into the methanogenic degradation of *N, N*-dimethylformamide: the functional microorganisms and their ecological relationships

Zhe Kong, Lu Li, Jiang Wu, Tao Zhang, Yu-You Li

PII: S0960-8524(18)31327-0
DOI: <https://doi.org/10.1016/j.biortech.2018.09.074>
Reference: BITE 20490

To appear in: *Bioresource Technology*

Received Date: 19 August 2018
Revised Date: 13 September 2018
Accepted Date: 14 September 2018

Please cite this article as: Kong, Z., Li, L., Wu, J., Zhang, T., Li, Y-Y., Insights into the methanogenic degradation of *N, N*-dimethylformamide: the functional microorganisms and their ecological relationships, *Bioresource Technology* (2018), doi: <https://doi.org/10.1016/j.biortech.2018.09.074>

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 Insights into the methanogenic degradation of *N, N*-dimethylformamide: the functional microorganisms and their ecological relationships

Zhe Kong, Lu Li, Jiang Wu, Tao Zhang, Yu-You Li*

Laboratory of Environmental Protection Engineering, Graduate School of Engineering, Tohoku University, 6-6-06 Aza-Aoba, Aramaki, Aoba Ward, Sendai, Miyagi 980-8579, Japan

ABSTRACT The methanogenic degradation of *N, N*-dimethylformamide (DMF) was investigated using anaerobic digested sludge (ADS), aerobic activated sludge (AAS) and co-cultured sludge (CCS), respectively. Both the metabolic pathway and the corresponding microorganisms which function in the methanogenic degradation of DMF were elucidated. DMF was unable to be degraded anaerobically by ADS due to the lack of DMF-hydrolyzing bacteria. DMF can be effectively degraded by AAS, however, no methane was recovered under the aerobic condition. The co-culture of DMF-hydrolyzing bacteria and methanogens in the CCS allowed for both hydrolysis of DMF and methane production to proceed successfully under the anaerobic condition, realizing the complete conversion from DMF to methane. However, a niche overlap due to the competition for the intermediates lowered the abundance of DMF-hydrolyzing bacteria. The introduction of nitrate, timely replenishment of AAS, micro-aeration and co-digestion were likely to maintain a high abundance of DMF-hydrolyzing bacteria to ensure an effective hydrolysis.

Keywords: *N, N*-dimethylformamide; anaerobic digestion; microbial community; ecological relationship; competition; hydrolysis

* Corresponding author. Tel.: + 81 022 795 7464; Fax: +81 022 795 7465

E-mail address: gyokuyu.ri.a5@tohoku.ac.jp

Download English Version:

<https://daneshyari.com/en/article/10226155>

Download Persian Version:

<https://daneshyari.com/article/10226155>

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