Ammonia tolerant inocula provide a good base for anaerobic digestion of microalgae in third generation biogas process - DTU Orbit (10/01/2019)

This study investigated the ability of an ammonia-acclimatized inoculum to digest efficiently protein-rich microalgae for continuous 3rd generation biogas production. Moreover, we investigated whether increased C/N ratio could alleviate ammonia toxicity. The biochemical methane potential (BMP) of five different algae (Chlorella vulgaris/manure (cattle) mixtures showed that the mixture of 80/20 (on VS basis) resulted in the highest BMP value (431 mL CH₄ g VS⁻¹), while the BMP of microalgae alone (100/0) was 415 mL CH₄ g VS⁻¹. Subsequently, anaerobic digestion of those two substrates was tested in continuous stirred tank reactors (CSTR). Despite of the high ammonium levels (3.7-4.2 g NH₄⁺-N L⁻¹), CSTR reactors using ammonia tolerant inoculum resulted in relatively high methane yields (i.e. 77.5% and 84% of the maximum expected, respectively) These results demonstrated that ammonia tolerant inocula could be a promising approach to successfully digest protein-rich microalgae and achieve a 3rd generation biogas production.

General information
State: Published
Organisations: Department of Environmental Engineering, Residual Resource Engineering, Zagazig University, Technical University of Denmark, Environment and Technology (CIEMAT)
Contributors: Mahdy, A., Fotidis, I., Mancini, E., Ballesteros, M.
Pages: 272-278
Publication date: 2017
Peer-reviewed: Yes

Publication information
Journal: Bioresource Technology
Volume: 225
ISSN (Print): 0960-8524
Ratings:
Web of Science (2019): Indexed yes
BFI (2018): BFI-level 2
Web of Science (2018): Indexed yes
BFI (2017): BFI-level 2
Scopus rating (2017): CiteScore 6.28 SJR 2.029 SNIP 1.799
Web of Science (2017): Impact factor 5.807
Web of Science (2017): Indexed yes
BFI (2016): BFI-level 2
Scopus rating (2016): CiteScore 5.94 SJR 2.215 SNIP 1.932
Web of Science (2016): Impact factor 5.651
Web of Science (2016): Indexed yes
BFI (2015): BFI-level 2
Scopus rating (2015): CiteScore 5.47 SJR 2.243 SNIP 1.897
Web of Science (2015): Impact factor 4.917
Web of Science (2015): Indexed yes
BFI (2014): BFI-level 2
Scopus rating (2014): CiteScore 5.3 SJR 2.399 SNIP 2.087
Web of Science (2014): Impact factor 4.494
Web of Science (2014): Indexed yes
BFI (2013): BFI-level 2
Scopus rating (2013): CiteScore 5.97 SJR 2.405 SNIP 2.477
Web of Science (2013): Impact factor 5.039
ISI indexed (2013): ISI indexed yes
Web of Science (2013): Indexed yes
BFI (2012): BFI-level 2
Scopus rating (2012): CiteScore 5.25 SJR 2.334 SNIP 2.461
Web of Science (2012): Impact factor 4.75
ISI indexed (2012): ISI indexed yes
Web of Science (2012): Indexed yes
BFI (2011): BFI-level 2
Scopus rating (2011): CiteScore 5.56 SJR 2.308 SNIP 2.507
Original language: English
Keywords: Ammonia inhibition, Anaerobic digestion, BMP, Co-digestion, Microalgae

Electronic versions:
1_s2.0_S0960852416316078_main.pdf. Embargo ended: 26/11/2018
DOIs:
10.1016/j.biortech.2016.11.086
Source: PublicationPreSubmission
Source-ID: 127347320
Research output: Research - peer-review › Journal article – Annual report year: 2017