Microbial electrochemical monitoring of volatile fatty acids during anaerobic digestion - DTU Orbit (08/11/2017)

Microbial electrochemical monitoring of volatile fatty acids during anaerobic digestion

Volatile fatty acid (VFA) concentration is known as an important indicator to control and optimize anaerobic digestion (AD) process. In this study, an innovative VFA biosensor was developed based on the principle of a microbial desalination cell. The correlation between current densities and VFA concentrations was firstly evaluated with synthetic digestate. Two linear relationships were observed between current densities and VFA levels from 1 to 30 mM (0.04 to 8.50 mA/m², R²=0.97) and then from 30 to 200 mM (8.50 to 10.80 mA/m², R²=0.95). The detection range was much broader than that of other existing VFA biosensors. The biosensor had no response to protein and lipid which are frequently found along with VFAs in organic waste streams from AD, suggesting the selective detection of VFAs. The current displayed different responses to VFA levels when different ionic strengths and external resistances were applied, though linear relationships were always observed. Finally, the biosensor was further explored with real AD effluents and the results did not show significance differences with those measured by GC. The simple and efficient biosensor showed promising potential for online, inexpensive and reliable measurement of VFA levels during AD and other anaerobic processes.

General information
State: Published
Organisations: Department of Environmental Engineering, Residual Resource Engineering
Authors: Jin, X. (Intern), Angelidaki, I. (Intern), Zhang, Y. (Intern)
Pages: 4422-4429
Publication date: 2016
Main Research Area: Technical/natural sciences

Publication information
Journal: Environmental Science & Technology (Washington)
Volume: 50
Issue number: 8
ISSN (Print): 0013-936X
Ratings:
BFI (2017): BFI-level 2
Web of Science (2017): Indexed yes
BFI (2016): BFI-level 2
Scopus rating (2016): CiteScore 6.26 SJR 2.538 SNIP 1.889
Web of Science (2016): Indexed yes
BFI (2015): BFI-level 2
Scopus rating (2015): SJR 2.584 SNIP 1.828 CiteScore 5.61
Web of Science (2015): Indexed yes
BFI (2014): BFI-level 2
Scopus rating (2014): SJR 2.777 SNIP 2.017 CiteScore 5.5
Web of Science (2014): Indexed yes
BFI (2013): BFI-level 2
Scopus rating (2013): SJR 2.956 SNIP 2.103 CiteScore 5.52
ISI indexed (2013): ISI indexed yes
Web of Science (2013): Indexed yes
BFI (2012): BFI-level 2
Scopus rating (2012): SJR 3.146 SNIP 2.056 CiteScore 5.17
ISI indexed (2012): ISI indexed yes
Web of Science (2012): Indexed yes
BFI (2011): BFI-level 2
Scopus rating (2011): SJR 3.178 SNIP 1.953 CiteScore 5.16
ISI indexed (2011): ISI indexed yes
Web of Science (2011): Indexed yes
BFI (2010): BFI-level 2
Scopus rating (2010): SJR 2.964 SNIP 1.729
Web of Science (2010): Indexed yes
BFI (2009): BFI-level 2
Scopus rating (2009): SJR 2.835 SNIP 1.803
Web of Science (2009): Indexed yes
BFI (2008): BFI-level 2
Scopus rating (2008): SJR 2.943 SNIP 1.942
Web of Science (2008): Indexed yes
Scopus rating (2007): SJR 2.8 SNIP 1.927
Web of Science (2007): Indexed yes
Scopus rating (2006): SJR 2.541 SNIP 1.901
Web of Science (2006): Indexed yes
Scopus rating (2005): SJR 2.604 SNIP 2.014
Web of Science (2005): Indexed yes
Scopus rating (2004): SJR 2.863 SNIP 2.046
Web of Science (2004): Indexed yes
Scopus rating (2003): SJR 2.545 SNIP 2.071
Web of Science (2003): Indexed yes
Scopus rating (2002): SJR 2.353 SNIP 1.953
Web of Science (2002): Indexed yes
Scopus rating (2001): SJR 2.419 SNIP 1.977
Web of Science (2001): Indexed yes
Scopus rating (2000): SJR 2.474 SNIP 2.334
Web of Science (2000): Indexed yes
Scopus rating (1999): SJR 3.466 SNIP 2.359
Original language: English
Electronic versions:
acs_2Eest_2E5b05267.pdf. Embargo ended: 31/05/2017
DOIs:
10.1021/acs.est.5b05267

**Bibliographical note**
just accepted paper
Source: PublicationPreSubmission
Source-ID: 122943329
Publication: Research - peer-review › Journal article – Annual report year: 2016