Methane production enhancement by an independent cathode in integrated anaerobic reactor with microbial electrolysis - DTU Orbit (08/11/2017)

Methane production enhancement by an independent cathode in integrated anaerobic reactor with microbial electrolysis

Anaerobic digestion (AD) represents a potential way to achieve energy recovery from waste organics. In this study, a novel bioelectrochemically-assisted anaerobic reactor is assembled by two AD systems separated by anion exchange membrane, with the cathode placing in the inside cylinder (cathodic AD) and the anode on the outside cylinder (anodic AD). In cathodic AD, average methane production rate goes up to 0.070 mL CH4/mL reactor/day, which is 2.59 times higher than AD control reactor (0.027 m3 CH4/m3/d). And COD removal is increased ~15% over AD control. When changing to sludge fermentation liquid, methane production rate has been further increased to 0.247 mL CH4/mL reactor/day (increased by 51.53% comparing with AD control). Energy recovery efficiency presents profitable gains, and economic revenue from increased methane totally self-cover the cost of input electricity. The study indicates that cathodic AD could cost-effectively enhance methane production rate and degradation of glucose and fermentative liquid.

General information

State: Published
Organisations: Department of Chemical and Biochemical Engineering, Center for BioProcess Engineering, Harbin Institute of Technology, Chinese Academy of Sciences
Authors: Cai, W. (Ekstern), Han, T. (Ekstern), Guo, Z. (Ekstern), Varrone, C. (Intern), Wang, A. (Ekstern), Liu, W. (Ekstern)
Pages: 13-18
Publication date: 2016
Main Research Area: Technical/natural sciences

Publication information

Journal: Bioresource Technology
Volume: 208
ISSN (Print): 0960-8524
Ratings:
BFI (2017): BFI-level 2
Web of Science (2017): Indexed yes
BFI (2016): BFI-level 2
Scopus rating (2016): CiteScore 5.94 SJR 2.191 SNIP 1.91
Web of Science (2016): Indexed yes
BFI (2015): BFI-level 2
Scopus rating (2015): SJR 2.255 SNIP 1.908 CiteScore 5.47
Web of Science (2015): Indexed yes
BFI (2014): BFI-level 2
Scopus rating (2014): SJR 2.41 SNIP 2.104 CiteScore 5.3
Web of Science (2014): Indexed yes
BFI (2013): BFI-level 2
Scopus rating (2013): SJR 2.412 SNIP 2.503 CiteScore 5.97
ISI indexed (2013): ISI indexed yes
Web of Science (2013): Indexed yes
BFI (2012): BFI-level 2
Scopus rating (2012): SJR 2.389 SNIP 2.465 CiteScore 5.25
ISI indexed (2012): ISI indexed yes
Web of Science (2012): Indexed yes
BFI (2011): BFI-level 2
Scopus rating (2011): SJR 2.314 SNIP 2.508 CiteScore 5.56
ISI indexed (2011): ISI indexed yes
Web of Science (2011): Indexed yes
BFI (2010): BFI-level 2
Scopus rating (2010): SJR 2.086 SNIP 2.355
Web of Science (2010): Indexed yes
BFI (2009): BFI-level 2
Scopus rating (2009): SJR 1.912 SNIP 2.231
Web of Science (2009): Indexed yes
BFI (2008): BFI-level 2

Scopus rating (2008): SJR 1.734 SNIP 2.732
Web of Science (2008): Indexed yes
Scopus rating (2007): SJR 1.529 SNIP 2.423
Web of Science (2007): Indexed yes
Scopus rating (2006): SJR 1.315 SNIP 1.98
Web of Science (2006): Indexed yes
Scopus rating (2005): SJR 1.269 SNIP 2.006
Web of Science (2005): Indexed yes
Scopus rating (2004): SJR 1.197 SNIP 1.659
Web of Science (2004): Indexed yes
Scopus rating (2003): SJR 0.948 SNIP 1.639
Web of Science (2003): Indexed yes
Scopus rating (2002): SJR 0.882 SNIP 1.3
Web of Science (2002): Indexed yes
Scopus rating (2001): SJR 0.541 SNIP 1.208
Scopus rating (2000): SJR 0.464 SNIP 1.049
Scopus rating (1999): SJR 0.669 SNIP 1.061
Original language: English
Anaerobic digestion, Cathode, Energy recovery, Methane, Methanogenesis, Cathodes
DOIs:
10.1016/j.biortech.2016.02.028
Source: FindIt
Source-ID: 2291970380
Publication: Research - peer-review › Journal article – Annual report year: 2016