A logical data representation framework for electricity-driven bioproduction processes

A logical data representation framework for electricity-driven bioproduction processes

Microbial electrosynthesis (MES) is a process that uses electricity as an energy source for driving the production of chemicals and fuels using microorganisms and CO2 or organics as carbon sources. The development of this highly interdisciplinary technology on the interface between biotechnology and electrochemistry requires knowledge and expertise in a variety of scientific and technical areas. The rational development and commercialization of MES can be achieved at a faster pace if the research data and findings are reported in appropriate and uniformly accepted ways. Here we provide a framework for reporting on MES research and propose several pivotal performance indicators to describe these processes. Linked to this study is an online tool to perform necessary calculations and identify data gaps. A key consideration is the calculation of effective energy expenditure per unit product in a manner enabling cross comparison of studies irrespective of reactor design. We anticipate that the information provided here on different aspects of MES ranging from reactor and process parameters to chemical, electrochemical, and microbial functionality indicators will assist researchers in data presentation and ease data interpretation. Furthermore, a discussion on secondary MES aspects such as downstream processing, process economics and life cycle analysis is included.

General information

State: Published
Organisations: Novo Nordisk Foundation Center for Biosustainability, Research Groups, Ghent University, Flemish Institute for Technological Research, Pennsylvania State University
Number of pages: 9
Pages: 736-744
Publication date: 2015
Peer-reviewed: Yes

Publication information

Journal: Biotechnology Advances
Volume: 33
Issue number: 6
ISSN (Print): 0734-9750
Ratings:
BFI (2018): BFI-level 2
Web of Science (2018): Indexed yes
BFI (2017): BFI-level 2
Scopus rating (2017): CiteScore 12.05 SJR 3.006 SNIP 3.531
Web of Science (2017): Impact factor 11.452
Web of Science (2017): Indexed yes
BFI (2016): BFI-level 2
Scopus rating (2016): CiteScore 11.05 SJR 2.747 SNIP 3.141
Web of Science (2016): Impact factor 10.597
Web of Science (2016): Indexed yes
BFI (2015): BFI-level 2
Scopus rating (2015): CiteScore 10.56 SJR 2.915 SNIP 3.396
Web of Science (2015): Indexed yes
BFI (2014): BFI-level 2
Scopus rating (2014): CiteScore 10.24 SJR 2.941 SNIP 3.738
Web of Science (2014): Indexed yes
BFI (2013): BFI-level 2
Scopus rating (2013): CiteScore 10.71 SJR 2.951 SNIP 4.017
Web of Science (2013): Impact factor 8.905
ISI indexed (2013): ISI indexed yes
Web of Science (2013): Indexed yes
BFI (2012): BFI-level 2
Scopus rating (2012): CiteScore 11.65 SJR 3.456 SNIP 5.153
ISI indexed (2012): ISI indexed yes