Continuous fermentation and kinetic experiments for the conversion of crude glycerol derived from second-generation biodiesel into 1,3 propanediol and butyric acid

This study investigated the performance of different mixed microbial cultures (MMC) able to ferment crude glycerol generated from animal fat-based biodiesel to produce 1,3 propanediol (1,3 PDO) and butyric acid, under non-sterile conditions. Eight different continuous flow stirred-tank reactors (CSTR) were set up with different inoculum types and growth media. The distribution of metabolic products under variable operating conditions was determined. All MMC were characterized from a kinetic point of view and overall stoichiometric reactions were constructed. Changes in the microbial communities were monitored by means of Next Generation Sequencing (NGS). Maximum substrate degradation rate reached approximately 110 g/L/d of glycerol (with a productivity of 38 g/L/d and 11 g/L/d for 1,3 PDO and butyric acid, respectively), obtained with an hydraulic retention time of 12 h and 60 g/L feed. The maximum feed concentration reached almost 90 g/L, leading though to an incomplete substrate degradation.

General information
Publication status: Published
Organisations: Department of Chemical and Biochemical Engineering, Center for BioProcess Engineering, PILOT PLANT, SINTEF, Technical University of Denmark
Pages: 149-161
Publication date: 2017
Peer-reviewed: Yes

Publication information
Journal: Biochemical Engineering Journal
Volume: 128
ISSN (Print): 1369-703X
Ratings:
BFI (2017): BFI-level 1
Scopus rating (2017): CiteScore 3.18
Web of Science (2017): Impact factor 6.735
Web of Science (2017): Indexed yes
Original language: English
Keywords: 1,3 propanediol, Butyric acid, Crude glycerol, CSTR, Fermentation, Mixed microbial cultures
DOIs:
10.1016/j.bej.2017.09.012
Source: FindIt
Source-ID: 2390179438
Research output: Contribution to journal › Journal article – Annual report year: 2017 › Research › peer-review