Integrated production of cellulosic bioethanol and succinic acid from industrial hemp in a biorefinery concept - DTU Orbit (13/11/2018)

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The aim of this study was to develop integrated biofuel (cellulosic bioethanol) and biochemical (succinic acid) production from industrial hemp (Cannabis sativa L.) in a biorefinery concept. Two types of pretreatments were studied (dilute-acid and alkaline oxidative method). High cellulose recovery (> 95%) as well as significant hemicelluloses solubilization (49-59%) after acid-based method and lignin solubilization (35-41%) after alkaline H2O2 method were registered. Alkaline pretreatment showed to be superior over the acid-based method with respect to the rate of enzymatic hydrolysis and ethanol productivity. With respect to succinic acid production, the highest productivity was obtained after liquid fraction fermentation originated from steam treatment with 1.5% of acid. The mass balance calculations clearly showed that 149 kg of EtOH and 115 kg of succinic acid can be obtained per 1 ton of dry hemp. Results obtained in this study clearly document the potential of industrial hemp for a biorefinery.

General information
State: Published
Organisations: Department of Environmental Engineering, Residual Resource Engineering, University Of Bielsko-biala
Pages: 639-647
Publication date: 2016
Peer-reviewed: Yes

Publication information
Journal: Bioresource Technology
Volume: 200
ISSN (Print): 0960-8524
Ratings:
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
Web of Science (2011): Impact factor 4.98
ISI indexed (2011): ISI indexed yes
Web of Science (2011): Indexed yes
BFI (2010): BFI-level 2
Scopus rating (2010): SJR 2.089 SNIP 2.344
Web of Science (2010): Impact factor 4.365
Web of Science (2010): Indexed yes
BFI (2009): BFI-level 2
Scopus rating (2009): SJR 1.915 SNIP 2.236
Web of Science (2009): Indexed yes
BFI (2008): BFI-level 2
Scopus rating (2008): SJR 1.736 SNIP 2.74
Web of Science (2008): Indexed yes
Scopus rating (2007): SJR 1.403 SNIP 2.396
Web of Science (2007): Indexed yes
Scopus rating (2006): SJR 1.314 SNIP 2.003
Web of Science (2006): Indexed yes
Scopus rating (2005): SJR 1.278 SNIP 1.98
Web of Science (2005): Indexed yes
Scopus rating (2004): SJR 1.19 SNIP 1.655
Web of Science (2004): Indexed yes
Scopus rating (2003): SJR 0.942 SNIP 1.665
Web of Science (2003): Indexed yes
Scopus rating (2002): SJR 0.908 SNIP 1.294
Web of Science (2002): Indexed yes
Scopus rating (2001): SJR 0.537 SNIP 1.2
Scopus rating (2000): SJR 0.653 SNIP 1.023
Scopus rating (1999): SJR 0.659 SNIP 1.033
Original language: English
Keywords: Cellulosic bioethanol, Succinic acid, Industrial hemp, Pretreatment, Biorefinery
DOI:
10.1016/j.biortech.2015.10.081
Source: FindIt
Source-ID: 2287721487
Research output: Research - peer-review - Journal article – Annual report year: 2016