Enzymatic hydrolysis and ethanol fermentation of high dry matter wet-exploaded wheat straw at low enzyme loading - DTU Orbit (15/03/2019)

**Enzymatic hydrolysis and ethanol fermentation of high dry matter wet-exploaded wheat straw at low enzyme loading**

Wheat straw was pretreated by wet explosion using three different oxidizing agents (H2O2, O2, and air). The effect of the pretreatment was evaluated based on glucose and xylose liberated during enzymatic hydrolysis. The results showed that pretreatment with the use of O2 as oxidizing agent was the most efficient in enhancing overall convertibility of the raw material to sugars and minimizing generation of furfural as a by-product. For scale-up of the process, high dry matter (DM) concentrations of 15-20% will be necessary. However, high DM hydrolysis and fermentation are limited by high viscosity of the material, higher inhibition of the enzymes, and fermenting microorganism. The wet-explosion pretreatment method enabled relatively high yields from both enzymatic hydrolysis and simultaneous saccharification and fermentation (SSF) to be obtained when performed on unwashed slurry with 14% DM and a low enzyme loading of 10 FPU/g cellulose in an industrial acceptable time frame of 96 h. Cellulose and hemicellulose conversion from enzymatic hydrolysis were 70 and 68%, respectively, and an overall ethanol yield from SSF was 68%.

**General information**

State: Published
Organisations: Bioenergy and Biomass, Biosystems Division, Risø National Laboratory for Sustainable Energy, Bioscience and Technology, Department of Systems Biology
Contributors: Georgieva, T., Hou, X., Hilstrøm, T., Ahring, B. K.
Pages: 35-44
Publication date: 2008
Peer-reviewed: Yes

**Publication information**

Journal: Applied Biochemistry and Biotechnology
Volume: 148
Issue number: 1-3
ISSN (Print): 0273-2289
Ratings:
BFI (2019): BFI-level 1
Web of Science (2019): Indexed yes
BFI (2018): BFI-level 1
Web of Science (2018): Indexed yes
BFI (2017): BFI-level 1
Scopus rating (2017): CiteScore 2.02 SJR 0.571 SNIP 0.8
Web of Science (2017): Impact factor 1.797
Web of Science (2017): Indexed yes
BFI (2016): BFI-level 1
Scopus rating (2016): CiteScore 1.81 SJR 0.579 SNIP 0.749
Web of Science (2016): Impact factor 1.751
Web of Science (2016): Indexed yes
BFI (2015): BFI-level 1
Scopus rating (2015): CiteScore 1.67 SJR 0.575 SNIP 0.736
Web of Science (2015): Impact factor 1.606
Web of Science (2015): Indexed yes
BFI (2014): BFI-level 1
Scopus rating (2014): CiteScore 1.92 SJR 0.644 SNIP 0.94
Web of Science (2014): Impact factor 1.735
Web of Science (2014): Indexed yes
BFI (2013): BFI-level 2
Scopus rating (2013): CiteScore 2.18 SJR 0.747 SNIP 1.027
Web of Science (2013): Impact factor 1.687
ISI indexed (2013): ISI indexed yes
Web of Science (2013): Indexed yes
BFI (2012): BFI-level 2
Scopus rating (2012): CiteScore 2.04 SJR 0.765 SNIP 1.027
Web of Science (2012): Impact factor 1.893
ISI indexed (2012): ISI indexed yes
Original language: English
Keywords: ethanol, high dry matter, pretreatment, wet explosion, saccharomyces cerevisiae, wheat straw, simultaneous saccharification and fermentation
DOIs: 10.1007/s12010-007-8085-z
Source: orbit
Source-ID: 221371
Research output: Research - peer-review › Journal article – Annual report year: 2008