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 (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
Web of Science (2012): Indexed yes
BFI (2011): BFI-level 2
Scopus rating (2011): CiteScore 1.92 SJR 0.802 SNIP 0.968
Web of Science (2011): Impact factor 1.943
ISI indexed (2011): ISI indexed yes
Web of Science (2011): Indexed yes
BFI (2010): BFI-level 2
Scopus rating (2010): SJR 0.71 SNIP 0.916
Web of Science (2010): Impact factor 1.879
Web of Science (2010): Indexed yes
BFI (2009): BFI-level 2
Scopus rating (2009): SJR 0.644 SNIP 0.717
Web of Science (2009): Indexed yes
BFI (2008): BFI-level 1
Scopus rating (2008): SJR 0.529 SNIP 0.632
Web of Science (2008): Indexed yes
Scopus rating (2007): SJR 0.489 SNIP 0.68
Web of Science (2007): Indexed yes
Scopus rating (2006): SJR 0.549 SNIP 0.843
Web of Science (2006): Indexed yes
Scopus rating (2005): SJR 0.446 SNIP 0.703
Scopus rating (2004): SJR 0.549 SNIP 0.784
Web of Science (2004): Indexed yes
Scopus rating (2003): SJR 0.444 SNIP 0.701
Web of Science (2003): Indexed yes
Scopus rating (2002): SJR 0.473 SNIP 0.736
Scopus rating (2001): SJR 0.494 SNIP 0.789
Web of Science (2001): Indexed yes
Scopus rating (2000): SJR 0.611 SNIP 0.736
Scopus rating (1999): SJR 0.537 SNIP 0.71
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