A vertical ball mill as a new reactor design for biomass hydrolysis and fermentation process
- DTU Orbit (07/12/2018)

A vertical ball mill (VBM) reactor was evaluated for use in biomass conversion processes. The effects of agitation speed (100–200 rpm), number of glass spheres (0–30 units) and temperature (40–46 °C) on enzymatic hydrolysis of rice straw and on glucose fermentation by a thermotolerant Kluyveromyces marxianus strain were separately studied. The results revealed an important role of the spheres during biomass' fiber liquefaction and yeast's fermentative performance. For hydrolysis, the spheres were the only variable with significant positive impact on cellulose conversion, while for fermentation all the variables have influenced the ethanol volumetric productivity (QP). For QP, the spheres showed an interactive effect with temperature, being obtained a maximum of 2.16 g/L·h when both variables were used in the lowest level. By applying the needed adjustments on the levels of the variables for each process (hydrolysis and fermentation), the VBM reactor could be efficiently used for biomass conversion into ethanol.

General information
State: Published
Organisations: Novo Nordisk Foundation Center for Biosustainability, Research Groups, Biomass Conversion and Bioprocess Technology, Universidade de Sao Paulo
Contributors: de Assis Castro, R. C., Mussatto, S. I., Conceicao Roberto, I.
Pages: 775-780
Publication date: 2017
Peer-reviewed: Yes

Publication information
Journal: Renewable Energy
Volume: 114
Issue number: Part B
ISSN (Print): 0960-1481
Ratings:
BFI (2018): BFI-level 1
Web of Science (2018): Indexed yes
BFI (2017): BFI-level 1
Scopus rating (2017): CiteScore 5.38 SJR 1.847 SNIP 2.008
Web of Science (2017): Impact factor 4.9
Web of Science (2017): Indexed yes
BFI (2016): BFI-level 1
Scopus rating (2016): CiteScore 4.83 SJR 1.661 SNIP 2.05
Web of Science (2016): Impact factor 4.357
Web of Science (2016): Indexed yes
BFI (2015): BFI-level 1
Scopus rating (2015): CiteScore 4.51 SJR 1.767 SNIP 2.085
Web of Science (2015): Impact factor 3.404
Web of Science (2015): Indexed yes
BFI (2014): BFI-level 1
Scopus rating (2014): CiteScore 4.51 SJR 1.925 SNIP 2.621
Web of Science (2014): Impact factor 3.476
Web of Science (2014): Indexed yes
BFI (2013): BFI-level 1
Scopus rating (2013): CiteScore 4.63 SJR 1.989 SNIP 2.719
Web of Science (2013): Impact factor 3.361
ISI indexed (2013): ISI indexed yes
Web of Science (2013): Indexed yes
BFI (2012): BFI-level 1
Scopus rating (2012): CiteScore 3.97 SJR 1.787 SNIP 2.699
Web of Science (2012): Impact factor 2.989
ISI indexed (2012): ISI indexed yes
Web of Science (2012): Indexed yes
BFI (2011): BFI-level 1
Scopus rating (2011): CiteScore 3.9 SJR 1.634 SNIP 2.349
Web of Science (2011): Impact factor 2.978
ISI indexed (2011): ISI indexed yes
Web of Science (2011): Indexed yes
BFI (2010): BFI-level 1
Scopus rating (2010): SJR 1.459 SNIP 2.215
Web of Science (2010): Impact factor 2.58
Web of Science (2010): Indexed yes
BFI (2009): BFI-level 1
Scopus rating (2009): SJR 1.272 SNIP 1.963
Web of Science (2009): Indexed yes
BFI (2008): BFI-level 2
Scopus rating (2008): SJR 1.436 SNIP 1.891
Web of Science (2008): Indexed yes
Scopus rating (2007): SJR 1.194 SNIP 1.63
Web of Science (2007): Indexed yes
Scopus rating (2006): SJR 1.112 SNIP 1.469
Web of Science (2006): Indexed yes
Scopus rating (2005): SJR 1.177 SNIP 1.271
Scopus rating (2004): SJR 0.761 SNIP 1.14
Web of Science (2004): Indexed yes
Scopus rating (2003): SJR 0.932 SNIP 0.926
Scopus rating (2002): SJR 0.417 SNIP 0.526
Scopus rating (2001): SJR 0.57 SNIP 0.482
Web of Science (2001): Indexed yes
Scopus rating (2000): SJR 0.326 SNIP 0.716
Web of Science (2000): Indexed yes
Scopus rating (1999): SJR 0.278 SNIP 0.62
Original language: English
Keywords: Non-conventional reactor, Rice straw, Enzymatic hydrolysis, Ethanol, Kluyveromyces marxianus
DOIs: 10.1016/j.renene.2017.07.095
Research output: Research - peer-review › Journal article – Annual report year: 2017