Studying the ability of *Fusarium oxysporum* and recombinant *Saccharomyces cerevisiae* to efficiently cooperate in decomposition and ethanolic fermentation of wheat straw

**Fusarium oxysporum** F3 alone or in mixed culture with *Saccharomyces cerevisiae* F12 were used to ferment carbohydrates of wet exploded pre-treated wheat straw (PWS) directly to ethanol. Both microorganisms were first grown aerobically to produce cell mass and thereafter fermented PWS to ethanol under anaerobic conditions. During fermentation, soluble and insoluble carbohydrates were hydrolysed by the lignocellulolytic system of *F. oxysporum*. Mixed substrate fermentation using PWS and corn cobs (CC) in the ratio 1:2 was used to obtain an enzyme mixture with high cellulolytic and hemicellulolytic activities. Under these conditions, activities as high as 34300, 9100, 326, 24, 169, 27 and 254 U dm⁻³ of xylanase, endoglucanase, β-glucosidase, arabinofuranosidase, avicelase, feruloyl esterase and acetyl esterase, respectively, were obtained. The replacement of the enzyme production phase of *F. oxysporum* by the addition of commercially available enzymes Celluclast® 1.5 L FG and Novozym® 188 in 3:1 ratio for the treatment of PWS, resulted in a 3-fold increase in the volumetric ethanol productivity without increasing the ethanol production significantly. By direct bioconversion of 110 kg m⁻³ dry matter of PWS, ethanol concentration (4.9 kg m⁻³) and yield (40 g kg⁻¹ of PWS) were similarly obtained by *F. oxysporum* and the mixed culture, while productivity rates as high as 34 g m⁻³ h⁻¹ and 108 g m⁻³ h⁻¹ were obtained by *F. oxysporum* and the mixed culture, respectively.

**General information**

State: Published
Organisations: Department of Systems Biology, National Technical University of Athens
Contributors: Panagiotou, G., Topakas, E., Moukouli, M., Christakopoulos, P., Olsson, L.
Pages: 3727-3732
Publication date: 2011
Peer-reviewed: Yes

**Publication information**

Journal: Biomass & Bioenergy
Volume: 35
Issue number: 8
ISSN (Print): 0961-9534
Ratings:
BFI (2018): BFI-level 2
Web of Science (2018): Indexed yes
BFI (2017): BFI-level 2
Scopus rating (2017): CiteScore 4 SJR 1.436
Web of Science (2017): Impact factor 3.58
Web of Science (2017): Indexed yes
BFI (2016): BFI-level 2
Scopus rating (2016): CiteScore 3.71 SJR 1.385
Web of Science (2016): Impact factor 3.219
Web of Science (2016): Indexed yes
BFI (2015): BFI-level 2
Scopus rating (2015): CiteScore 4.03 SJR 1.596
Web of Science (2015): Impact factor 3.249
Web of Science (2015): Indexed yes
BFI (2014): BFI-level 2
Scopus rating (2014): CiteScore 4.36 SJR 1.865 SNIP 1.964
Web of Science (2014): Impact factor 3.94
Web of Science (2014): Indexed yes
BFI (2013): BFI-level 2
Scopus rating (2013): CiteScore 4.42 SJR 1.666 SNIP 1.811
Web of Science (2013): Impact factor 3.411
ISI indexed (2013): ISI indexed yes
Web of Science (2013): Indexed yes
BFI (2012): BFI-level 2
Scopus rating (2012): CiteScore 3.66 SJR 1.516 SNIP 1.754
Web of Science (2012): Impact factor 2.975