

Technical University of Denmark



## Silage pretreatment and enzymatic hydrolysis of green energy grass for 2nd generation bioethanol production.

**Ambye-Jensen, Morten; Kádár, Zsófia; Didion, Thomas; Johansen, Katja Salomon; Schmidt, Jens Ejbye**

*Publication date:*  
2011

*Document Version*  
Publisher's PDF, also known as Version of record

[Link back to DTU Orbit](#)

*Citation (APA):*

Jensen, M., Kádár, Z., Didion, T., Johansen, K. S., & Schmidt, J. E. (2011). Silage pretreatment and enzymatic hydrolysis of green energy grass for 2nd generation bioethanol production.. Abstract from 33rd Symposium on Biotechnology for Fuels and Chemicals, Seattle, WA, United States.

## DTU Library

Technical Information Center of Denmark

---

### General rights

Copyright and moral rights for the publications made accessible in the public portal are retained by the authors and/or other copyright owners and it is a condition of accessing publications that users recognise and abide by the legal requirements associated with these rights.

- Users may download and print one copy of any publication from the public portal for the purpose of private study or research.
- You may not further distribute the material or use it for any profit-making activity or commercial gain
- You may freely distribute the URL identifying the publication in the public portal

If you believe that this document breaches copyright please contact us providing details, and we will remove access to the work immediately and investigate your claim.

## **Abstract for 33rd Symposium on Biotechnology for Fuels and Chemicals, Seattle, May 02-05, 2011**

### **Silage pretreatment and enzymatic hydrolysis of green energy grass for 2<sup>nd</sup> generation bioethanol production.**

*Morten Jensen\**, *Zsófia Kádár*, *Thomas Didion*<sup>1</sup>, *Katja Salomon Johansen*<sup>2</sup> and *Jens Ejbye Schmidt*

Biosystems Division, Risø DTU. \*Presenting author, email: morj@risoe.dtu.dk

1. Danish Plant Breeding Research Division, DLF-TRIFOLIUM A/S
2. Novozymes A/S

Pretreatment and enzymatic hydrolysis for conversion of lignocellulosic biomass to fermentable sugars is often the most expensive steps in 2<sup>nd</sup> generation bioethanol production. The presented work aimed at studying a pretreatment method at high dry matter (DM) and low temperature, using silage treatment combined with enzymatic hydrolysis. Ensiling is an anaerobic biological process where lactic acid bacteria consume free soluble sugars in the biomass and produce lactic acid. The drop in pH prevents further biological degradation and thus conserves the biomass. The biomass used in the study was two species of high yielding energy grass (ca 15-17 tonnes DM/hectare). Their content of free sugars and moisture makes them suitable for ensiling. The fresh grass was dried to DM between 25-50%, cut to 2-4 cm, sprayed with and without industrial silage inoculums, ensiled in plastic bags at 99% vacuum and disrupted at different times. The ensiled grass was hydrolysed by Cellic™ CTec enzymes, and the efficiency of the treatment was measured in ethanol yield by batch fermentations with *Saccharomyces cerevisiae*. The pretreatment method presents a simpler, less energy intensive and far cheaper possibility of producing 2<sup>nd</sup> generation bioethanol. Furthermore, it can potentially be implemented at the biomass producers (the farmers) and used, at the same time, as a storage method for bioenergy-biomass.