Perennial Herbaceous Biomass Energy Crops: Potential and Status

Kenneth P. Vogel  
*University of Nebraska - Lincoln, Ken.Vogel@ars.usda.gov*

Hans-Joachim Jung  
*USDA-ARS*

Robert B. Mitchell  
*University of Nebraska - Lincoln, rob.mitchell@ars.usda.gov*

Joann Lamb  
*USDA-ARS*

Gautam Sarath  
*University of Nebraska - Lincoln, Gautam.sarath@ars.usda.gov*

Follow this and additional works at: [http://digitalcommons.unl.edu/usdaarsfacpub](http://digitalcommons.unl.edu/usdaarsfacpub)

*Part of the Agricultural Science Commons*

---

This Article is brought to you for free and open access by the U.S. Department of Agriculture: Agricultural Research Service, Lincoln, Nebraska at DigitalCommons@University of Nebraska - Lincoln. It has been accepted for inclusion in Publications from USDA-ARS / UNL Faculty by an authorized administrator of DigitalCommons@University of Nebraska - Lincoln.
Research Project: Improved Plants and Production Practices for Grasslands and Biomass Crops in the Mid-Continental USA

Location: Grain, Forage & Bioenergy Research

Title: Perennial Herbaceous Biomass Energy Crops: Potential and Status

Authors
- Vogel, Kenneth
- Jung, Hans-Joachim
- Mitchell, Robert
- Lamb, Joann
- Sarath, Gautam

Submitted to: Biotechnology for Fuels and Chemicals Symposium Proceedings
Publication Type: Abstract
Publication Acceptance Date: April 16, 2003
Publication Date: May 9, 2004


Technical Abstract: Agricultural Research Service, U.S. Dept. of Agriculture (USDA-ARS), U.S. Dept. of Energy (DOE), and cooperating Universities have been investigating the feasibility of using perennial forages (herbaceous biomass) for energy production. The most promising species include switchgrass, a native prairie grass, and alfalfa, a nitrogen-fixing legume. Using technology that is under continual improvement, it is feasible to break down the cellulose, hemicellulose, and pectin of these biomass species into simple sugars that can be converted into ethanol or other fermentation products. These species can produce high biomass yields on lands with high erosion potential such as the land currently enrolled in the Conservation Reserve Program that is not suitable for grain crop production, as well as be incorporated into annual row crop rotations. Existing switchgrass and alfalfa cultivars can produce over 5 tons/acre (11 Mg/ha) which could produce ethanol yields of over 400 gal/acre (3750 L/ha). At a price of $40/US ton ($18/Mg), the feedstock cost of ethanol from biomass would be about $0.50 gallon ($0.13/L). Research is in progress to improve biomass yield and genetically modify feedstock composition to enhance conversion to ethanol.