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Perennial Herbaceous Biomass Energy Crops: Potential and Status

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United States Department Of Agriculture
Agricultural Research Service

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

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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.