

**CELLULOSE AND LIGNIN CONCENTRATIONS IN PRAIRIE AND WETLAND SPECIES:
IMPLICATIONS FOR ETHANOL PRODUCTION.**

**ADAM H. WARNKE*, DEPARTMENT OF BIOLOGICAL SCIENCES, MINNESOTA STATE
UNIVERSITY 242 TRAFTON SCIENCE CENTER SOUTH, MANKATO, MN 56001**

**ALEX CAHLANDER-MOOERS, DEPARTMENT OF BIOLOGICAL SCIENCES, MINNESOTA STATE
UNIVERSITY 242 TRAFTON SCIENCE CENTER SOUTH, MANKATO, MN 56001**

**JANET WOOD, DEPARTMENT OF BIOLOGICAL SCIENCES, MINNESOTA STATE UNIVERSITY 242
TRAFTON SCIENCE CENTER SOUTH, MANKATO, MN 56001**

**BREANN M. WOZNAK, DEPARTMENT OF BIOLOGICAL SCIENCES, MINNESOTA STATE
UNIVERSITY 242 TRAFTON SCIENCE CENTER SOUTH, MANKATO, MN 56001**

**CHRISTOPHER T. RUHLAND, DEPARTMENT OF BIOLOGICAL SCIENCES, MINNESOTA STATE
UNIVERSITY 242 TRAFTON SCIENCE CENTER SOUTH, MANKATO, MN 56001**

Abstract: Highly productive landscapes such as prairies and wetlands have recently been identified as a potential source of plant material for cellulosic ethanol production. Holocellulose (cellulose + hemicelluloses) is a complex structural polysaccharide found in primary and secondary cell walls of vascular plants and concentrations of this compound varies between species. Theoretical ethanol yield depends on the holocellulose concentration within each plant but can also be confounded by high concentrations of lignin which can inhibit microbial enzyme accessibility to cell-wall polysaccharides. The goal of this study was to examine the cellulose, hemicelluloses and lignin concentrations of species commonly found in prairies and wetlands in Southern Minnesota. We examined Big Bluestem (*Andropogon gerardii*), Indian Grass (*Sorghastrum nutans*), Little Bluestem (*Schizachyrium scoparium*), Reed Canary Grass (*Phalaris arundinacea*), and Switchgrass (*Panicum virgatum*) from the Kasota Prairie (Kasota, MN) and Cattails (*Typha latifolia*), Reed Canary Grass and Bulrush (*Scirpus sp.*) in Rasmussen Woods wetlands (Mankato, MN). Biomass from prairie plants had 10, 7 and 17.5% more cellulose, hemicelluloses and lignin, respectively, than biomass from wetland species. Total theoretical holocellulosic ethanol yields (expressed per 1000 kg dry weight) were higher in prairie species averaging 150 liters, compared to wetland species which averaged 136 liters. Theoretical cellulosic and hemicellulosic ethanol yields ranged from 89 to 117 and 35 to 51 liters, respectively, and were generally higher in prairie species. Holocellulose to lignin ratios ranged from 5.9 to 12.2. Our results show there are subtle differences in lignocellulosic biomass between plants from prairies and wetlands.