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Storage activity in the woody biomass supply chain: Mitigating GHG emissions and biomass degradation

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Biomass piles spontaneously combust due to internal heat generation from biological and chemical activity in the woody materials. The biological and chemical activity also causes the breakdown of biomass to greenhouse gasses (GHG's); this breakdown is further enhanced by rising temperature within the pile. Both the conversion of biomass matter to GHG's and spontaneous combustion of biomass results in decreased material available for bioenergy generation, resulting in increased cost of storage and decreased efficiency of the biomass supply chain. Small-scale and industrial field trials have led to an improved understanding of the biological and chemical processes that occur in woody biomass piles. Models that simulate GHG generation and temperature changes in stored woody biomass piles have been developed. Current parameters being investigated are moisture content, oxygen levels, pile height and bulk density. Work is being conducted in developing mathematical relationships between the parameters and biomass growth rates. The growth rates are used to predict heat generation and GHG emissions. The model outputs are used to recommend test conditions for storage trials across Canada in order to determine best practices for minimizing GHG emissions and spontaneous combustion. The consolidation of these best practices into a CSA standard will allow for the safe and cost-effective storage of biomass, as it reduces the need for expensive GHG and temperature monitoring while minimizing matter losses. It is the hope that removing this barrier for biomass storage will increase the use of biomass feedstock throughout Canada.

Biography

Dr. Krigstin's research interests are focused on value-added applications for wood and biomass materials as well as by-product streams from related processing industries. Being practical and focused, this research tends to resolve industrial issues in the Forest and Pulp and Paper Industry. Dr. Krigstin has spent many years working in the Pulp and Paper Industry and uses her practical knowledge to bring feasible solutions to challenges facing one of Canada's main manufacturing sectors. The current research on bioenergy centres around characterization of biomass during the natural degradation occurring over storage phase in bioenergy supply chain.

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