Effect of In-Woods Storage of Unprocessed Logging Residue on Biomass Feedstock Quality

Yingqian Lin[1] and Fei Pan[2], Michigan State University

Abstract

An air-drying process was designed to avoid material decomposition and eliminate the high cost involved in other drying and storage methods. This process, which involved no chipping of biomass at the harvest site, was tested at two study sites in Escanaba, Upper Peninsula, Michigan, from June to November 2011. The primary objective of this study was to evaluate the effect of air-drying on biomass moisture content (MC) and higher heating value (HHV) over field storage. In addition the impacts of different positions within a pile, biomass pile sizes, and weather conditions on biomass moisture change were also tested. Results showed that biomass MCs were significantly reduced during the 5-month field storage period. In addition, the biomass MCs at different positions within a biomass pile were found to be statistically uniform. Results further suggested that making a biomass pile smaller is an appropriate way to store woody biomass when it is scheduled for short-term use, while larger piles should be considered as an option for long-term storage. Biomass HHVs were found to be stable during the 5- month storage period. These results indicate that field piling of unprocessed biomass is a reliable solution for year-round biomass supply without incurring additional costs. Regression analysis also showed that field-stored biomass MC can be significantly impacted by air humidity, while the effect of air temperature and cumulative precipitation on biomass MC was minor.

Key words: Biomass, air-drying, storage, moisture content, higher heating value

[1] PhD Student
Department of Biosystems and Agricultural Engineering
Michigan State University
524 S. Shaw Lane, Rm 9
East Lansing, MI 48824, USA
Email: linyingq@msu.edu, Tel: 517-432-0378, Fax: 517-432-2892

[2] Assistant Professor
223 Farrall Hall
Department of Biosystems and Agricultural Engineering
Michigan State University
524 S. Shaw Lane, Rm 223
East Lansing, MI 48824, USA
Email: feipan@anr.msu.edu, Tel: 517-432-1257, Fax: 517-432-2892