

Monitoring Woody Biomass Chips Quality Change during Field Storage in Michigan

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Storage is a key component within the woody biomass supply chain, especially when year-round harvesting is impossible. To determine whether chipped biomass is a better form for in-woods storage than unchipped biomass, and to examine the effect of weather factors on wood chip quality, this study was designed and conducted at three study sites in Michigan. From July to December 2013, samples were collected twice a month and tested for moisture content (MC) and higher heating value (HHV). Results showed that during the 4-month field storage, unlike unchipped biomass, the small particle size and high degree of compaction in the wood chip pile caused biomass MCs to increase. Results also indicated that a smaller sized pile and higher initial MC could lead to a wetter middle layer in a wood chip pile. Owing to the high MC and microbial activity, declining trends in biomass HHV were detected. Whole tree chips were found to have higher HHV variation than pure stem wood chips because of the different content and types of lignin and extractives. Different positions within a wood chip pile did not affect the biomass HHV. Regression analysis showed that at Site 3, monthly cumulative rainfall was significant in predicting biomass MC in three models, and average air temperature was significant most of the time. However, none of the preselected variables were tested to be significant at the remaining two study sites because the biomass HHV change was small over storage time. Other more sensitive variables need to be considered in future studies.

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