

EFFECT OF PARTICLE SIZE AND BALE WRAP ON STORAGE LOSSES AND QUALITY OF SWITCHGRASS

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Abstract

Cost of switchgrass delivered to a biorefinery is influenced by the methods used to store switchgrass after harvest. This presentation summarizes a study that evaluated storage dry matter (DM) losses and quality of switchgrass preprocessed using the BaleTech III industrial baler. Alamo switchgrass was preprocessed using the industrial baler on 23-Feb-2012 at the Biomass Innovation Park, Vonore, TN. The storage treatments were: 1) particle size of feedstock, 2) bale wrap, and 3) days in storage. Particle sizes evaluated were: 1) full length [~243.84 cm], 2) 7.62 cm, and 3) 1.27 cm – 1.91 cm. Bale wrap methods were: 1) high density polyethylene (HDPE) net, and 2) HDPE net and an air and water tight linear low polyethylene film. Bales were stored outdoors for 75, 150, and 225 days. At the end of each storage period, bales were weighed, destroyed, and material was randomly sampled. Samples were analyzed following National Renewable Energy Laboratory standard analytical procedures. Response functions were estimated from the data for storage DM losses, cellulose, hemicellulose, xylan, lignin, and ash content and used to evaluate the profitability of each storage treatment. The key findings are as follows, Net and film wraps applied to bales containing <2-cm length switchgrass reduced DM losses during storage. The content of cellulose, hemicellulose, xylan, and lignin increased with days in storage while ash decreased. Switchgrass price and cost of storage influenced choice of storage method based on days in storage. The implications of our findings to decision makers will be discussed.