# IMPACT OF BLENDING CORN STOVER, SWITCHGRASS, AND MSW GRASS ON BIOCHEMICAL CONVERSION PERFORMANCE AND FEEDSTOCK COST

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The cost to access biomass represents a major hurdle to the economic viability of a feedstock supply chain. A blended feedstock strategy has been proposed to address the high cost of feedstock access and enable biomass feedstock supply systems for biofuel production. However, the effects of blending on conversion performance are not well understood. Here, we used a simplex-centroid, mixture design to assess performance and cost for blends of corn stover, switchgrass, and municipal solid waste (MSW) grass clippings. Total glucose and xylose yields from laboratory-scale, dilute-acid pretreatment and enzymatic hydrolysis were combined with grower payment data from the Billion Ton update and used to develop models for the mixture design. Temperature-normalized linear models were estimated for glucose and xylose. Regression analysis of measured sugar release for blends versus sugar release predicted from the weighted average of individual feedstocks provided linear models ($R^2 > 0.85$) for glucose and xylose (n=56). A model was developed to optimize blending formulation by maximizing glucose release while minimizing grower payment. The glucose response produced a model statistically comparable with the previously shown blending models indicating that blends behave linearly, with a temperature dependence. When desirability was maximized, an “optimal” blend of approximately 70% corn stover, 18% switchgrass, and 12% MSW grass clippings was predicted, which is similar to a Least Cost Formulation (LCF) blend of 60% corn stover, 35% switchgrass, and 5% MSW grass clippings. These results demonstrate how predictive models can be used to select feedstocks and blends for testing in larger-scale studies.