Maximizing the Value of Corn Biotechnologies in Ethanol Production

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A simulation model has been developed representing the ethanol supply chain. This model starts the analysis at the farm, continuing through the grain handling system, to the ethanol facility and on to the end user. While this model is useful for general research on the ethanol industry, the availability of specific data is always the weakest link in accurately depicting/predicting particular technologies. As such, the project has sought to improve the accuracy and application of the model by applying and calibrating the model to the operations of the National Corn to Ethanol Research Center (NCERC) located at SIUE.

NCERC is a pilot scale dry mill with the ability to physically test and quantify many changes in product and process –and thus populate the simulation model with detailed information. In addition to improving the model's power to accurately depict the role of new activities at the NCERC, the model will also help the NCERC predict how one activity in the supply chain affects the remainder. Although tailoring the model to the NCERC has been slower than expected, it is believed this additional time will pay dividends as it will extend both the model's and the NCERC's analytical powers.

As efforts on model integration continue, the simulation model is being employed to more generally research the impacts of new corn biotechnologies on ethanol production efficiency. Crop biotechnologies have impacts all along the supply chain; ultimately lowering production costs as well as increasing corn and ethanol yields. The simulation model allows for these diverse technologies to be evaluated ex ante in a common framework, despite the inherent dearth information from physical testing. The model can track system wide changes in such things as: costs, emissions, production, and energy consumption. To date one version of the model has been applied to the operations of two case wet mills to derive the costs of handling specific feedstocks. More recently, the dry mill version was used in conjunction with the GREET model, developed at the DOE Argonne National Labs, to value the energy and environmental impacts of ethanol utilizing novel biotech feedstocks.