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U.S. Department
of Transportation



Title: Commercialization of Identity Preserved Grain Sorghum with Optimized Endosperm Matrices for Enhanced Bioethanol Conversion and High Lysine DDG Feed and Food Value

DR. Dirk Hays

Project Goal

The goal of the completed 2007 South Central Sun Grant award was to develop designer sorghum hybrids that optimize the grain's endosperm matrix for low energy bioethanol conversion and improved grain distiller's feed value. This project carries on that work to include development of sorghum that combines a high endosperm protein digestibility (HD) trait (removes the inhibitory protein matrix surrounding endosperm starch) with the high amylopectin (waxy) starch trait. The HD trait also confers 60% higher lysine content compared to wildtype corn or sorghum.

Expected Outcomes

- The outcomes/products derived from this research will be new sorghum hybrids ideally optimized for the bioethanol/DDG animal feed system.
- The grain endosperm will be optimized for low energy input cooking, and gelatinization, and higher efficiency fermentation. Additionally, the DDG will be optimized as a high lysine DDG/DWG feed.
- This project will improve the value chain bioethanol refineries' economic return by reducing energy cost, improving ethanol yield per raw input, and feed value return.
- Hays' team will also show that the HD x waxy grain traits improves other sorghum-based products. These include healthier high lysine, and Celiac friendly beers, breads, pancakes, cakes, North Africa Injera's and Kisra's, as well as whole grain breakfast cereals, and porridges. These will have a significant impact for previous USAID INTSORMIL collaboration and current USAID-SMIL collaboration in Africa and Central America.



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