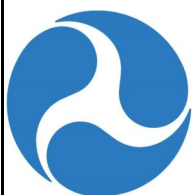


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U.S. Department of
Transportation



Project Title: ***Designer Sorghums: Development of High Yielding Sorghum Cultivars with Modified Endosperm Matrices for Optimized Low Energy Input Ethanol Production and High Nutrition Feed***

DR. DIRK HAYS

Project Goal

The overall goal was to develop a systems approach for designer sorghum hybrids that optimizes the grain's endosperm matrix for low energy bioethanol conversion and grain distiller's feed value. This approach included the development of sorghum cultivars that combine a high endosperm protein digestibility (HD) trait with a high amylopectin (waxy) starch trait.



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Project Outcomes

- The team had optimized the sorghum grain for bioethanol conversion by combining the high protein digestible (HD) trait with the high amylopectin starch endosperm trait (waxy). This combination improves the bioethanol efficiency by 65% higher (at 24 hrs) and by 14% higher (at 72 hrs) of fermentation versus wild-type sorghum or current commercial grain.
- Bioethanol systems often sell the remaining grain by-products, dry distillers grains (DDGs) as a high protein feed supplement, but, sorghum and corn grain are low in essential amino acids such as lysine. The combination of the HD by waxy trait also optimized the DDG feed by-products by increasing protein bioavailability and the limiting amino acid lysine by 100% versus wild-type sorghum or corn DDGs. So, in the bioethanol-feed supplement system, the grain is optimized for feed.
- Therefore, this project has provided a systems package of optimized grain sorghum for high efficiency low energy bio-ethanol production while providing additional revenue streams via improved DDG animal feed value.