Protocol developed for screening thermostability of modified commodity enzymes

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A protocol for quick measurement of thermo-stability and enzyme conversion efficiency in cross-linked enzyme crystals (CLECs) of glucose isomerase (GI) has been developed. The procedure effectively deals with the problem of enzyme inactivation by exposure to the lowered pH of continually heated substrate, while allowing testing of the crystalline structure at elevated temperatures. This protocol is useful for inexpensive screening of CLEC samples prior to long-term tests.

This research project will seek thermostabilization of the enzyme GI in the form of a CLEC with Altus Biologics, Genencor, and Cargill. GI CLEC would allow direct conversion of glucose syrup to 55 percent fructose syrup during isomerization at higher temperatures than are currently used and eliminate the chromatographic fractionation step of the current process. GI CLEC will also decrease the need for evaporation later in the process, resulting in significant energy savings. The dextrose feedstock for the process can also be of lower quality if the GI form offers enhanced organic resistance. The CLEC form will have a long lifetime with the potential for multiple reuse. Contact: B. H. Davison, ORNL.