

Sugar Production from Bioenergy Sorghum by Using Pilot-Scale Continuous Hydrothermal Pretreatment Combined With Disk Refining

Background/objective

Overcoming the recalcitrant lignocellulosic biomass structure is a major barrier to low-cost biomass processing to soluble sugars for conversion to bioproducts and biofuels. Here, researchers evaluated sugar production from bioenergy sorghum processed via continuous hydrothermal pretreatment combined with disk milling.

Approach

- ❖ Biomass sorghum was processed via pilot-scale continuous hydrothermal pretreatment (PCH) or lab-scale hot water pretreatment (LHW), each followed by disk milling.
- ❖ Pretreated biomass was further treated via enzymatic hydrolysis.

Results

- ❖ PCH more effectively increased the surface area of pretreated biomass than LHW.
- ❖ PCH followed by disk refining at a severity of 3.36 resulted in optimal yields of glucose (82.55%) and xylose (70.78%). The resulting hydrolysate was tested for the concentration of six inhibitors, and all were non-detectable.

Significance

This study demonstrated that chemical-free pretreatment of biomass can minimize inhibitor formation and be successfully scaled up from bench- to pilot-scale, suggesting promise for future industrial application.

