

BESC - A novel monolignol that reduces recalcitrance of plant cell walls

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Technology Summary

A new plant monolignol has been identified and associated changes in upstream lignin precursors that together result in the reduced recalcitrance of cell walls to enzymatic or biocatalyst breakdown for the release of biochemical components, including constituent sugars. Genetic modification of a gene in the lignin biosynthetic pathway of switchgrass (*Panicum virgatum*) resulted in the production of cell walls that release more constituent sugars when pretreated with hot water or treated with glycosyl hydrolases. This evidence of reduced recalcitrance to deconstruction processes was attributed to the production of a novel monolignol and increases in phenolic acids of the lignin pathway. The novel monolignol was subsequently generated by organic synthesis and the identity of natural and synthetic materials were confirmed by mass spectrometric and NMR analyses. Incorporation of the novel monolignol and associated changes in upstream phenolic acids of the lignin pathway can be used to modify the synthesis of cell walls of switchgrass and other bioenergy grasses and crops, including woody perennial species, for more facile deconstruction in energy, forest products and food/feed/fiber applications.

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