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**Fungus yields a new biomass-digesting enzyme**

The oxidase makes plant material easier to break down, increasing sugar yield for biofermentation

**The Science**

Fungi are responsible for much of the degradation of lignin-rich plant material in natural environments. A team from the University of York and the Great Lakes Bioenergy Research Center isolated a soft-rot fungus that shows exceptional ability to break down lignocellulose. From this fungus, they identified oxidase enzyme activity that effectively cleaves one of the major bonds in lignin, a process that currently requires expensive and time-consuming pretreatment steps. The enzyme also releases potentially useful co-products and makes the remaining lignin more easily digested by other enzymes.

**The Impact**

Lignin is a major barrier to being able to access more of the fermentable sugars in bioenergy crops. The newly described oxidase activity makes lignocellulosic biomass more easily digested by other enzymes without the need for additional pretreatment steps, potentially improving the efficiency of lignin breakdown while keeping processing costs down. It simultaneously releases compounds with potential pharmaceutical and industrial value, which may improve the economics of biorefining.

**Summary**

From wheat straw-enriched compost, researchers isolated a soft-rot fungus from the genus *Parascedosporium* that showed robust enzyme activity and the ability to break down lignocellulose. They identified a new oxidase that effectively cleaved the most common interunit bond in lignin, the -O-4 ether bond, without the need for any cofactor. The oxidase enzyme also released several useful co-products from wheat straw, including tricin (a flavonoid compound with antioxidant and antibacterial properties), vanillin and *p*-coumaric acid. Pretreatment of wheat straw with the oxidase enhanced its digestibility by other cellulases, resulting in a 20% increase in the amount of glucose released compared to a control treatment. Integration of this type of enzyme activity into a biorefinery could improve the yield, efficiency, and cost of producing sustainable fuels and chemicals.

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**Publications**

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