White rot fungus boosts ethanol production from corn stalks, cobs and leaves

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Scientists are reporting new evidence that a white rot fungus shows promise in the search for a way to use waste corn stalks, cobs and leaves – rather than corn itself – to produce ethanol to extend supplies of gasoline. Their study on using the fungus to break down the tough cellulose and related material in this so-called "corn stover" to free up sugars for ethanol fermentation appears in the ACS' journal *Industrial & Engineering Chemistry Research.*

Yebo Li and colleagues explain that corn ethanol supplies are facing a crunch because corn is critical for animal feed and food. They note that the need for new sources of ethanol has shifted attention to using stover, which is the most abundant agricultural residue in the U.S., estimated at 170-256 million tons per year. The challenge is to find a way to break down tough cellulose material in cobs, stalks and leaves – so that sugars inside can be fermented to ethanol. Previous studies indicated that the microbe Ceriporiopsis subvermispora, known as a white rot fungus, showed promise for breaking down the tough plant material prior to treatment with enzymes to release the sugars. To advance that knowledge, they evaluated how well the fungus broke down the different parts of corn stover and improved the sugar yield.

Treating stover with the white rot fungus for one month enabled them to extract up to 30 percent more sugar from the leaves and 50 percent more from the stalks and cobs. Because corn leaves are useful for controlling soil erosion when left in the field, harvesting only the cobs and stalks for ethanol production may make the most sense in terms of sustainable

agriculture, the report suggests.

More information: "Enzymatic Digestibility of Corn Stover Fractions in Response to Fungal Pretreatment" *Industrial & Engineering Chemistry Research.* 2012, 51 (21), pp 7153–7159. DOI: 10.1021/ie300487z

Abstract

Corn stover fractions (leaves, cobs, and stalks) were studied for enzymatic digestibility after pretreatment with a white rot fungus, Ceriporiopsis subvermispora. Among the three fractions, leaves had the least recalcitrance to fungal pretreatment and the lignin degradation reached 45% after 30 days of pretreatment. The lignin degradation of stalks and cobs was similar but was significantly lower than that of leaves (p

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