

Searching in the microbial world for efficient ways to produce biofuel

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With the help of genetic materials from a cow's rumen, U.S. Department of Agriculture (USDA) scientists are developing new ways to break down plant fibers for conversion into biofuel.

To convert [corn stover](#) and [switchgrass](#) into [biofuel](#), the plant fibers must first be broken down into sugars. But cell wall polymers are cross-linked in various ways that make them very resistant to breaking down, according to Dominic Wong, a chemist at the USDA Agricultural Research Service (ARS) Western Regional Research Center, in Albany, Calif. ARS is the principal intramural scientific research agency of USDA.

Previous studies have shown that a special group of enzymes known as feruloyl esterases (FAEs) are capable of breaking apart key links between the polymers, and that the enzymes are produced by certain types of microbes that degrade plant materials. Wong collected the [microbial population](#) from a cow's rumen, and screened their genetic compositions to find genes that produce FAE enzymes.

Working with scientific partners at Cargill, Wong has isolated, sequenced and cloned 12 genes capable of being introduced into *Escherichia coli* for production of the enzymes, which can then be used to break loose the polymeric network in the plant cell wall. Wong and the Cargill team have filed a provisional patent application on the FAE genes and enzymes.

In addition to increasing the efficiency of biomass conversion to biofuel, the enzymes could also be used to enhance the digestibility and the nutritional qualities of animal feeds, aid in the development of nutritional supplements, and prove useful in the development of other value-added products.

Provided by United States Department of Agriculture

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