Science & Technology

Creating a Better Biofuel

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Scott Banta (Eileen Barroso)

In the race to develop a biofuel that can replace gasoline, the most eagerly awaited discovery is a cheap way to manufacture butanol. Butanol is more similar to gasoline than is ethanol and can be poured into the gas tanks of most cars today without modifications to their engines. The problem is that scientists haven’t yet figured out a cost-efficient means of fermenting biomass to produce this alcohol fuel, which therefore is much more expensive to make than ethanol.

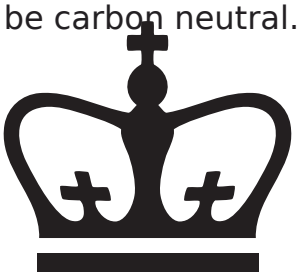
Scott Banta, an associate professor of chemical engineering at the Fu Foundation School of Engineering and Applied Science, recently was awarded a $543,394 grant from the U.S. Department of Energy to address this challenge. Banta believes that

he can produce large quantities of butanol by growing bacteria in a mixture of ammonia and carbon dioxide. The organism whose growth will generate the necessary fermentation, N. europaea, is currently used to break down wastewater at sewage treatment plants.

“Other researchers have worked on engineering organisms to make biofuels,” says Banta. “But this will be the first time that an ammonia-oxidizing organism has been used for this purpose.”

Banta will work on the project with Kartik Chandran, an assistant professor of earth and environmental engineering who has studied emissions from sewage treatment processes, and with Alan West, a professor of chemical engineering who specializes in the behavior of fluids.

“The carbon in the butanol will come from ambient CO2 and not from fossil fuels,” says Banta. “The ammonia that is required by the bacteria will come from renewable electrical energy or from wastewater treatment, meaning that the whole process will be carbon neutral.”



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