

**By Meghan Sapp**

In the world of second- and third-generation biofuels, there's a rush on to see who and what will be first to the market. When it comes to sugarcane, the eye typically looks towards cellulosic ethanol and the elusive breakdown of the cell wall. Will it be corn cobs or bagasse that's first to the pump?

But it may be that the discussion about sugarcane ethanol is a moot point, at least when talking about going beyond first-generation. Solazyme and Amyris, both San Francisco Bay Area-based technology companies, are looking to sugarcane as a feedstock for "drop-in" fuels rather than even talking about ethanol or worrying about the cell wall.

The idea of "drop-in" fuels is that they are close enough to diesel or gasoline that they can not only be blended at higher levels than ethanol or biodiesel, but that the existing fuel infrastructure for storage, transport and even use in cars, doesn't have to be changed in order to handle the new fuel. In essence, sugarcane becomes petrocarbon rather than biofuel.

Within the tiny subset of drop-in fuels from sugarcane, Amyris in the past few weeks has made huge jumps. As early as April, things started looking pretty good for the company when they completed auto drive tests using their new fuel with positive results. In September, they were the first biofuel company to register their new style fuels with the US's Environmental Protection Agency for use in the commercial fuel market. No more R&D, Amyris had passed the EPA's strict requirements for introduction into American cars while Amyris' diesel also passed specification for diesel. Not biodiesel, but diesel.

On Tuesday, the company was granted patents for its line of "No Compromise" fuels, from renewable gasoline and diesel to renewable jetfuel and lubricants. But the big thumbs up came on Wednesday, not when their fuels received more accolades or more federal approvals, but when they signed a deal to test their sugarcane-based biojet.

Brazil has been flying small personal aircraft and agricultural spray planes for years on ethanol, but whereas in the US there is the fear of a "blend wall" that prohibits ethanol from being blended at too high a level with gasoline because of phase separation, in Brazil and elsewhere the fear is that too high elevation will freeze the ethanol—or biodiesel—which keeps renewables out of the jetfuel market. There's a push the world over for renewable jetfuel, from jatropha and coconut to camelina and algae. So far it's a low-level blend in a single engine during a short-haul flight, but that's about to change.

According to Amyris and its new partnership with GE, Embraer and Azul Airlines, it's sugarcane-based biojet that may be first to the commercial aviation market. By early 2012 they'll be ready to do a demo flight. The new fuel has already undergone previous testing conducted by the US Air Force Research Laboratory, Southwest Research Institute, GE Aviation, and other industry participants and is partially funded by the Brazilian government via Financiadora de Estudos e Projetos – FINEP.

Amyris produces its renewable fuel using the emerging science of synthetic biology. By altering the metabolic pathways of microorganisms, such as yeast, Amyris is able to engineer "living factories" that transform sugar into a range of renewable products, including diesel fuel, jet fuel, and performance chemicals.

Interesting too is the choice of airline partner. Azul Airlines is only a bit more than a year old yet it has already taken 30% of Brazil's domestic air travel market. The founder of the airline also founded JetBlue, a low cost but not low thrills airline in the US that has taken domestic air travel in a new direction with the idea of low-cost business-class style travel. Azul Airlines has done the same thing and is quickly growing its fleet of Embraer airplanes. So rather than teaming up with the Brazilian national carrier TAM or the main domestic carrier GOL, the Brazilian government is taking a stand along with Embraer and GE that this new renewable jetfuel from sugarcane is new, hot, and going to put the country on the map—again—as a leader in greening the skies.