Algae jet fuel makes splash at international air show

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A young girl and and a young boy stop to study information about the algae tanks at the Farnborough International Air Show, which took place in London July 14-20.

Researchers Qiang Hu and Milton Sommerfeld from ASU's Department of Applied Biosciences recently flew to London to share their findings and research on the application of algae-based oils for creating biofuels at the Farnborough International Air Show.

The exhibit was part of a collaboration and ongoing relationship between the researchers and aviation giant Boeing.

While many exhibits showed off the latest improvements on turbines and designs for commercial aircraft and jet fighters, the researchers ended up stealing the show and attracting numerous visitors to their booth.

The star attraction of the Boeing exhibit was a 75-gallon tank of bright green algae.

The tank was, in fact, a bioreactor – a "feeding ground" container that promotes accelerated algae growth. The exhibit was the high note of a one-year relationship between the ASU researchers and Boeing.

The company has committed a $225,000 grant to support ongoing algae research at ASU, and to provide three scholarships for graduate students.

"The experience was very positive, because most shows are too technical for the public," Hu says. "With the live algae, we can explain to children and families how algae grow, and how we extract the oil and convert it to jet fuel."

Hu and Sommerfeld were a big hit with children – and they also attracted the attention of aviation business leaders and engineers.

The two researchers earned an immediate nod from Boeing to keep a presence at the air show.

"Not many people knew about ASU," Sommerfeld says. "However, they expressed great interest in the growing algae and the potential it has for production of oil that can be used for transportation fuel, especially since using algae eliminates the problem associated with converting crop foods to fuel."

The use of algae for multiple applications has several appeals, including:

• Algal oil is very similar to other vegetable oils, but its yield is projected at 100 times that of soybean per acre of land on an annual basis.

• Unlike other plants, algae reproduce quickly without roots and stems,

and they never go dormant.

• Algae can remove carbon dioxide from power plant emissions and recover nutrients from wastewater.

According to Hu, the technology to help algae reproduce effectively is still five years away.

“The critical issue is the biomass feedstock, not oil conversion,” Hu says. “To bring the cost down we need much more breakthroughs and innovations. Bioreactors are expensive at this stage. We need a cost-efficient way to sustain high growth.”

Once algae reach a critical mass, traditional methods can be used to extract oil from the plants. In turn, these oils can be refined into gasoline, biopolymers and jet fuel.

So what’s next in the process of making jet fuel from algae?

“Our effort will be geared to developing a pilot-scale facility that will enable us to integrate various components of oil production and evaluate the economics of the process,” Sommerfeld says. “Since ASU is a leader in developing approaches to sustainability, it could, for example, incorporate the use of algae-produced biofuels on some of its vehicles over the next several years as our production increases.”

Hu and Sommerfeld are the co-directors of the Laboratory for Algae Research & Biotechnology (LARB) at the Polytechnic campus.

The duo has been able to take their combined 40-plus years of research with algae and apply it to use in air and water remediation, alternative fuels and animal feed. Considered a nuisance by many, algae have the potential to someday become an environmentally sound substitute for

crude oil.

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