

BIOFUEL Engine-uity

Did you know...

Biofuels can be made from a wide variety of biological feedstocks, such as grass, wood chips, corn stalks and algae. New methods of making biofuel are also available that use bacteria to efficiently convert waste from kitchens or latrines into long-chain alcohols. All of these alternative fuels are important to the nation's plan to develop diverse sources of clean and renewable energy.

OPPORTUNITY

Argonne biofuels researchers have teamed up with the lab's mechanical engineers as part of an integrated effort to create new biofuels that are compatible with current engine technologies and the transportation infrastructure.

SOLUTION

As part of this project, the research team is exploring new territory by engineering strains of fuel that can be produced in large quantities by photosynthetic bacteria, eventually producing a long-chain alcohol called phytol. The physical and chemical properties of phytol are very similar to diesel fuel, suggesting it would be a good blending agent for diesel applications.

Argonne engineers have conducted engine experiments and computer simulations with diesel-phytol blends (5%, 10% and 20% phytol by volume) that reveal similar combustion and emission characteristics to conventional diesel fuel. These findings prove that phytol can be a suitable biofuel for diesel blends.

BENEFITS

The U.S. can displace a significant amount of petroleum by adding low levels of biofuel to the diesel fuel used every day for transportation and industry.

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Argonne mechanical engineer Doug Longman uses the laboratory's engine testing facilities to evaluate the performance and emissions of newly developed biofuels.



Argonne biophysicist Philip Laible oversees the growth of photosynthetic bacteria designed to produce biofuels such as phytol. In this culture mode, it is easy to extract cells during all phases of growth for analysis, and add chemicals (shown here) to speed growth or induce the production of biofuels.

