

GM algae could dramatically cut carbon emissions to produce 'greener' plastics

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From polyester shirts to the production of high-grade industrial ethanol, the contribution of the chemical feedstock ethylene can be found just about everywhere. But ethylene has an environmental cost. It's made using petroleum and natural gas, and its production emits more CO₂ than any other chemical process. As concerns about levels of CO₂ in the atmosphere have grown, scientists have been experimenting with ways to make ethylene production more green. At the Department of Energy's National Renewable Energy Laboratory (NREL), researchers are finding unexpected success with the help of cyanobacteria, or blue-green algae.

Jianping Yu, a research scientist with NREL's Photobiology Group, is leading a team of researchers working with these organisms. They have been able to make ethylene directly from genetically modified algae which can convert some of the CO₂ normally used to make sugars during photosynthesis into ethylene. Because ethylene is a gas, it can easily be collected.

Making ethylene doesn't require many inputs, either. The basic requirements for cyanobacteria are water, some minerals and light, and a carbon source. In a commercial setting, CO₂ could come from a point source like a power plant, Yu said.

If this alternative production method becomes efficient, it could potentially replace steam cracking, the energy-intensive method currently used to produce ethylene. And the process acts as a carbon sink.

But there are safety concerns associated with producing large quantities of ethylene gas. The byproducts also produced by the algae are flammable, and certain safety precautions would have to be put in place to safely collect ethylene.

Success will depend on whether algae produced ethylene can become cost-competitive. That won't be easy because petrochemical-based ethylene is cheap. According to the researchers' economic analysis, ethylene made from petrochemicals cost \$600 to \$1,300 per ton, while the gas coming from the algae is estimated to be about \$3,240 per ton.

Read full, original post: [Genetically Modified Algae Could Replace Oil for Plastic](#)