


WHAT IF WE USED ALGAE TO MAKE BIOFUEL?

Will we be trading barrels of algae instead of oil in the future?

Solution: Adjusting a specific algae gene with genome editing, enabling the algae to be a feedstock for biofuels.

Did you know?

Average global oil consumption was 93 million barrels per day in 2015. Algal biofuel could help substitute this, thereby contributing to the 7th UN Sustainable Development Goal of Affordable and Clean Energy.



Scientists have been trying to make algal fuels commercially viable since the 70's, continuously hitting the same limitation: algae are capable of either rapid growth or high lipid (oil) production, but not both. So, while large-scale production of biofuel was possible, this trade-off meant it would not be competitive with fossil fuels.

However, in 2017, researchers from Synthetic Genomics and ExxonMobil managed to overcome the problem. Their first step was a global algae-hunt to find the most suitable algae species, which they found to be *Nannochloropsis*. Then, the researchers set about sequencing the strain's 9000 genes and identified 20 potential "master regulators" of lipid production. The regulators were made inactive one-by-one by using CRISPR genome editing. This technique allows scientists to make changes to the individual letters of the genetic code in an efficient and easy way. One of the 20 regulators, the *ZynCys* gene, dramatically increased lipid production when knocked out, but also stunted growth. However, by adjusting the gene's activity with another tool, called RNA interference, the normal growth rate was retained while also doubling the lipid production. The trade-off was overcome.

Today, the research has moved outdoors to field studies in contained ponds. This will provide a better understanding of the fundamental engineering parameters, enabling the scaling of the technology for potential commercial deployment. To demonstrate their belief in the project's potential, the companies have recently set the goal of producing 10,000 barrels of algae biofuel per day by 2025. A welcome ambition and a good start for cutting down on oil consumption.

Genome editing is

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