

Study finds algal cells create fat more quickly than thought, could aid biofuel research

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(Phys.org) —Many scientists see great promise in algae as a new source of oil—a sustainable, environmentally sound way to break the world's fossil fuel dependence.

Algal lipids from microalgae are one of the best sources for biofuels—algae grow quickly, tolerate [extreme weather conditions](#), and do not pose the same issues as biofuel crops that are grown both for fuel and food.

Many research teams in academia and private industry are struggling, however, with one vexing problem with algae as a fuel source: The conditions that promote algal growth aren't the same as the conditions that allow the algae to create the maximum amount of oil.

In short: If algae are deprived of nitrogen, the cells become stressed and begin to produce lipids, but their growth rate slows. And if alga is ever to become a commercially viable [fuel source](#), scientists must ensure that not only can it produce as many lipids as possible, but also that it can grow at the fastest rate possible.

Bala Rathinasabapathi, a professor in the University of Florida's horticultural sciences department, and graduate research assistant Elton Goncalves decided to look into how nitrogen starvation stress induces [lipid](#) accumulation in [green algae](#), also called chlorella.

Their findings, described online this month in the journal *Planta*, show

that lipid accumulation in [algal cells](#) begins just hours after they are starved of nitrogen – not days, as scientists previously believed.

They also found that about 30 percent of lipids produced under nitrogen stress occurred as the membrane began to degrade inside each cell, the cell recycling the membrane lipids to oil.

"Our hope is that what we have done will be helpful to understand what's going on in cells under nitrogen starvation and might help us to tweak the technique where we can use the cells to make lipids but not necessarily stop growth – that's our long-term goal," Rathinasabapathi said.

The next step for the researchers is to begin looking at genes and proteins involved during the cellular-stress stage, he said.

"We're working to understand that genetic network, which is important for turning on [lipid accumulation](#)," he said. "That's our next goal."

Provided by University of Florida

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