U.S. DEPARTMENT OF

Office of ENERGY EFFICIENCY & RENEWABLE ENERGY



Have you ever wondered what the light green fuzzy material that covers ponds, lakes, and rivers is made of? Then look no further. The U.S. Department of Energy Bioenergy Technologies Office is fueling your curiosity with five fun facts you may not know about algae.

For more information, visit: energy.gov/bioenergy

5 FUN FACTS ABOUT ALGAE

Algae can help us live on Mars!

Algae may be small, but they give a wide range of benefits, including the potential to allow humans to live on Mars! But before putting on your space gear and heading there, remember that the red planet's atmosphere is very thin and doesn't have enough oxygen for humans to breath. But algae can save the day!

Algae farms on Mars would benefit from

the planet's abundant CO₂-rich air, which would allow them to produce ethylene (a basic building block for all kinds of plastics) for use in a variety of building materials. Additionally, they would release oxygen, which colonists could gather and store. In other words, algae have the potential to provide a solution for two fundamental needs of any healthy human community: shelter and clean air.

You can wear algae!

Imagine if your flip-flops were made from a naturally derived material that was actually helping to clean up our oceans! That's the idea behind these **new algae-based plastic shoes**, created by researchers at the University of California San Diego (UCSD).

> The process starts with growing algae in ponds, then separating it from water to create a paste. Next, the researchers extract all the fats from algae paste and run them through numerous chemical steps to break them down into smaller pieces used to make "polymers". Lastly, the polymers are poured into a shoe mold. UCSD researchers successfully created a plastic foam with about 50% algae content.

They hope to make a product that uses 100% renewable materials.





Algae is a food source!

Algae are packed with nutrients and have high protein levels. You may be familiar with spirulina, a common algae-based nutrition supplement that can be added to juice and smoothies. So now when you flip that green juice label around and read "**spirulina**," you'll know you're drinking juice with a little bit of algae sprinkled in.

You may have also heard about the varied health benefits of supplementing your diet with omega-3 fatty acids found in fish oils. **Where do fish get these oils?** The answer is from algae. A number of natural health brands are cutting out the middle...fish...and going right to the source by extracting omega-3s directly from algae. These supplements appeal especially to vegetarian and vegan consumers. So next time you're at the grocery store, be sure to pick up some nutritious algae!



PHOTOSYNTHESIS PHOTOSYNTHESIS

DID YOU KNOW?

Algae could be a sustainable source of biofuels and other valuable chemicals. Most "microalgae" grow through photosynthesis by converting sunlight and CO_2 into a material known as biomass. Using this process of photosynthesis, algae convert greenhouse gases into oils and other valuable industrial products.

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Algae can fuel cars, planes, and more!

The future of travel is looking green. **Tiny algae organisms have big potential for America's clean energy future.** These microscopic green machines convert sunlight and CO₂ into energy, storing it in the form of natural oils that can be extracted to fuel planes, cars, and trains.

Traveling by airplane can have negative consequences on the environment. The emissions from cars and other transportation methods can be reduced by powering them with batteries instead of gasoline. Because long-range commercial airplanes need to weigh as little as possible to stay in the air safely, and be able to travel very long distances without stopping, batteries are not a good option due to being heavy and

unable to hold enough power for a long-distance flight. That means sustainable fuel may be

the best way to lessen the environmental impact of airplanes. Since algae are plentiful and can create sustainable fuel, algae can help to reduce airplane emissions! Scientists estimate that by the year 2030, sustainable fuel made from algae could power just under half of all domestic flights inside the United States.

There's algae in your sushi!

Sushi is one of the most popular foods in the world. One of the best parts about sushi is its versatility. Sushi can be mixed and matched with different kinds of seafood, meats, and vegetables to create infinite unique dishes. There's something about the combination of flavors and textures wrapped together that just makes taste buds happy.



Did you know the greenish film around the rice is algae?

Yes, most sushi rolls are wrapped with dried edible seaweed. **Seaweeds** are a type of macroalgae that thrive in saltwater environments. Some people say seaweed tastes like salty spinach, while others find it to have a

slightly fishy flavor. But the combination of rice, fillings, and toppings wrapped in algae creates a flavor profile that's hard to beat. So next time when you order sushi, know that our green friend is holding every bite together.

RESOURCES RESOURCES

Words to Know

Bioenergy: Energy produced from biomass. When you see "bio-" in front of fuels, products, and power, it means these were made from biomass instead of petroleum.

Bioeconomy: A global transition to the sustainable use of renewable biomass resources in energy and products aiming to increase economic, environmental, and social benefits and reduce environmental and social harm. **Biofuels:** Liquid or gaseous fuels derived from bioenergy feedstocks. Examples include ethanol, methanol, methane, and hydrogen.

Biomass: An energy resource derived from plant material. It includes agricultural residues (leftovers), forest residues, purpose-grown energy crops (such as algae and some kinds of grasses), urban wood waste, and food waste. **Bioproducts:** Materials that are derived from bioenergy feedstocks. Examples include paper, ethanol, and plastics.

Greenhouse Gases: These gases make Earth warmer and throw off the energy balance of the planet.

AlgaePrize Student Competition

What happens when innovation meets algae?

Prizes! Competition! Networking! And most importantly, science! Launched in January 2022, the AlgaePrize is a new competition from the U.S. Department of Energy Bioenergy Technologies Office that encourages students to pursue innovative ideas for the development, design, and invention of technologies within the commercial algae value chain. Teams of two or more students compete for national recognition and prize money awards as they work to advance algae technology and make the world a better place.

For the latest AlgaePrize news, and to learn how your team can participate in the next AlgaePrize competition, visit: energy.gov/AlgaePrize.

These fun facts were gathered from the following souces:

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U.S. DEPARTMENT OF CONTROL OF ENERGY EFFICIENCY & RENEWABLE ENERGY BIOENERGY TECHNOLOGIES OFFICE

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