REVERSE PHOTOSYNTHESIS USES SUNLIGHT TO CONVERT PLANT BIOMASS INTO FUEL

By Alyssa Navarro

A vast majority of the planet's industrial system is fueled by petroleum, a naturally occurring liquid found in formations beneath the surface of the Earth. This makes the petrochemical industry completely indispensable in society.

However, petrochemicals have a huge impact on both the environment and climate.

Now, a team of scientists from Denmark has discovered a new method called reverse photosynthesis, which could potentially revolutionize industrial production of chemicals and fuels.

How Reverse Photosynthesis Works

Photosynthesis is a process used by most plants to convert light energy from the Sun into chemical energy, often resulting in vital products such as oxygen.

Just like photosynthesis, the reverse process collects sunlight through using chlorophyll, a green pigment found in leaves.

But instead of building plant material, the process allows energy in solar rays to break down with the help of a specific enzyme that combines with light energy.

Here is how it works: Researchers collect a large sugar molecule broken down from biomass, and then mix it with the special enzyme from bacteria and fungi.

The special enzymes used in reverse photosynthesis are called monooxygenases, natural enzymes applied in the production of industrial fuel. When exposed to sunlight, the plant biomass is completely broken down.

Klaus Benedikt Møllers, one of the study's researchers, said with reverse photosynthesis, the breaking down of sunlight transforms carbon bonds, instead of building plants and producing oxygen.

The revolutionary process takes place within five minutes with sunlight, but without sunlight, it would take hours to achieve the energy transformation.

Although researchers have yet to determine whether reverse photosynthesis is a natural process that occurs in the environment, there are many indications that bacteria and fungi actually use reverse photosynthesis to access nutrients and sugar in plants.

The Impact of Reverse Photosynthesis

David Cannella, one of the researchers of the study, said their discovery means that the production of biofuels and biochemicals for things like plastic could be faster and more efficient.

"Some of the reactions, which currently take 24 hours, can be achieved in just 10 minutes by using the Sun," said Cannella.

The new method's ability to split chemical bonds between hydrogen and carbon may be developed to turn biogas-planted source methane into liquid fuel methanol, an "attractive" raw material that can be processed into fuels.

Claus Felby, a professor from University of Copenhagen and lead researcher of the study, believes that the discovery is a "game-changer" that could change how the industry produces chemicals and fuels, "thus serving to reduce pollution significantly."

In the meantime, further investigations must be done before their discovery could directly benefit society, but the potential is "one of the greatest we have seen in years," added Felby.

Source

Navarro, A. (2016, April 5). Reverse photosynthesis uses sunlight to convert plant biomass into fuel. Tech Times. https://www.techtimes.com/articles/147122/20160405/reverse-photosynthesis-uses-sunlight-to-convert-plant-biomass-into-fuel.htm