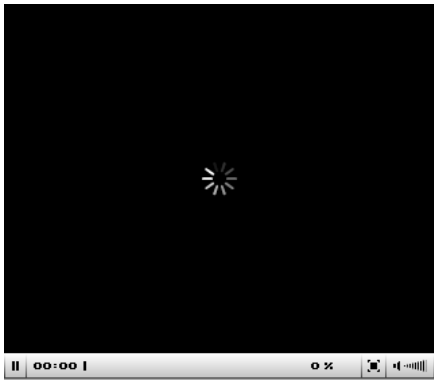
Science Video

Possible Fix For Global Warming?
Environmental Engineers Use Algae To Capture Carbon Dioxide

April 1, 2007 — Engineers have designed a simple, sustainable and natural carbon sequestration solution using algae. A team at Ohio University created a photo bioreactor that uses photosynthesis to grow algae, passing carbon dioxide over large membranes, placed vertically to save space. The carbon dioxide produced by the algae is harvested by dissolving into the surrounding water. The algae can be harvested and made into biodiesel fuel and feed for animals. A reactor with 1.25 million square meters of algae screens could be up and running by 2010.



See also:

Plants & Animals
- Botany
- Invasive Species

Matter & Energy
- Fossil Fuels
- Organic Chemistry

Earth & Climate
- Energy and the Environment
- Renewable Energy

Reference
- Coral bleaching
- Food chain
- Chlorophyll
- Phytoplankton

Global warming's effects can be seen worldwide, and many experts believe it's only going to get worse. In fact, America is by far the largest contributor to global warming than any other country -- releasing a quarter of the world's carbon dioxide -- the primary cause of global warming. But now engineers have found a natural way to eliminate one of the worst contributors to our environment's decay.

What's coming from power plants, traffic jams and industrial smog is causing our ozone to disappear, ice caps to melt, and temperatures to rise. The latest international report says carbon dioxide responsible for 60 percent of the greenhouse gases.

Now engineers say a simple, sustainable and natural solution may come from algae. "If this sort of technology can be developed, it can be deployed anywhere there's sunlight," David Bayless, a professor of mechanical engineering at Ohio University in Athens, tells DBIS.

Bayless, with a team at Ohio University, created a photo bioreactor that uses photosynthesis to grow algae just like a plant would take carbon dioxide up and, through the energy of the sun, convert that into oxygen.

"That passes the carbon dioxide over these membranes," Ben Stuart, an Ohio University environmental engineer, tells DBIS. "These membranes are fabric just like your shirt. It's a woven material, and as the carbon dioxide pass by them, that carbon dioxide dissolves into the water."

That carbon dioxide is broken down by the algae. Nitrogen and clean oxygen are released back into the atmosphere. But to capture the CO_2 created from a power plant, algae would have to fill a building the size of Wal-Mart.

"The size of these things would be enormous, about an acre worth of land space. And so the flu gases would run through this huge building and the algae would be growing on the suspended vertical surfaces." Stuart says.

But what makes it cost effective? The algae can be harvested and made into biodiesel fuel and feed for animals.

Bayless says, "You are talking about definitely home-grown fuel, a win-win thing. You know, you are taking a potentially very negative thing in carbon emissions and turning it into a

Related Stories

Scientists Look To Nature To Cut Greenhouse Emissions (July 20, 2000) — Greenhouse gas emissions are an environmental concern and acostly problem for coal-fired power plants, which are facing tighter federal pollution laws. But scientists at Ohio University are looking ... > *read more*

Desert Dust Enables Algae To Grow (December 22, 2003) — Biologists from the Royal Netherlands Institute for Sea Research have demonstrated that desert dust promotes the growth of algae. Scientists had already assumed that the iron in desert dust ... > *read more*

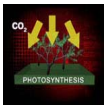
The Secret Life Of Algae (January 14, 2006) — A fundamental process that has puzzled researchers for many years has been explained by UK scientists. Some simple plants that are crucial in maintaining the balance of carbon in the Earth's ... > *read more*

North Sea Efficient Sink For Carbon Dioxide (October 12, 2005) — A relatively large number of algae grow in the North Sea. These form the basis for a much richer food chain than that found in the Atlantic Ocean. Dutch-sponsored researcher Yann Bozec calculated ... > *read more*

Scientist Searches Yellowstone Park For Carbon Dioxide-Eating Microbe (January 31, 2001) — Wanted: Algae of the most adventurous type. Must grow in slime on scratchy plastic discs. A willingness to be periodically purged in favor of new recruits required. Above all, must have a hearty ... > *read more*

Just In:
Biologists Find Out What's Eating Bats

Science Video News



Can Carbon Dioxide Be A Good Thing?
A physicist from Colorado State University and his colleagues from the North American Carbon Program (NACP) have discerned and confirmed the. ... > *full story*

Materials Engineers Turn to Ferocious Fish for Nonstick Ship Coating

Atmospheric Scientists Monitor Global Carbon

A Vacuum Alternative to Pesticides for Microbiology Solution

more science videos

Breaking News

... from NewsDaily.com

REUTERS

Floods and droughts make mild diseases deadly

More study of heart imaging agent risks urged

U.S. man attacked, eaten by mountain lion

Radio frequency identification in hospitals could pose risks

Study suggests colon cancer vaccine possible

more science news

In Other News ...

Pakistani court postpones Sharif by-election

U.N. nuclear inspectors on last day of Syria visit

IOC investigates anti-Dalai Lama torch relay speech

Pakistani court postpones Sharif by-

and just in time! In the past 50 years, the U.S. carbon dioxide emissions have almost doubled. Texas ranks first in the nation for the highest emissions ... And just remember, once carbon dioxide is released into the atmosphere, it stays there for about 100 years.

The American Geophysical Union, American Society for Microbiology, and the Optical Society of America contributed to the information contained in the TV portion of this report.

BACKGROUND: A researcher at Ohio University's Ohio Coal Research Center has developed a bioreactor that cleans up carbon dioxide emissions from fossil fuel exhaust with the help of heat-loving algae and hybrid solar lighting. David Bayless believes that the easiest way to eliminate CO_2 from coal-burning power plants is to use the natural process of photosynthesis.

HOW IT WORKS: Bayless designed a box packed with blue-green algae spread onto vertical screens. The algae use the CO_2 and water from the power plant to grow new algae, giving off oxygen and water vapor in the process. The organisms also absorb components of acid rain, such as nitrogen oxide and sulfur oxide. Building a workable prototype had its share of challenges. For instance, there was a problem of limited space -- it just wasn't possible to cover an area of around 100,000 acres with algae. So Bayless instead placed screens of woven fiber with algae vertically. Since algae need sunlight to thrive he brought in hybrid solar lights that collect sunlight with curved mirrors and then channel it through the reactor via optical fibers.

And instead of trying to genetically modify any kind of algae, he found a species that naturally thrives in the hot springs of Yellowstone National Park, and does equally well in the exhaust of a power plant. A remaining challenge is how to dispose of the large quantities of algae produced by the bioreactor; one option is to collect it and use it as a biologically derived fuel.

ALL ABOUT ALGAE: Algae are relatively simple organisms that capture light energy through photosynthesis and use it to convert inorganic substances into organic matter. Photosynthesis is the process of producing sugar from sunlight, carbon dioxide and water, with oxygen as a waste product. Nearly all life depends on this complex biochemical process, which occurs most famously in plants, but also in phytoplankton, algae, and some bacteria, among other organisms. They are usually found in damp places or bodies of water. They vary from single-celled forms to complex forms made of many cells, such as giant kelps, which can grow as much as 65 meters in length. It is estimated that algae produce between 73% to 87% of the net global production of oxygen.

strikes a different pose
Iraq bomb kills 3 U.S. soldiers, interpreter
China offers rare praise for Myanmar's drug fight
more top news