



The algal-biofuel project: Wintertime research at VIMS

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In spite of near-freezing winter temperatures, scientists at the Virginia Institute of Marine Science (VIMS) harvested algae from the boatyard floway in February. Meanwhile, physicists from the College of William & Mary and the University of Maryland waded into the knee-numbing York River to check on their substrate screens.

The scientists, part of the Chesapeake Algae Project (ChAP), were conducting basic research that promises to clean agricultural and other pollutants from the Chesapeake—and potentially the oceans—while delivering a carbon-based, sustainable stock that can meet the automotive fuel needs of an increasingly mobile world population. By concentrating on wild strains of algae that have adapted to their open-water environments during millions of years of evolution, ChAP participants believe their systems can be successfully deployed worldwide. That promise was underscored by the start-up investment of \$3 million supplied by Statoil, a Norwegian energy firm.

"Instead of needing to fertilize the algae, we're using the algae to remove fertilizers that have been put in the water by land-based crops," said Elizabeth Canuel, professor in the department of physical sciences at VIMS. By replicating the technology at key points along the Bay where phosphorous and nitrogen inputs are concentrated, Canuel believes a significantly cleaner Bay can be enjoyed within the decade. A marine chemist at VIMS, she reported that the lipid production of the algae forms that proliferate in nearby waters ranges from 2 percent to 9 percent and that it is dominated by saturated and unsaturated fatty acids in proportions that are optimal for biofuel production.

While Duffy, Canuel and others concentrated on the floways, the physics professors were collecting samples from their screens in the river shallows.

Patrick Kangas, a ChAP researcher from the University of Maryland, was impressed with the cold-water production. "Five grams per meter per day—this is good," he exclaimed.

"We want it to be like a factory," countered William Cooke, professor of physics at William & Mary. "What we saw in November makes us really greedy."

"I see the nutrient-reduction and the fuel production as going hand in hand," said J. Emmett Duffy, the Loretta and Lewis Glucksman Professor of Marine Science at VIMS. "We like to think of it as turning pollution into fuel. You harvest corn or soybeans once a year, generally, whereas you can harvest the algae every week in warm weather. On a per-time or per-area basis, the productivity is much higher—10, 100, sometimes even 1,000 times higher."

ChAP partners are Statoil, Blackrock Energy, College of William & Mary, Virginia Institute of Marine Science, Smithsonian Institution, University of Maryland, University of Arkansas and HydroMentia.