



“We’ve gotten a long way on fossil-based systems, but in the long run, there are these issues with carbon released into the atmosphere, as well as someday, you will run out (of fossil fuels).”

—Hal May, Ph.D., environmental microbiologist, on current fuel production

Hal May needs a microscope to see his workmates, but wonders if eventually it will take an environment as large as an ocean to reach their potential.

In his lab at the Hollings Marine Laboratory at Fort Johnson on Charleston Harbor, May and his staff have found methods to induce microbes to produce various chemicals and fuels that eventually could have commercial value, and do it at minimal cost in a relatively new process called microbial electrosynthesis. With this process, electricity is used as an energy source to feed microbes and stimulate them into producing a variety of organic compounds.

“You take electricity, carbon dioxide, water, and microbes, and you say ‘make something’ which also means they have to make a living out of this,” he says. “The electricity is their energy source. We all have

to have an energy source—their is electricity. We all have to have a carbon source—their carbon source is carbon dioxide.”

May, an environmental microbiologist with a PhD from Virginia Tech, initially succeeded in getting microbes to generate electrical current, but eventually concentrated on feeding electricity to microbes to make other products.

This project came in response to an initiative from the US Department of Energy’s Advanced Research Projects Agency (ARPA), seeking innovative shortcuts to make chemicals and fuels from carbon dioxide. “We don’t want to use fossil fuels and we don’t want to use photosynthesis. We just want to make it straight up from carbon dioxide,” May recalls the DOE’s directive, “which was a bit of a tall order.”

“So I proposed (that) you could put an electrode in (with microbes) and that could be the energy source for these things. The reason I proposed that because I knew the reverse was true. We can make electricity in an electrode with microbes, but can we get microbes to consume electricity in an electrode, just turn the process