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From Ocean Depths To High-Tech Labs

By Vince Winkel, posted Dec 16, 2016 www.wilmingtonbiz.com

The world's oceans are packed with marine microorganisms that have the potential to provide chemicals for pharmaceuticals, and Wilmington has been positioning itself to become a leader in this field.

UNCW's team of marine scientists have been collaborating with IKA Works, the Wilmington-based U.S. division of a German company that manufactures high-end lab equipment, and the growing public-private partnership is starting to pay dividends.

IKA benefits from having scientists test and refine its lab apparatus, while University of North Carolina Wilmington benefits by having state-of-the-art equipment to test new sources of potentially life-saving drugs found in organisms from the sea.

"I think it important to be able to showcase IKA, relatively small here with around 90 employees, but it's a huge industry in that they produce high-quality grinding and mixing equipment that is sold around the world," said Carmelo Tomas, a marine biologist at UNCW who helped spearhead the partnership. "This is a company that also has branches in China, in India, Japan as well as Germany and here. Relative to Wilmington it is one of these hidden gems, and one of the success stories of industries being here."

IKA's relationship with the university has been evolving for about seven years, according to Daniel Baden, executive principal of Marine Biotechnology in North Carolina (MARBIONC) and a professor of marine science at UNCW.

"It started as us looking at the equipment they already had and trying to get some equipment into the university," Baden said. "Carmelo's group cultures organisms all the time. As IKA would give them a redesigned or initially designed apparatus to work with, Carmelo would take cultures of the organisms, take notes on it, keep very good lab notebooks and feed that information back to IKA," Baden added.

The cultures of these marine organisms are extracted in a 10-liter device manufactured by IKA. Tomas and his team have used the devices, called photobioreactors, to culture hundreds of strains of algae and related organisms from oceans all over the world.

"The idea was to begin to optimize the environment within the bottles to allow the algae to grow at a fast rate, produce large amounts of the chemicals that we were interested in working with and to be able to do this reproducibly," Baden said. "The only way we could do this was to work with a company that could design all of the control apparatus around the vessel that we culture the organisms in."

The photobioreactors don't come cheap, costing in the tens of thousands of dollars.

In a report for the National Institutes of Health last spring, Harshad Malve spelled out the potential for growth beneath the waves in the pharmaceutical arena.



*A bioreactor, manufactured by IKA, spins in a temperature-controlled lab at UNCW's Center for Marine Science.
(photo by Vince Winkel)*

"The marine environment has become a promising source of natural products, molecules and drugs of therapeutic use," Malve wrote.

"Many drugs from marine sources have a promising effect on several chronic and unbeatable diseases like cancer," he continued. "Seventy-five percentage of the earth's surface is covered by water, but research into the pharmacology of marine organisms is limited, and most of it still remains unexplored."

That potential is not lost on Refika Bilgic, the CEO of IKA in Wilmington.

"IKA is collaborating with scientists on their applications to improve their research, learning more about marine biology, and UNCW is receiving a product that they can conduct their experiments with," Bilgic said. "With the chancellor emphasizing collaboration of academia and industry, the collaboration with UNCW is a prime example."

Bilgic said that her U.S. facility grew revenues by 15 percent in 2015 and is on track to surpass its 2016 targets.



IKA was founded in Cologne, Germany, in 1910 and moved to Staufen after much of Cologne was reduced to rubble during bombing raids in 1942. In those early days the company made a name for itself across Europe for its design and production of test tubes, bowls, tubes, bottles and flasks made from glass that were blown and polished in its workshop. Those evolved into technically- advanced testing equipment as IKA began to expand overseas.

The company opened a U.S. facility in Cincinnati, which was moved to Wilmington in 1995.

Today, the privately held company has over 800 employees at eight locations on four continents, with almost 100 staff based at their newly- expanded facility in Wilmington at 2635 Northchase Parkway SE.

The company now offers a wide array of lab apparatus such as magnetic stirrers, mixers, overhead stirrers, shakers, homogenizers, mills, rotary evaporators, calorimeters, laboratory reactors and specially developed software for laboratory and analysis applications, as well as temperature control products.

This type of equipment fits in well with the marine research at UNCW.

“The relationship with UNCW has grown stronger and closer over the years,” said IKA’s Bilgic, “even to the point that IKA has funded a fellow at UNCW to advance the project. We would like to further deepen the collaboration in the years to come.”

In the coming weeks, IKA will unveil a 100-liter bioreactor in Wilmington, to culture much larger quantities in the lab.