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Ohio State Installs, Commissions New Pilot-Scale Ultra Shear Technology Processing Equipment for Preparation of Higher Quality and Safer Liquid Foods and Beverages

Columbus, Ohio, March 3, 2022 – Food processing companies looking for innovative new ways to preserve clean-label liquid food without artificial preservatives will soon have a new option to do so thanks to new technology being developed at The Ohio State University College of Food, Agricultural, and Environmental Sciences (CFAES) in partnership with scientists and engineers at Pressure BioSciences, Inc. (OTCQB: PBIO), a Massachusetts-based company that manufactures high pressure-based equipment and laboratory instrumentation for the life sciences industry.

Researchers in the CFAES departments of Food Science and Technology as well as Food, Agricultural and Biological Engineering (FABE) have installed and commissioned a new, innovative manufacturing technology that preserves foods and beverages using wholesome, recognizable ingredients; no artificial preservatives; and reduced heat. And they will soon launch an outreach program to food and beverage companies to join the Food Industry Consortium to begin using the new technology.

Called BaroShear MAX ultra shear technology (UST), this new method of high-pressure-based shear technology will allow beverage companies to manufacture healthier beverages by reducing thermal exposure through the combined application of elevated pressure, shear, and controlled times and temperatures.

The result?

"Healthier beverage options that health-conscious consumers want that aren't preserved using chemical additives and preservatives with names they can't pronounce," said V.M. "Bala" Balasubramaniam, a CFAES professor of food engineering who is leading the project. His laboratory—with a multidisciplinary team of microbiologists, chemists, and nutritionists—investigates innovative food manufacturing technologies and then works with industry to implement them.

And it's not just drinks that might soon be preserved in a much healthier way. UST can also be used by food manufacturers in the healthier processing of sauces, condiments, and other liquid foods, including nutritional drinks, ice cream mix, juices, and food emulsions, Balasubramaniam said.

"UST is a new processing tool that enables liquid food and beverage producers to meet the changing dietary desires of health-conscious consumers," he said. "These consumers are interested in minimally processed liquid foods and beverages that not only quench thirst, but also satisfy their healthy lifestyle aspirations."

UST also satisfies liquid food manufacturer interest in developing a continuous high-pressure processing method. That's significant, considering that the batch high-pressure processing industry is now estimated to be a $15 billion a year market, Balasubramaniam said.

"We hope UST will have a similar impact on liquid beverages," he said.

Known internationally for his research on high-pressure and other types of nonthermal processing, or safely processing food using significantly less heat, Balasubramaniam holds joint appointments in the CFAES departments of Food Science and Technology and FABE.

Other members of the CFAES research team include Ahmed Yousef, professor of food microbiology; Rafael Jimenez-Flores, the J.T. "Stubby" Parker Endowed Chair in Dairy Foods; and Christopher Simons, associate professor of sensory science.

The team's UST research is funded through a four-year, $891,000 grant from the U.S. Department of Agriculture's National Institute of Food and Agriculture.

Edmund Ting, a recognized leader in high-pressure science, a USDA project co-investigator, and a senior vice president at the company, led the development of the laboratory scale and pilot plant equipment that CFAES researchers use in the research project. PBI installed the pilot-scale equipment at Ohio State's Advanced Food Processing Technology Pilot Plant.

"The ability to modify products through UST-directed physical stress will create many new opportunities in the commercialization of liquid foods and beverages, as well as in such enormous markets as nutraceuticals, cosmetics, and pharmaceuticals," Ting said. "UST not only can produce the highest quality nanoemulsions, but this innovative process can also help destroy bacteria and other pathogens, and reduce or eliminate the need for chemical additives, thus increasing food safety and quality."

Both pasteurization and sterilization processing objectives can be realized by suitable choice initial process conditions, Balasubramaniam said.

"Mechanically, the food is subjected to high shear, reducing the size of the droplets so small that they stay in suspension, eliminating or reducing the need for additive stabilizers," he said. "High pressure also promotes beneficial changes in viscosity for certain starch or protein products."

Balasubramaniam and his colleagues now plan to work with a consortium of interested food processors on industrially relevant questions before scaling up the UST into industrial practice.

Food processors can learn more about UST through a pilot-scale system at Ohio State's Center for Clean Food Process Technology Development. Consortium members will also have first rights to nonexclusively license all new applications for commercial utilization in their own products, worldwide.

"Access to UST through the consortium is expected to be particularly beneficial for food processors and entrepreneurs who otherwise have limited technical resources to evaluate such novel food manufacturing processes," Ting said.

"Further, this will also facilitate the training of the next generation of workforce with knowledge on various advanced food manufacturing technology concepts," Balasubramaniam said.

To learn more about the consortium, interested food processors can contact Balasubramaniam at 614-292-1732 or balasubramaniam.1@osu.edu. Additionally, they can contact Ting at 253-347-0026 or eting@pressurebiosciences.com.

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