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INNOVATION AND ECONOMIC PROSPERITY UNIVERSITIES
AWARDS PROGRAM

CASE
STUDY
2013

Food Chain Safety

Bringing Food Processing into the 21st Century

OVERVIEW

Food Chain Safety (FCS) was founded at Washington State University (WSU) in 2010 to maximize the impact from over a decade of food sterilization research in the lab of Dr. Juming Tang. Beginning in 1999 with a grant from the US Army and an industry consortium of US food producers, Dr. Tang began a 10-year journey to develop a process that could provide healthy, flavorful, and safe, foods to troops worldwide. This new sterilization process uses microwave heating; a new process with potential to replace the standard centuries-old process of “retorting”, or high-heat treatment of foods with a gentler heating process preserving foods’ flavor, nutrition and texture better than traditional sterilization. The resulting technology has been called “groundbreaking”, and “a tipping point technology” by major international food manufacturers, and is on track to revolutionize the processed food industry.

BACKGROUND

Food and beverage production generated \$850 billion in net sales in the United States in 2012.¹ Processed food, a subset of the food and beverage production industry, uses several methods of sterilization to create safe, ready-to-eat foods for consumers. However, while thermal retorting is the current industry standard for sterilization, retorting causes undesirable changes in the taste, appearance, and nutritional value of the foods. Additionally, the high use of steam makes it one of the most energy intensive operations in the food industry.

In an effort to produce foods of higher nutritional value and improved taste, while potentially lowering the amount of energy needed to create these products, the WSU-based lab of Dr. Tang began doing research on the use of microwave radiation to sterilize foods. After several years of research Dr. Tang’s group was able to validate the use of 950Mhz microwave radiation to sterilize foods. This process not only uses less energy than the standard retort technique, it produces a food of superior quality in almost every category: taste, appearance, and nutritional value.



Creamy Cajun Chicken Pasta sterilized with FCS-developed MATS (L) and conventional retort (R).

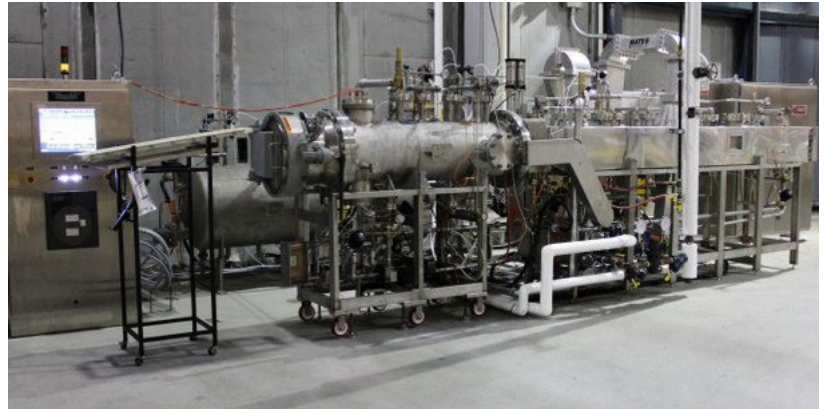
TRANSLATIONAL RESEARCH

As WSU Office of Commercialization began protecting and commercializing the intellectual property generated by Dr. Tang’s research, the Washington State legislature launched an Entrepreneur in Residence (EIR) program. After assessing many commercial ready technologies

1. [Food Industry Overview](#), Plunkett Research. Retrieved 9 August 2013

at WSU, Kevin Petersen—WSU’s first EIR—began working closely with Dr. Tang and his team in helping translate the research program into a robust, profitable, company.

To facilitate the transition, several food processing industry-partners invested in FCS, helping to validate the work, give guidance on its development, and ensure the research was leading to a product that would be accepted, and used, in their industry. This resulted in involvement of more than eight private companies including Printpack, Silgan Plastics, Hormel, Ameriqua, Wornick, Natick Soldier Systems (US ARMY), Kraft (formerly) and five other international food manufacturing companies partnering on FCS’ research and development efforts. The result of these collaborative efforts yielded the first MATS-B (Microwave Assisted Thermal Sterilization) machine, below. Additional R&D is ongoing to continue to refine and improve on the technology. Furthermore, other uses such as pasteurization are being considered for the technology, as well as applications beyond the processed food industry.



MATS-B Machine built by WSU Researchers and installed at a customer.

ECONOMIC IMPACT

Food Chain Safety’s genesis was in a grant from the US Army for \$60,000 to explore radio frequency sterilization. After 10 years of research and refinement and nearly \$4 million in federal follow on funding, FCS was formed in 2010 and remains in Washington State. Over the past four years FCS has raised over \$3 million in private capital from more than eight corporate partners, coupled with \$2 million in grants and gifts from public and private sources. They have employed 15 people (10 at WSU, three at a subcontractor, and two at FCS) and currently support 10 students in Dr. Tang’s lab. This substantive, enduring, and meaningful economic impact came before the company had sold any machines. Once manufacturing comes on-line in late 2013 or early 2014, these numbers will grow significantly.

LINK

www.fcsmats.com