

PoultryTech

VOLUME 32 ♥ NUMBER 2

FALL 2020

Researchers Optimize the Use of Magnetic Nanoparticles to Remove Free Fatty Acids from Rendered Oil

Rendered oil from poultry byproducts is typically used for animal feed. However, the quality of rendered oil products is directly affected by the quality of the starting raw materials. In the case of poultry processing, secondary protein nutrients contain large amounts of free fatty acids (FFAs), particularly after rendering. These FFAs have a deleterious effect on the quality, shelf life, and nutritional value of rendered oils. To combat this, renderers must find ways to remove the FFAs. Hexane is often used to extract FFAs from rendered oil, but it is expensive and suffers from low oil recovery. Researchers with the Georgia Tech Research Institute's (GTRI) Agricultural Technology Research Program have successfully optimized the use of magnetic nanoparticles (MNPs) to remove free fatty acids from rendered oil.

The research team, led by Dr. Daniel Sabo, GTRI senior research scientist, developed the novel extraction method that uses the MNPs to remove the free fatty acids from the oil based on a chemisorption principle. Chemisorption is the process of producing a chemical bond between a surface and any targeted substance that contacts the surface. Sabo's team has shown that FFAs will chemisorb to the MNP surface. Once the MNPs are removed from the oil using a magnet, the FFAs attached to the surface will also be removed, thus lowering the FFA level in the oil.

Initial experiments by the team showed the amount of FFAs captured by MNPs (i.e., adsorption capacity) to be five to 10 times larger than the best currently used adsorbent materials. Since then, researchers have developed a unique method for the production of the MNPs, which enabled free fatty acid removal from volumes of oil up to 1 liter with similar FFA capture levels as initial experiments. According to Sabo, the team's functionalized MNPs are very competitive and continue to demonstrate a significantly higher adsorption capacity compared to the best available adsorbents currently used in industry.

"In recent work, we have focused on optimizing two measures that will drive down the cost of the implementation of this technology, making it an attractive alternative to current FFA removal technologies. This along with a higher quality output product will provide renderers with additional flexibility in terms of market applications," explains Sabo.



Dr. Daniel Sabo, GTRI senior research scientist, and Lance Barrett, GTRI visiting research student (foreground), test magnetic nanoparticles (MNPs) for the removal of free fatty acids (FFAs) from rendered oil. Results have shown the functionalized MNPs provide a significantly higher adsorption capacity compared to the best available adsorbents currently used in industry.

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MANAGER'S CORNER

The Agricultural Technology Research Program (ATRP) prides itself on the breadth and depth of our research initiatives. Our multidisciplinary teams work to develop technology solutions for poultry, agribusiness, and food manufacturing, with an aim of reducing overall development time while still addressing critical industry needs.

Our current full-scale research portfolio includes five projects, of which I am excited to share a brief overview of their focus and goals.



PAA Decay Kinetics led by Daniel Sabo – A primary challenge in managing antimicrobials in poultry chillers is understanding the PAA (peracetic acid) dosing and concentration required for effective intervention under various loading conditions (fat, proteins, and solids). Through theoretical and experimental methods, the team seeks to quantify factors that primarily lead to the accelerated decay of PAA in chiller water under a variety of conditions.

Integrated Wastewater Management led by Jie Xu – Wastewater management requires the periodic capture and analysis of samples to understand how best to deploy treatment interventions. Unfortunately, each sample represents a single “snapshot” in time and does not provide extensive spatio/temporal information about the effluent water stream. The long-term goal of this effort is to develop a reagent-free system to monitor critical parameters (TSS, COD, BOD, TKN, etc.) in situ at adequately high sample rates using a multiplexed interferometric sensor platform, thus enabling adaptive intervention.

Multi-function Sensor System led by Milad Navaei – Cost-effective and rapid sensing of ammonia in live operations has long been a challenge for both poultry producers and sensor manufacturers. Building on their design of a thermal conductivity detector (TCD), the team is developing a solid-state gas sensing system to improve detection limits, selectivity, sensitivity, and survivability. An additional goal is to leverage data analytics tools to better manage the sensor for integration into a whole house controller.

Enhanced Chilling Automation led by Comas Haynes – Thermal cooling using chillers is a primary mechanism for producing top-quality and safe products in poultry operations. In addition to the exploration of higher thermal capacity cooling media, such as ice slurry, the team is investigating the addition of mechanical manipulation to further reduce total chilling time while maintaining quality and food safety.

Growout House Robotics led by Colin Usher – Robotics in live poultry housing environments has become a hot topic. In addition to solving the autonomy challenges associated with operating in live poultry environments, the research team is building a suite of applications for performing tasks such as mortality collection, egg picking (in breeder operations), in addition to environmental and animal health monitoring.

All of these efforts align with our vision of transforming the poultry, agribusiness, and food manufacturing sectors through advanced technologies. The diversity of these projects allows us to continue to address needs across the industry. As always, we welcome suggestions and input on future ATRP research activities. We certainly could not conduct our work without the terrific support of our academic, industry, and government partners. We are enthusiastic about 2021 and look forward to sharing future progress on these and other ATRP research projects. 🍷

A handwritten signature in black ink, appearing to read 'Doug Britton'.

Doug Britton, Ph.D.
ATRP Program Manager

Thermal Conductivity Detector (TCD) for Ammonia Sensing in Poultry Houses

BY MILAD NAVAEEI, PH.D.

Today's trend in the poultry industry is focused on large-scale growout farms where chickens are raised with a commitment to maintaining the highest standards of animal health and welfare. One of the best practices that unlocks this relationship is to keep ammonia and CO₂ levels low to prevent degradation of the quality and quantity of meat production. The economic impact of exposure to 50 ppm ammonia is about 6% catch-time weight loss in a typical 7-week broiler growout and an 8-point increase in feed conversion, which translates to thousands of dollars.¹ Additionally, ammonia exposure may cause skin and digestive system irritation for the humans working in these facilities. Therefore, accurate detection and measurement of ammonia is an ongoing critical issue that impacts both food quality control and labor safety.

The advancement of semiconductor technology that has resulted in the explosion of consumer electronics and the adaptation of low-cost sensors for indoor air monitoring would seem like an immediate solution for this issue. However, research has indicated that these sensors lack the durability and sensitivity required for successful integration into a poultry house environment. This leaves the industry in need of a highly selective, fast response with fast recovery time sensor to operate effectively in this environment. This sensor would also need to be inline and provide alerts when changes in the environment occur. In fact, a durable and dependable ammonia sensing system with the capability to be integrated into the ventilation system opens a new path to smart and efficient ventilation in the

poultry farms and improved energy consumption, resulting in a healthier environment for the chickens.

With this issue in mind, researchers in the Georgia Tech Research Institute's (GTRI) Agricultural Technology Research Program (ATRP) have developed a low-cost multi-function thermal conductivity detector (TCD) that can sense ammonia concentration, temperature, and humidity. The TCD sensing principle is based on joule heating where the resistance of the TCD sensor changes based on the thermal conductivity of the surrounding gas. TCD sensors have several advantages, including non-destructive detection, fast response time, low power consumption, and low cost.

A durable and dependable ammonia sensing system with the capability to be integrated into the ventilation system opens a new path to smart and efficient ventilation in the poultry farms and improved energy consumption, resulting in a healthier environment for the chickens.

In addition, TCDs can be used to detect corrosive gases such as ammonia because of the physical nature of the detection technique, which does not interact chemically with the gas. This advantage prevents base-line drift and the need for frequent calibration and gives TCDs a long shelf life. However, TCD performance suffers from poor limit of detection (LOD) and sensitivity. These limitations could be overcome by changing the working temperature, optimizing the sensor geometry, and implementing a high signal to noise ratio (SNR). The 3 Omega technique is a harmonic technique that excites the sensor with a sinusoidal current, and the resistance change is measured by filtering out the third harmonic of the voltage across the sensor.

Milad Navaei, Ph.D., is a GTRI senior research engineer.



The latest ATRP work is focused on the optimization of the TCD sensor and selection of materials to reduce the residual thermal stress of the sensor due to higher working temperatures. The 3 Omega technique has been implemented to enhance the sensitivity of the sensor and improve LOD detection. Data analytics using deep learning algorithms for large arrays of sensors are also being explored to improve the

reliability and robustness of the detection results. Analysis of the time series data can improve the identification of trends from specific gas species detection.

Deep learning algorithms may also be able to identify changes in the condition of the sensor network, identify changes in calibration, or identify if defective sensors are present. If the adequate LOD and data reliability can be achieved, the same multi-function sensing platform can be adopted for sensing other gases of interest in the poultry industry. This is only one out of many poultry advancements coming from ATRP in partnership with the poultry industry. ♥

¹ Miles, D.M., S.L. Branton, and B.D. Lott. 2004. Atmospheric ammonia is detrimental to the performance of modern commercial broilers. *Poultry Science* 83:1650-1654.

Envisioning the Future of Poultry Production

Each year the Agricultural Technology Research Program (ATRP) funds a number of small-scale research projects. These “exploratory” projects investigate unconventional ideas that, if successful, could lead to significant improvements over current systems and/or processes. As such, the projects seek to tackle the challenge of envisioning the future of poultry production. Nine exploratory projects were funded in FY 2020, which ended June 30. The following briefs highlight research results.

3D Reasoning for Robotic Manipulation

Researchers continued to develop state-of-the-art algorithms that use sensor data to predict a deformable object’s pose and the best way to manipulate it for poultry processing tasks. During FY 2020, they evaluated a deep learning-based approach that takes a 3D point cloud as input and extracts geometrical and color features to perform task-specific predictions based on those 3D features. The integration of the developed components will improve the accuracy of robotics for poultry processing tasks such as cone loading and deboning that require prediction of target point, trajectory, or chicken pose.

Poultry Skinning Process

Researchers evaluated the feasibility of skinning poultry carcasses after slaughter and bleeding using a novel poultry skinning technique as an alternative to the current scalding and de-feathering processes. Four skin-slicing approaches were investigated: front incision, back incision, front incision gas-assisted, and back incision gas-assisted. Initial testing showed each method as a potential alternative. In particular, in the gas-assisted approach, the skin detached from the muscle beneath, making skinning even easier. More work is needed to quantify the force needed to remove the skin as well as address potential further processing issues.

Countering Bacterial Agents at the Cellular Level

Researchers analyzed the volatile organic compounds (VOCs) released from several strains of Shiga-Toxin producing *E. coli*. Testing results identified different VOC

profiles between the strains. These differences can help in differentiating bacteria and identifying the organisms’ growth cycle. However, further testing is needed to characterize each *E. coli* strain during each of the four exponential growth phases and to identify if microbial VOC profiles change when attached to meat and/or skin. Researchers believe the work shows promise for using VOCs in the development of food safety sensors tailored to specific pathogens.

PAA Lifetime in Poultry Chiller Media

Researchers investigated the effect of organic carbon on the concentration of PAA (peracetic acid) within chiller media throughout the processing day. Specifically, they used a standard method for making carbon-loaded water, where PAA concentrations were measured as a function of time. From the data, a half-life of the PAA under different conditions (pH and organic loading) was calculated. Initial results indicate a compounding effect of pH and organic loading on PAA concentration and stability within a chiller, with initial PAA gone within 15 minutes. This indicated PAA may not be at target concentrations as carbon content within chillers increases throughout a processing shift.

Farm Processing and Transport (FPaT) System

Researchers continued to evaluate the suitability, effects on processing, and economic feasibility of using the FPaT system for on-farm bird harvesting and transport tasks. During FY 2020, researchers tested the proposed system’s impact on processing. Initial results showed carcasses had no physical damage during transport, and processing operations at the test facility did not show large deviations in processing parameters such as picking, meat quality, and pH levels between FPaT and traditionally processed carcasses.

Dynamic Laser Speckle Imaging for Detecting Living Bacteria

Researchers continued to investigate a rapid and non-contact imaging system that analyzes time-varying granular or speckle patterns in images to identify

living bacteria. Additional analyses of experimental time-lapse laser speckle images show clear distinction between the presence and absence of bacteria. However, the difference between low, medium, and high concentrations was not discernable, most likely due to hardware and setup limitations. Researchers believe there is opportunity to consider more approaches to data analysis.

Calibration-Free Sensor for Monitoring Ammonia in Poultry House

Researchers developed a proof-of-concept sensor array for real-time and calibration-free monitoring of ammonia concentration in poultry houses. The designed platform contains interdigitated electrodes with a functional layer of single-walled carbon nanotube sensing film deposited on top, enabling high sensitivity in resistance and capacitance sensing. Individual sensors of differing sizes are printed on polyimide, a flexible polymer substrate that can endure high temperature and corrosive environments. Simulation testing showed the signals from the different-sized sensors cross-validate each other, increasing the fidelity of measurements and providing a calibration-free sensing system.

Visual Assessment of Chicken Gait Score

Researchers explored the use of a vision-based algorithm to remove the subjectivity from gait scoring and monitoring poultry welfare. Researchers used 2D video processing techniques to evaluate normal and abnormal chicken gaits data obtained in a commercial chicken house. More than 60 samples were collected and analyzed, showing significant differences between birds with normal versus modified gaits. These initial results are promising in that they confirm the ability to track foot location with high fidelity.

Audio/Video Data Processing Engine

Researchers developed a system that acquires and processes data from audio and video sensors to monitor and document activities. The system supports the management of birds reared in confined environments by providing information for better control of conditions that affect their well-being. ♡

RESEARCHER PROFILE

Marc Zanghi



Job title: Research Engineer I

Education: B.S., Chemical Engineering

Areas of research expertise: Chemical process design and optimization

List of any poultry industry projects you're working on and your role: Phosphorous Removal, Phosphorous Sensing, and Dynamic Filtration. I help develop, design, and improve novel wastewater treatment processes and sensing technologies.

What I find most rewarding about working on poultry industry projects: It is very rewarding to work on projects that will have a direct impact on Georgia and its economy, especially since Georgia has been my home my whole life.

A talent I wish I had: Programming

Another occupation I'd like to try: CNC Machinist

My first job: Dairy Queen worker

If I could meet someone famous, who would it be and why: Neil deGrasse Tyson because I feel like he is the kind of guy who would talk to me about literally anything and still be inspiring and enthusiastic regardless of the topic.

One thing people may not know about me: I'm an avid baker

My day would not be complete without: Coffee

The last book I read: *The Thrive Diet* by Brendan Brazier

The last movie I saw: *Stranger than Fiction*

My favorite song: "Planet Telex" by Radiohead

My motto: The Dude abides.

My hobbies: Golfing, music, cooking, and baking

Researchers Optimize the Use of Magnetic Nanoparticles to Remove Free Fatty Acids from Rendered Oil

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The first measure that was optimized was MNP loading, or the amount of MNPs added to the rendered oils. The amount of MNPs added is a percentage of the weight of the rendered oil. For example, if the oil weighed 100 pounds, a 1% loading would call for 1 pound of MNPs to be added. Sabo investigated five different loading amounts ranging from 0.5% to 5%, with 2% loading showing the best performance of MNPs. Above a 2% loading, there was diminishing returns, in that the amount of FFAs removed per particle decreased. By optimizing the FFA to MNP ratio through loading, the use of excess MNPs is avoided, thus reducing the overall cost of using this technology.

Another cost-saving measure centered on the regeneration of the surface of the MNPs. Regeneration is the process of removing the FFAs and other captured contaminants so that the particles can be reused without needing to be replaced. In terms of determining an optimal regeneration condition, two methods were explored: chemical and physical. Chemical regeneration, which involves the use of a caustic solution, was optimized to reduce the concentration of the solution and the required interaction time. Physical regeneration involves using heat to burn off the FFAs and any other organic material at the particle surface. In this case, 650°C gave the best results, bringing the regenerated MNP surface to pre-exposure levels.

Each method has its own distinct advantages and disadvantages. For example, for chemical regeneration, the process requires separation of the MNPs from the regeneration solution before they can be used; however, it is more energy efficient than the physical method. On the other hand, the physical regeneration method is faster, but requires more energy and additional equipment. "Overall, both methods regenerate the magnetic nanoparticles to pre-exposure levels, so either is usable, ultimately giving flexibility to an end user," says Sabo.

Researchers have also investigated the effects of FFA removal on oil stability. The presence of FFAs in rendered oils causes additional FFAs to form. By being able to capture, attach the FFAs to the surface of the MNPs, and remove them, this FFA formation process can be slowed. Results showed the oil exposed to MNPs can be stabilized for up to 5 months at 50°C with slower FFA formation when compared to control oil samples without MNP interventions.

"Stabilizing the rendered oil system by slowing the formation of problematic FFAs allows renderers the ability to hold their products for longer periods of time without the degradation of their product, allowing them to sell when the market is in their favor. Additionally, the end product will be a higher quality for longer periods of time," says Sabo.

Additional tests also showed that further reduction in FFAs can be accomplished through repeated treatment with the MNPs without a loss in oil quality. The team demonstrated that up to a 3.8% reduction in total FFAs was possible after multiple treatments with MNPs. "After multiple exposures, the oil became cleaner and lighter, and we were able to use fewer MNPs in subsequent treatments with easier separation," says Sabo.

Going forward the team hopes to test the process at pilot-scale levels.

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Dr. Wayne Daley Retires ... Sort Of

Some people retire but don't stop working. That's true of Dr. Wayne Daley.

After 38 years with the Georgia Tech Research Institute (GTRI), Daley retired on June 30, 2020. A Yellow Jacket through and through, he received bachelor's, master's, and doctoral degrees in Mechanical Engineering from Georgia Tech, making him a helluva engineer! He joined GTRI in 1982 as a Research Engineer I, ultimately attaining the rank of Principal Research Engineer and serving as Associate Division Chief of GTRI's Food Processing Technology Division. In FY 2014, Daley was named a GTRI Fellow, a designation that recognizes exceptional research accomplishment and notable contribution to advancing GTRI's mission. Due to the COVID-19 pandemic and event restrictions, a formal retirement celebration has been postponed until 2021.



An expert in computer vision and intelligent systems, Daley led or participated on countless poultry processing and food safety-related projects for GTRI's Agricultural Technology Research Program (ATRP), many culminating in commercially licensed products. A noteworthy seven U.S. patents bear his name. But, he's hardly resting on his laurels; Daley joins the ranks of the RBWs — GTRI's classification for employees who are Retired but Working.

PoultryTech recently asked Daley to take a walk down memory lane, sharing his thoughts on his years at GTRI and what lies ahead.

Q: *PoultryTech* – What was the first project you worked on and your role?

A: Daley – I was part of a team that investigated Alternative Energy Systems for Broiler Housing. We installed and monitored solar and wood heating systems on poultry farms in Villa Rica and Carrollton, Georgia.

Q: *PoultryTech* – What was your favorite project and why?

A: Daley – Working with the team that built the first Farm Computer System that was designed to help poultry farmers monitor and control environmental conditions in broiler growout houses. Most of the work was conducted at the Gold Kist Research Farm in Talmo, Georgia. The farm manager Mr. Rudy Forrester was a soft-spoken knowledgeable man that did not mind working with a bunch of "kids." We were all learning as we went along and had to learn several things the hard way, for example, that lightning and electronics did not mix well. We also had a couple of interesting adventures when the workday was done. Rudy would allow us to ride his horses and took us next door to his neighbor Mr. Blackstock who taught us how to make wine the country way using grapes that he grew. There were many long days and late and restless nights, but we were having fun.

I also enjoyed early work in machine vision and plant implementations. But, most of all, I have pleasant memories of working with people that were not only smart but great human beings here at Georgia Tech, UGA, and in my industry interactions.

Q: *PoultryTech* – What was your "I couldn't believe that happened" moment on a research project?

A: Daley – Well, it relates back to my favorite project above and learning several things the hard way. One day, I came into the office and no one was there. The secretary told me I had to go to Talmo, Georgia. Rudy, the farm manager, had called to say "we had a problem ... our system failed and had led to the demise of many of his birds." The farm computer system we were building had a lightning encounter, which destroyed the control system for the house. It was interesting going to Gold Kist to explain, but Craig Wyvill, the ATRP director, was very supportive and Gold Kist was understanding but asked that we try to avoid a similar problem in the future. The second memorable moment was when a group from our branch led by Chris Thompson won the first-ever autonomous flying vehicle competition.

Q: *PoultryTech* – What was your proudest professional accomplishment at GTRI?

A: Daley – It was both personal and professional — earning my Ph.D. I was the first in my family to do so, and I really appreciated GTRI supporting the effort.

Q: *PoultryTech* – What will you be working on in your current RBW status?

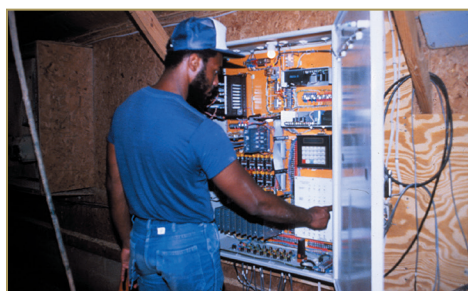
A: Daley – Supporting colleagues Doug Britton, Colin Usher, and Alex Samoylov on development and commercialization of next-generation robotics, automation, and production systems.

Q: *PoultryTech* – Although you are RBW, do you have plans for pursuing anything on your bucket list?

A: Daley – COVID has complicated the situation, but I am hoping to spend more time exploring the Caribbean (I love the clear blue water), visiting friends, and hopefully, listening to more live music ... before time runs out.

Q: *PoultryTech* – Do you have any words of wisdom for researchers just beginning their careers?

A: Daley – GTRI is a great place; be inquisitive, flexible, build relationships with folks in other areas, and seek to leverage technologies. The fun really is the journey — be cognizant of and try to appreciate the now. ♥



Poultry Supply Chains Evolve, and Your Product Traceability Program Needs to Adapt

BY RAFAEL RIVERA, MANAGER, FOOD SAFETY & PRODUCTION PROGRAMS, U.S. POULTRY & EGG ASSOCIATION
REPRINTED FROM THE MAY/JUNE 2020 EDITION OF USPOULTRY'S NEWS & VIEWS PUBLICATION

Poultry supply chains are complex, and their ability to track and trace products from farm to fork can be very difficult. The industry has diversified its distribution channels creating variety in sale points for customers. Tracking product serves several purposes, such as determining demand, analyzing consumer preferences, and importantly, locating product if there is a public health incident. In order to trace product during a public health incident, you need to have tools at your disposal. As your business expands, your food traceability program needs to adapt along with it.

Food recall and traceability programs must comply with:

- Regulations and laws
- Codex Alimentarius (joint FAO/WHO Food Standards Program)
- Good Manufacturing Practices (GMP)
- Hazard Analysis Critical Control Point (HACCP) Principles
- Industry best practices

Food traceability best practices are designed to protect public health and your business in case of a food recall event. Food recalls are a series of actions that remove potentially unsafe food products from the distribution channel, store shelves, and consumers' kitchens. Several things can trigger a food safety investigation that could lead to a recall:

- **Outbreak of illness:** Public health officials identify a potential link between an illness and a specific food.
- **Regulatory inspection finding:** Certain activities (such as visual observations of products and manufacturing practices or analysis of company records) can detect a food safety concern.
- **Consumer complaint:** A complaint about the safety of a food product is reported to the company, the Food Safety and Inspection Service (FSIS), or the Food and Drug Administration (FDA).
- **Recall in another country:** Another country recalls a food

product that is also sold in your country.

- **Other triggers:** These may include information from law enforcement about potential food tampering, trade complaints, information from consumer associations, or even posts on social media websites.

In most situations, a company may undertake a self-initiated recall and subsequently inform its respective regulatory agency of its actions. There are three recall categories defined by FSIS and FDA. These guidelines categorize all recalls into one of three classes, according to the level of hazard involved.

Class I: Dangerous or defective products that predictably could cause serious health problems or death. Examples include food found to contain a pathogen, such as *Salmonella* spp. or *Listeria monocytogenes*, or food with undeclared allergens.

Class II: Products that might cause a temporary health problem or pose only a slight threat of a serious nature. Examples include those listed in Class I but may also cause sporadic or local cases.

Class III: Products that are unlikely to cause any adverse health reaction, but that violate FDA labeling or manufacturing laws. Examples include a minor container defect and/or mislabeling not involving safety instructions or allergen declarations.

As a consumer, news of food recalls is alarming and raises concerns, since there is a possibility of having consumed potentially contaminated and harmful products. For manufacturers, a food safety recall signals a shortfall in internal quality or food safety control processes. It can also cause significant expense, impact long-term financial health, garner negative media attention, and result in the loss of client confidence, all of

which can be difficult to overcome.

Food safety investigations are complex, and several steps are needed to determine if a food recall is required. An investigation should follow three primary objectives:

- Determine which products could be unsafe.
- Track where potentially harmful products have been distributed.
- Determine the root cause of the problem.

Food safety investigations and recalls require training, discipline, and teamwork. A multidisciplinary team is required to gather the necessary information to identify the affected product, remove it from market, and determine the root cause of the problem. Training is necessary so that the investigation teams know their respective roles, can remove products from market quickly, can use investigation and root cause analysis tools correctly to prevent a problem from happening again, and can communicate every new development to the government, customers, and consumers effectively. Practicing potential scenarios develops the discipline and the teamwork that becomes necessary when a real situation arises.

Traceability programs need to keep pace with an increasingly complex distribution chain. Traceability tools, like blockchain, are improving by helping to identify affected products accurately and minimizing the recall of more products, while restoring public safety. Food recalls can have a negative impact to your business. An adequate investigation strategy with training, practice, and execution discipline will protect public health and help businesses recover quickly. ♥



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“Currently, we have successfully removed FFAs from rendered oil volumes of up to 1 gallon. We hope to increase that volume to 10 gallons as our next scale-up goal,” says Sabo. “By scaling up to 10 gallons or more, we would not only be able to show the ability to use MNPs to remove FFAs on a pilot-scale level, but it would provide needed information about the economic feasibility of future scale-up efforts.”

The team also plans to explore additional separation technologies for removing MNPs from oils of varying viscosities. Megasonic separation is a promising removal technique that may enhance separations, perhaps even augmented by magnetic fields, notes Sabo. It has been used on small-scale separation of impurities from olive oil, which means it has the potential to separate MNPs along with other impurities from various types of rendered oil.

“We continue to make great strides in the use of our MNPs for the removal of not only problematic FFAs but other contaminants from rendered oil systems. We are looking to move this technology to testing at the pilot scale to showcase its benefits. Being able to remove FFAs in a method that not only maintains the volume and quality of the oil but also uses a technique that is recyclable will be a huge benefit to renderers and allied industries,” says Sabo. ♥

International Food Automaton Networking (IFAN) Conference Announces New Dates

Due to continued COVID-19 concerns, the International Food Automation Networking (IFAN) Conference has been rescheduled for September 19-21, 2021, at the Georgia Tech Hotel and Conference Center in Atlanta, Georgia. The organizing committee's number one priority is to provide a quality education and networking experience while maintaining the safety and health of all parties involved.

Mark your calendars for the premier conference that focuses on robotics and automation in the food industry, along with new technology trends, industry challenges, and evolving research. Since its U.S. debut in 2016, the IFAN Conference has continued to attract industry thought leaders from food processors, equipment manufacturers, and university researchers from across the globe, including six European countries, the United States, and Australia. The September 2021 conference will cover key topics that have implications for shaping the food system of the future. More details regarding topics and speakers will be shared as the conference program is developed.

In addition to the conference, we are excited to be launching a new initiative specifically designed for the IFAN community. Information on how you can be a part of this new initiative will be shared in the first quarter of 2021. If you are not on the IFAN Conference email list, please send an email to kristi.campbell@gtri.gatech.edu with your contact information so you can stay abreast of the latest information. You may also check for updates on the conference website at ifan.gtri.gatech.edu.

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PoultryTech

Published by the Agricultural Technology Research Program of the Georgia Tech Research Institute, a program conducted in cooperation with the Georgia Poultry Federation with funding from the Georgia Legislature.

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PoultryTech is published twice a year (Spring and Fall) and delivered free of charge to subscribers. To subscribe, visit atrp.gatech.edu/subscribe.html or scan our QR code.



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Corporation, Centennial Research
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