



Ag Innovation News

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BY SHANNON SCHLECHT
AURI EXECUTIVE DIRECTOR

The Strategy of Success

If you read the last issue of Ag Innovation News, you know that AURI is celebrating its 30th anniversary this year, and I feel it offers an extraordinary opportunity to reflect on the past and look to the future. While AURI began as a vision held by the Minnesota Legislature, our on-the-ground-impact has expanded throughout the state and now beyond its borders. As such, I believe it is important for our programs, services, and strategic direction to evolve and grow along with the organization.

To that end, I'd like to share with you some insight into AURI's strategic plan for the coming year. I believe it will offer a higher level of understanding of the organization and its direction.

Recently, the AURI Board of Directors approved a strategic goal, "to align the organization's resources to create the greatest impact for agriculture and the economy." I believe this goal is of the utmost importance for AURI and the state of Minnesota, especially when considering current economic challenges in the agricultural sector. To accomplish this, each of AURI's focus areas created a long-term vision and plan addressing key components needed to positively impact the ag economy.

COPRODUCTS:

The Coproducts staff will support interests from industry and entrepreneurs adding value to agricultural coproducts through product or process development. Specifically, the Coproduct focus area will diligently strive to grow the services AURI provides to clients, stakeholders and industry in the following ways:

- Upgrade Coproduct Pilot Lab and double its workspace.
- Construct a food grade area in the pilot lab upgrade to meet an increasing number of stakeholder and client requests.
- Explore incubator space opportunity for coproduct focused start-up entities.

FOOD:

To support Minnesota's growing food innovation ecosystem, AURI will enhance both its food focus area resources and its influence in the local and national support communities through the furtherance of the following targeted themes: (1) The Nexus of Food, Health and Wellness, (2) Exploring Traditional and Alternative Protein Sources, and (3) Creating an Environment for Scalable Business. Targeted growth areas include:

- Rebuild AURI's meat science expertise.
- Enhance AURI's capability to provide food business modeling guidance to clients and the ecosystem through continuous education.
- Establish a regular presence in the emerging Twin Cities Food Innovation community while continuing its strong collaboration with Greater Minnesota clients and partners.

RENEWABLE ENERGY:

Ongoing collaborative research and development efforts at AURI offer significant opportunity to increase the volumes of commodities utilized in energy related applications. New programs designed to engage the statewide stakeholders are increasingly important to potential new innovative renewable energy projects. Important aspects include:

- Supporting the biofuels industry evolution with fuel processing to more in-depth biorefining.
- Aiding the strategic reinvestment of existing biofuels capital infrastructure into higher value diversified product capability.
- Investigating energy applications for new oilseed cover crops and emerging dual-purpose fiber/protein crops for energy such as industrial hemp.

BIOBASED PRODUCTS:

High value materials can be derived from many agricultural commodities and secondary processing streams. Biobased materials, associated supporting technologies and product applications offer unique opportunities in the Minnesota agricultural economy. AURI scientists and facilities support early stage assessment and development of projects that have the potential to capture these significant new business opportunities. AURI is working on unique public, private industry and internal projects that advance commercialization potential, creating patentable technology that represent innovative value-added opportunities. A few of the areas AURI is actively working in include:

- Biobased component parts for the plant grow-out industry.
- Understanding and supporting sustainable biobased purchasing programs to increase utilization.
- Exploring food waste as a feedstock for biological and thermal processes to generate biofuels and biobased products.

The long-term visions in these areas illustrate opportunities for AURI to help advance commercialization across Minnesota's agricultural value-chain entities. Undoubtedly, the outcomes from these efforts will advance new products and processes, creating new sales and disappearance of commodities, furthering capital investment, and creating and retaining jobs in both rural and urban areas across the state.



BY AURI

This quarter, Ag Innovation News highlights one of its newest board members, Jon Veldhouse. In addition to his role on the Board of Directors, Mr. Veldhouse is also currently responsible for identifying and realizing new business opportunities to grow Cargill's global bio-industrial footprint. Read on to learn more about him, his background and his goals for the future.

AIN

Please tell our readers a little about your background?

JV

I have a degree in Biotechnology from St Cloud State. Following graduation, I joined Cargill in 1999 as a chemist at its Blair, NE corn milling facility, supporting the manufacture of erythritol. In 2001, I spent two years developing biological pesticides with Encore Technologies before returning to Cargill as part of the NatureWorks joint venture to develop lactic acid fermentation technologies. Following my time at NatureWorks, I spent three years in Cargill's Cultures and Enzymes business developing products and processes to support the dairy industry. In 2012, I became Principal Scientist within Biotechnology R&D, primarily focusing on advanced yeast development for the fuel ethanol business. In 2014, I became responsible for the Global Fermentation Technology group and a member of the Global Biotechnology R&D leadership team. Finally, in 2016, I joined Cargill Bioindustrial business as Business Development Manager.

AIN

Do you have experience with value-added agriculture?

JV

My experience spans 18 years on a rural Minnesota farm followed by two decades of experience developing and commercializing new technologies in ag industries. I have had the opportunity to work across the globe with people in academic, start-up, and established companies to bring solutions ranging from biofuels, biopolymers, and biochemicals to value added food and feed ingredients. I have a deep expertise in microbial fermentation technologies and the commercial structure that is needed to bring these technologies to reality.

AIN

Was there a specific reason you wished to join the AURI Board of Directors?

JV

Yes, I am very passionate about the several opportunities for Minnesota farmers and rural entrepreneurs to identify and leverage technologies and business models that can add value to the region's agricultural economy.

AIN

What are your goals as a new board member?

JV

To work with the Executive Director, the Board of Directors and the entirety of AURI to further the mission of creating long term economic benefit for MN through value-added agricultural products.

AIN

What do you want to achieve as a new board member?

JV

To have a positive impact on AURI and be a source of expertise to help enable its mission. I want to make a meaningful contribution to the success of the organization and believe my background can be helpful to advancing opportunities.

AIN

What do you most look forward to in this new position?

JV

Getting to know the people, the strengths and passions of the organization and how I can best support the aspirations of AURI into the future. Technology development in agriculture and the opportunities that await the industry are immeasurable. I am excited to see how AURI enables some of these new opportunities for Minnesota's agricultural commodities.

AURI Drives Demand for **HIGH OLEIC SOYBEAN OIL** in University Foodservice Operations



PHOTOS BY ROLF HAGBERG

While intended to share program results, the event also provided an opportunity for high oleic soybean industry stakeholders, including the United Soybean Board, Minnesota Soybean Research & Promotions Council, Cargill, Calyxt, Minnesota Department of Agriculture and several restaurateurs to discuss the current state of high oleic soybean oil in Minnesota.

BY AURI

Rarely do restaurants and foodservice operators have the opportunity to improve the quality and healthfulness of their products while saving costs, but that's exactly what three universities in Minnesota and Western Wisconsin discovered during a test of high oleic soybean oil conducted by AURI and funded by the United Soybean Board. The test, a key element of a pilot program to demonstrate a model for building grass-roots demand within the foodservice channel, was recently highlighted in a soybean oil innovation session held at The Good Acre in St. Paul.

Commercialization of high oleic soybean oil has been a focus of the U.S. soybean industry for several years. The United Soybean Board, in partnership with Pioneer and Monsanto, developed high oleic soybean oil as a solution to trans-fat labelling requirements and the subsequent ban on partially-hydrogenated oils. High oleic soybean oil, which is naturally trans-fat free, contains three times the monounsaturated fat and significantly less saturated fat than conventional oils, providing high stability in frying applications and extended shelf life in packaged foods. While much of the early promotion of the oil focused on aligning upstream stakeholders such as farmers, processors and oil distributors, AURI recognized an opportunity to help spur demand with end users through deployment of a multi-location pilot program that validated lab testing in real-world scenarios and exposed front-line personnel to the benefits of the oil.

“Laboratory oil studies, where a single food item is fried on a highly monitored, rigid schedule, are hard to make relevant to foodservice operators,” said Dr. Jimmy Gosse, AURI microbiologist in charge of the project. “They don't reflect the variability in products, demand and labor that a foodservice operator faces in their business,” he continued.

Building on an initial frying study with Sodexo and Chartwells, the foodservice providers at the University of Minnesota Crookston (UMC) and Southwest Minnesota State University (SMSU), AURI recognized an opportunity to leverage information and positive results with other universities in the same systems to expand demand for high oleic soybean oil within Minnesota. The hypothesis was foodservice operators would be more engaged in learning about test results from similar institutions than from a commercial, national oil distributor.

AURI recruited three facilities for this pilot program, Riverland Community College (RCC) in Austin, MN; University of Wisconsin-River Falls (UWRF); and Minnesota State Community and Technical College (M-State) in Moorhead. Each location was provided a Testo Meter, a handheld device that rapidly measures oil temperature and Total Polar Materials (TPM), a measure of oil quality, without interruption to frying operations. The simplicity of measurement was critical to the success of the pilot program, as testing could not distract operators during peak times.

The three locations were asked to establish a baseline by testing their current oil on a daily basis from fresh to their typical disposal point, which was often determined by a specific day of the week. The pilot locations were then instructed to change to high oleic soybean oil and take daily quality readings until the point it reached 25% TPM, which is an industry standard disposal point for frying oil.

As anticipated, the high oleic soybean oil outperformed the standard oil used by the pilot facilities. In most cases, it showed potential to last more than twice as long as the standard oil providing the facility an opportunity for cost savings via reduced oil usage and associated disposal costs. At UWRF, where the facility previously used a high-performance frying oil, high oleic soybean oil proved to last a comparable amount of time, offering the opportunity to take advantage of soybean oil's cleaner flavor profile. Furthermore, the on-site foodservice management team recognized the additional benefit of reduced injury risk from less handling of spent oil.

What's more, the test results were consistent despite significant differences in the operation of the three facilities. RCC and M-State are both low-volume operations, frying a mix of products, while UWRF is a high-volume, multi-fryer facility with some fryers dedicated to individual items such as French fries while others are used as mixed-use fryers.

To highlight the results of the pilot program, AURI, along with the United Soybean Board, hosted a High Oleic Soybean Oil Innovation Session at The Good Acre in St. Paul. The event shared details of this initiative as well as the benefits of high oleic soybean oil with local restaurants and foodservice operators, as well as Minnesota food and agriculture industry representatives.

Attendees had an opportunity to experience foods made with high oleic soybean oil. Local chef Shelagh Mullen created fritters featuring vegetables grown by The Good Acre farmers and local food entrepreneur PaSee Yang fried egg rolls in high oleic soybean oil allowing attendees to experience the clean flavor and low oil absorption into the foods fried in the oil. Yang, a food entrepreneur and AURI client said, “In the past, we would fry the egg roll and still see some oil inside, but with this oil there’s no oil inside the egg roll. And, the texture is a lot better.”

In addition, Mullen served rosemary focaccia with high oleic soybean dipping oil and breakfast scones with icing to demonstrate the oil’s versatility in applications beyond frying. Shortening made from high oleic soybean oil, with its high stability and low saturated fat, makes an excellent drop-in solution for bakers looking for options to current shortenings and it is gaining popularity as distribution grows. “It’s really nice to be able to use a different kind of oil other than olive oil for different needs in my kitchen. And to try another oil that has some health benefits is definitely worthwhile,” said Mullen.

To try the oil first hand, restaurateurs and food manufacturers in attendance were offered a ten-gallon sample of one of the commercially available high oleic soybean oils to test in their operation. Additionally, one restaurateur, Mahmoud Shahin, owner of Mim’s Café near the University of Minnesota St. Paul campus, won a giveaway for a year’s supply of oil.

The session was highlighted by presentations from AURI staff involved in the project that shared the universities’ experience moving to this advanced cooking oil, as well as Lawrence Sukalski, a soybean farmer from Southwest Minnesota and USB board member. “The success of high oleic soybeans is important to Minnesota farmers,” said Sukalski. “With the competitive pressures from other oil options, high oleic soybean oil gives the soy industry a product that competes well,” he continued.

While intended to share program results, the event also provided an opportunity for high oleic soybean industry stakeholders, including the United Soybean Board, Minnesota Soybean Research & Promotions Council, Cargill, Calyxt, Minnesota Department of Agriculture and several restaurateurs to discuss the current state of high oleic soybean oil in Minnesota.

As a result of the successful test and the challenges to adoption, AURI is actively seeking to share test results at the regional level of each universities’ foodservice provider to encourage a shift to high oleic soybean oil. Project leaders provided a strategic recommendation to approaching the university foodservice channel and are collaborating with United Soybean Board partners to identify key decision-makers and foster discussions to drive trial and adoption. Driving adoption in a larger number of foodservice settings will positively impact the long-term viability of high oleic soybean oil in Minnesota. Universities purchase oil from the same broadline foodservice distributors that serve local restaurants. As with any distributor, stocking the products with the greatest demand is critical to their success.

Soybeans are a vital crop to Minnesota’s economy with more than 28,000 Minnesota farmers growing soybeans annually. Producing more than 11.5 million tons of soybeans places the state third for total soybean production and contributes more than \$3.3 billion of economic impact to the state. As AURI works to foster long-term economic benefit for Minnesota through value-added agricultural products, supporting development of high oleic soybean oil has immediate positive impact. Compared to commodity soybeans, farmers growing high oleic soybeans capture up to a five percent premium allowing them to improve their bottom line in agriculture’s challenging economic environment.

For more information on the health benefits of high oleic soybean oil, visit:

www.auri.org/2019/04/high-hopes-for-high-oleic/ or www.foodnavigator-usa.com/Article/2018/11/19/FDA-approves-qualified-health-claim-for-high-oleic-oils-and-reduced-risk-of-coronary-heart-disease.

The event provided an opportunity for high oleic soybean industry stakeholders, and several restaurateurs to discuss the current state of high oleic soybean oil in Minnesota.



PHOTOS BY ROLF HAGBERG

Attendees had an opportunity to experience foods made with high oleic soybean oil. The Good Acre farmers and local food entrepreneur PaSee Yang fried egg rolls in high oleic soybean oil allowing attendees to experience the clean flavor and low oil absorption into the foods fried in the oil.

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SIGNIFICANTLY LESS SATURATED FAT THAN CONVENTIONAL OILS,

providing high stability in frying applications and extended shelf life in packaged foods





AURI PUBLISHES REPORT ON GROWING HEMP INDUSTRY

BY AURI

A market for hemp-derived products is emerging in Minnesota, creating a groundswell of excitement and the need for reliable information. In response, the Agricultural Utilization Research Institute (AURI) set out to make sense of the state's burgeoning industrial hemp industry. It did so by producing a comprehensive report, which functions as an overview of the landscape and guide for stakeholders and interested parties.

Titled *Building an Industrial Hemp Industry in Minnesota*, AURI believes this report will help develop commercial markets for hemp products while bringing together growers, economic developers, processors and regulators to identify the hurdles and opportunities hemp presents. The intended result is to help Minnesota's industry capitalize on the market potential.

Already a significant economic force, industrial hemp will continue to yield benefits for those who understand its potential. Therefore, in addition to publishing the hemp report AURI continues to research and develop materials to support the growing industrial hemp industry in the upper Midwest and beyond.

The report's intent is to be a catalyst for continued infrastructure development of the hemp opportunities for Minnesota and networking with existing assets. Because Minnesota has many of the resources to drive innovation with this crop it can provide economic activity that will benefit farmers, business and consumers. Additionally, it identifies several product opportunities for hemp in food, fuel, fiber, feed and cannabidiol (CBD). At the same time, the report identifies emerging pathways for markets in various sectors, potential supply and demand synergies and infrastructure needs necessary to expand markets in Minnesota.

WHAT IS HEMP?



Hemp is often confused with marijuana, which is why the label commonly used to distinguish it from the drug is industrial hemp. While obtained from *Cannabis sativa*, industrial hemp is high in fiber and low in active tetrahydrocannabinol (THC)—the psychoactive ingredient in marijuana. First introduced to North America in the early 1600s, hemp was primarily grown for fiber as a cash crop.

The industrial hemp variety of the plant species is a viable fiber, seed, and dual-purpose crop with properties that are useful for a host of commercial purposes. Its vast potential and versatile nature make industrial hemp a popular commodity for exploration.

In 1937, the U.S. Congress passed the Marihuana Tax Act, which effectively began the era of industrial hemp prohibition. The tax and licensing regulations of the Act defined it as a narcotic drug and made hemp cultivation difficult for American farmers. As a result, it required farmers to hold a federal registration and special tax stamp to continue growing the crop.

Recently, there has been an active movement to legalize industrial hemp production. However, it wasn't until the signing of the 2018 Farm Bill that America saw the removal of hemp from the Controlled Substances Act which allowed the production and sale of hemp and hemp products. Now that legislation has allowed markets to form, research and development of industrial hemp has accelerated. AURI has been at the forefront of exploring industrial hemp's potential and collecting information to build a large and sustainable industry in Minnesota.

That is where AURI's research comes in.

"With growing interest nationwide in the topic of industrial hemp, and due to Minnesota being a great location to grow this plant, we at AURI felt it was only fitting to begin educating ourselves and others on some of the key opportunities and hurdles that could affect Minnesota," said Riley Gordon, engineer at AURI. "The passing of the 2018 Farm Bill shortly after we started working on this, really added confidence to the value of the research and work we were doing to connect with this new industry and identify opportunities for Minnesota farmers and businesses to get involved."

AURI HEMP REPORT SUMMARY

The primary objective of AURI's hemp initiative is to examine and analyze Minnesota's agribusiness landscape and capacity to cultivate a viable hemp industry. The Hemp Report achieves this by contextualizing the state's industrial hemp market and identifying both challenges and opportunities for hemp-derived products on their pathway from conception to commercialization. Work also included identifying supply and demand synergies within the state and necessary infrastructure to grow the industrial hemp industry. This holistic approach of knowledge exploration synthesizes information into a resourceful guide for entrepreneurs and interested business sectors to produce success within the new, dynamic industrial hemp industry.

CHALLENGES

The state's industrial hemp industry has been dormant for nearly six decades, so its revival will require Minnesota to overcome a few challenges. The two significant barriers the industrial hemp industry faces are processing delays and legal/regulatory complexities. Both of these obstacles are factors slowing industry growth and are inherent in any new and developing market. Continued research and innovation by AURI and industry stakeholders will further mitigate these difficulties.

PROCESSING DELAYS

Due to industrial hemp being illegal for decades, there has been little progress in improving processing — how to most effectively and efficiently harvest the crop. There is no universal protocol or agreed upon method of processing, and this lack of uniformity makes a difficult path for commercialization. Equipment for processing is very expensive due to numerous processing methods currently employed. As demand for industrial hemp increases and market acceptance is defined, aligned commercialization pathways will form and its anticipated there will be a reduction in processing delays.

LEGAL/REGULATORY CHALLENGES

The regulatory environment for industrial hemp is complex, controversial and still taking shape. This is due to the infancy of the crop. New legislation and rules are consistently made, amended and vary greatly from state to state. To complicate matters further, industrial hemp has numerous applications and uses in numerous sectors, which requires the involvement of many regulatory bodies and administrations in its production and sale. Oversight and enforcement of these unique policies can hinder efficiency and lengthen timelines. As the commercialization of industrial hemp becomes more

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PHOTOS BY ROLF HAGBERG

Hemp has a diverse variety of applications, offering many opportunities for the industrial hemp industry. AURI identified and analyzed many of them in the process of compiling its new hemp report.

widespread, the regulatory environment will become more synergistic, with industrial hemp stakeholders and its authoritative bodies interacting more cooperatively.

OPPORTUNITIES

Hemp has a diverse variety of applications, offering many opportunities for the industrial hemp industry. AURI identified and analyzed many of them in the process of compiling its new hemp report.

“While several challenges exist in developing the market opportunities due to the infancy of this crop, a wide range of opportunities and entities in Minnesota and the region are enthusiastic and committed to making this a success,” said Shannon Schlecht, executive director at AURI. “Minnesota is well positioned to be a market leader due to the many innovative producers and businesses that reside here and the state’s close ties to Canada where the industry has advanced over its 20 years of legalization.”



FIBER

Hemp hurds and fibers are unique raw materials that have hundreds of potential applications. Businesses in several key industries in the state can benefit from the use of biobased materials made of hemp as an alternative to existing materials.

“The market will continue to grow especially in the CBD area as well as the fiber area,” said Harold Stanislawski, AURI’s project development director. “The feed and human food area has the potential to grow as the feed markets work toward animal feed approvals, and the food market continues to innovate with new products. Hemp food protein is non-allergenic, and non-GMO which gives it market appeal.”



FOOD

Industrial hemp’s seeds and oil content are useful in food production. Hemp seeds offer a high nutritional appeal, containing between 25 to 30 percent protein, insoluble fiber, omega-3 fatty acid and traces of other beneficial fatty acids.

Fresh hemp seed oil can also serve as a substitute for olive oil, walnut oil or butter when stir frying and sautéing meats and vegetables on the stove. Hemp oil also works well as a salad dressing or additive to smoothies or shakes.



CBD OIL

Many in the hemp industry say the CBD Oil sector is the largest growth area for the crop. Consumer demand for CBD Oil is driving development and investment. Industry analysts predict that by 2020 CBD Oil will be a \$22 billion-dollar industry in the U.S. for food, supplements, beverages, medicine and tinctures.



FUEL

Hemp coproducts offer opportunities to the renewable energy market. Hemp flour and cake have high energy content. Hemp hurd pellet fuel blends with other natural fuel commodities such as wood or corn for use in residential or industrial pellet burner systems.



FEED

Hemp coproducts such as hemp cake, hemp hulls, and the high protein hemp flower and stem can provide an excellent source of protein and energy to help support the growing livestock industry.

MOVING FORWARD (WHAT’S NEXT?)

Publication of the hemp report does not mean AURI’s work with farmers, processors and businesses is over. According to industry experts at New Frontier Data, a cannabis market research firm, federal legalization could triple the overall hemp market to \$2.5 billion by 2022, with \$1.3 billion of those sales from hemp-derived CBD products.

The market assessments identified during the research for the hemp report are helpful, but it is also clear that there is a significant need for more research and collaboration in the hemp market.

AURI is committed to working with the hemp industry by providing value-add research, laboratory analysis, business and technical services, and a network of science and business professionals.

“AURI will work with all value-add innovations in advancing the needed infrastructure to buildout this sector,” said Stanislawski. “With only a little more than six months since the passage of the Farm Bill, Minnesota entrepreneurs have already made investments in this industry in the CBD, food, and fiber arena. For example, AURI has purchased a hemp fiber decorticator which will be a valuable asset in advancing the fiber sector and characterizing Minnesota hemp fibers for various markets.”

To obtain a free copy of AURI’s Building an Industrial Hemp Industry in Minnesota,

Visit auri.org/research-reports/hemp/



FILLING THE INFORMATION GAP



AIP

AURI'S PROGRAM CATALYZES INNOVATION

BY AURI

The Latin proverb “fortune favors the bold” may hold some truth, but it’s not a very sound business strategy. Over the course of its 30-year history, AURI and its staff have demonstrated that success in the business world most frequently favors the prepared.

AURI’s Agricultural Innovation Partnership (AIP) program helps entrepreneurs and existing businesses prepare by answering key questions and leveraging the expertise and resources of collaborating organizations.

“The purpose for starting the program was to broaden the community of partners working with us on projects that impact our stakeholders,” says Jennifer Wagner-Lahr, AURI Senior Director of Innovation and Commercialization. “We’re working with others who bring unique assets to the table.”

The AIP program helps catalyze innovation, generate new ideas and support collaborative partnerships that add value to Minnesota’s agricultural products or improve processing efficiencies. The program then delivers applied research studies, guides or tools to help Minnesota businesses use and add value to the state’s agricultural commodities.

This three-year-old program fills information gaps to benefit Minnesota’s food and agricultural sectors through collaborative research partnerships. Information generated through the AIP program is public domain and shared to drive new opportunities for ag product utilization.

“The AIP collaborative’s key objective is to make research results public and transfer opportunities for value-added opportunities to Minnesota entities,” adds AURI Executive Director Shannon Schlecht. “Filling information gaps helps to de-risk topic areas and highlight new investment opportunities for new or existing businesses to further explore.”

“It fits in perfectly with our initiatives and innovative network programs and hopefully puts the wheels in motion for future commercialization services projects,” Schlecht adds.

Food Packaging Guide

Among the projects supported through this program is a Food Packaging Guide to help emerging businesses better understand the requirements and finer points of packaged food. Supported and directed by AURI and the Minnesota Department of Agriculture (MDA), the Food Packaging Guide was developed by the marketing firm Clutch Performance.

David Miller heads up the food marketing efforts for Clutch Performance, having been involved with packaged goods marketing for several large companies.

“It’s easy to start a food business,” Miller contends, “but it’s difficult to grow from serving farmers markets to regional or even national distribution.”

Miller says packaging involves much more than simply serving as the device that delivers food products to consumers. Businesses face several major considerations when aiming to grow their packaged food products distribution.

Packaging provides food protection and safety. Miller says proper packaging helps maintain desired product shelf life, physical integrity, and maintains consumer trust that the product they’re buying is safe.

“Entrepreneurs often think about packaging in terms of what they want it to look like, but the important decisions around packaging are often more functional,” Miller explains.

Those functionalities include safety seals, tamper-evident packaging as well as moisture protection.

Food packaging also provides product protection through the supply chain. Hand delivering products to local markets is simple for entrepreneurs, but when markets grow to larger distribution, Miller says food businesses must understand that primary and secondary packaging needs to satisfy the entire value chain including distributors, retailers and end users.

Store shelves are crowded spaces. Miller says food packaging must catch a grocery store consumer’s eye in five seconds from five feet away. In addition to required packaging elements like nutrition information, food packages serve to differentiate products in a crowded marketplace. Ensuring the finished, packaged product delivers the intended message to effectively compete in the retail space is a careful consideration.

Miller believes knowledge of the food industry is valuable for start-up companies working in the packaged foods world, because it can be a challenging endeavor.





AGRICULTURAL INNOVATION PARTNERSHIP

“If some entrepreneurs knew what it would be like getting into the food business, they probably wouldn’t take step one,” Miller adds. “I applaud those who succeed because it can be tough sledding.”

Resources like the Food Packaging Guide smooth the path for Minnesota businesses by harnessing available resources.

“A strong spirit of collaboration exists among groups that are trying to push the ball forward,” Miller says. “We’re delivering something to the small entrepreneur that can help them move up the value chain in this big machine of packaged goods.”

The Food Packaging Guide is available for download on the AURI website at www.auri.org.

Sourcing Local Ingredients

Many food companies look to differentiate their products and support sustainability by sourcing ingredients locally. AURI and the MDA partnered with Renewing the Countryside to develop a resource connecting food companies with local ingredient suppliers.

“The idea is to create a compilation of suggestions and resources for manufacturers to consider,” says Elena Byrne with Renewing the Countryside. “As they’re finding sources for ingredients, they’re building their company.”

Renewing the Countryside partners in the FEAST! Local Foods Marketplace event which encourages local sourcing among the food manufacturer sector. As part of the FEAST! event, Byrne says she’s witnessed food companies trying to make connections with potential ingredient providers—with varying degrees of success.

“We’re always thinking towards how we, as service providers, can help make that local sourcing more possible,” Byrne explains. “We’re aware of many instances where exhibitors made connections at the FEAST! event that helped them increase their local sourcing and jumped at the chance to create a focused effort. We became aware of barriers as they come up incidentally, but the project gives us a chance to compile them alongside correlating factors such as scale, ingredient category, food sector, certifications and more.”

Byrne says the local ingredient sourcing project considered the available data pool by sector, knowing that different types of ingredients are subject to different standards for variables like shelf life, temperature and handling. It was important to understand the effect of scale and the system for sourcing locally.

“We wanted to discover who successfully sourced local ingredients, how they found those sources, how they handled barriers, and how they managed the process, as well as who was not able to source locally, and what those reasons or barriers were,” Byrne says.

Byrne says there is an opportunity for food companies to source more local ingredients, but the factors, including economics, can

be complex. Byrne says price/cost will always favor direct sales of agricultural products because that carries a higher margin compared to selling to a food manufacturer. Those companies will add further processing, packaging, and branding while also trying to keep final cost and retail price as low as possible.

Byrne adds that manufacturers require efficiency, which can cause them to buy from distributors, and can also mean they purchase product after it’s undergone some type of intermediate processing.

Byrne says having the full weight of the MDA and AURI, both of which aided hundreds of companies, helped in the project research protocol.

“AURI helped provide insights on research tools like our local sourcing survey and contributed suggested subjects for focus groups and interviews,” Byrne states. “Also, with multiple organizations interested in the study’s outcomes, there is extra confidence that this research will make a difference.”

Once complete, the sourcing guide will be available from the AURI website.

Working Together

The resources developed through the Agricultural Innovation Program are valuable for the state’s agriculture and business communities. However, the collaboration involved with putting these resources together is also extremely important.

Schlecht says AURI develops its priority research areas for the AIP program by getting input from key stakeholders. Bringing those resources together provides a broad perspective on the issue.

“When mutual interest areas align, collaborations are created and dollars are further leveraged to help meet shared objectives,” he says. “A collaborative approach ensures AURI is meeting an industry need and further leverages resources to generate ideas that can result in new commercial opportunities.”

“None of us have huge money trees, so by working together, we can leverage financial resources and connections,” says Renewing the Countryside Executive Director Jan Joannides. “By being connected, we can pull resources together and come up with solutions.”

Wagner-Lahr says the collaborative projects are working very well and AURI is pleased to work with top notch organizations. By bringing mutual interests and diverse expertise together, the end result is a resource to support value-added agricultural businesses.

Organizations or individuals who are interested in partnering with AURI or want to stay abreast of future requests for proposals can contact Jennifer Wagner-Lahr at jwagner@auri.org.

AURI Upgrading Facilities

BY AURI

In an effort to meet current client needs and expected growth in the food and agriculture sectors, AURI is implementing a number of upgrades to its laboratories and facilities. Specifically, the centers in Waseca and Marshall, Minnesota will undergo significant additions and extensions to increase both capacity and capabilities.



WASECA

AURI's Coproducts Pilot facility is already a unique resource for entrepreneurs in the upper Midwest. It offers a variety of technical and scientific services for those who wish to develop a value-added product based on existing agricultural byproducts and residues, however those services are about to expand significantly this fall.

First, the Waseca lab is expanding into a second facility, which will house a new fluid bed dryer. This new space and resource will offer clients the capability to receive accurate and informative baseline drying information for various feedstocks. Additionally, AURI expanded its dewatering capabilities by obtaining a new mechanical screw press to remove water mechanically versus thermal drying only for research comparison purposes.

"Because many agricultural coproducts contain high levels of moisture, adding value to them often requires the removal of water for stability and transportation," said AURI Coproducts Scientist Alan Doering. "These new equipment additions will allow us to provide service to a wider variety of clients using agricultural coproducts."

However, the most exciting addition to the Waseca facility will be the addition of a pilot-scale decorticator to mechanically separate plant fibers. This piece of equipment will expand AURI's capabilities in the areas of hemp fiber and flax straw processing and is believed to be the only research and development piece of equipment of its kind in the Midwest.

MARSHALL

Beginning this November, AURI's Marshall site will expand to include a product evaluation center, paid for in part with bonding dollars from the State of Minnesota in partnership with the Minnesota Department of Agriculture. This is an important and unique addition to the facility because it can help food entrepreneurs with a key step in obtaining some basic feedback for developing their food products.

Sensory testing is an important step in the development of new food products. Regardless of price point, packaging or consumer awareness, the product needs to have good sensory attributes which include appearance, taste and texture. If the product has off flavors or other negative attributes, consumers will not purchase (or re-purchase) it. By utilizing this new facility, food businesses can learn early-on from potential consumers and address their sensory-related concerns prior to commercializing their new product.

"This is a major benefit to food businesses as it can speed up the development process and streamline the process of taking a new food product from idea stage to full commercialization," said Lolly Occhino, AURI's scientist of food & nutrition. "This, in turn, saves financial resources and increases the chances of success for the new product in a very competitive marketplace."

To learn more about either of these facilities and their recent upgrades, contact AURI at 218.281.7600 or online at auri.org.

BY AURI Editor's note: As a service to our readers, we provide news about the work of others in ag utilization. Often, research done elsewhere complements AURI's work.



Building up an appetite for a new kind of grub

The rapidly changing climate and expanding global population are serious risks for worldwide food security. Edible insects have a high nutritional value and significantly lower carbon footprint compared to meat production and are a viable option as a sustainable source of protein. Despite this, edible insect cultivation remains rare in Western countries, where people consider them unusual sources of nutrition.

In a new study, researchers from the University of Leeds and University of Veracruz in Mexico reviewed current insect farming methods, processing technologies and commercialization techniques, as well as current perceptions towards entomophagy -- the practice of eating insects.

Approximately two billion people around the globe regularly eat insects although research on the subject is relatively new. The 'ick factor' remains one of the biggest barriers to edible insects becoming the norm. In some European countries consumers, particularly young adults, have shown interest in new food products that use insects in un-recognizable form, such as flour or powder used in cookies or energy drinks.

In Western countries it is the younger generation that show more willingness to try new food products, including edible insects. The 'foodies boom' and the rise of veganism and flexitarians have opened the door to alternative food sources.

Compared to meat production, insect farming uses much smaller amounts of land, water and feed, and it is possible to cultivate them in urban areas. Insect farming also produces far fewer greenhouse gases.

Improvements to edible insect farming and processing techniques could also open the door for increasing the use of insects for other purposes. Chitin extracted from certain insect exoskeletons has the potential for use in food preservation. It also has a number of industrial applications such as surgical thread and as a binder used in glue. Food is only the tip of the iceberg for insects' sustainable potential.

Science Daily



Managing the ups and downs of coffee production

Each day, people consume more than 2 billion cups of coffee worldwide.

Developing countries produce about 90% of the beans used to make all those lattes, espressos and mochas. That makes coffee a key source of revenue and livelihood for millions of people worldwide.

But coffee plants have up-and-down yield patterns. Years with high yields are often followed by years with low yields and vice-versa. This alternating pattern of high and low yields is called the "biennial effect."

The biennial effect makes it challenging for coffee breeders to compare yields from different varieties of coffee. Without accurate measures of yield, breeders cannot know which varieties of coffee would be most useful for farmers to grow.

In a new study, Indalécio Cunha Vieira Júnior and colleagues outline a computational model that compensates for the biennial effect in coffee. This model reduces experimental error and increases the usefulness of data obtained from field trials. In turn, the model directly impacts the quality of coffee varieties supplied to farmers.

The new model could also help farmers improve yields. Using information from the model, farmers could tailor cultivation strategies to individual plants. Effective management of growing conditions directly impacts harvest quality and yields.

The study also yielded some unexpected results. Researchers discovered that the biennial effect in coffee doesn't follow a well-defined pattern, as previously thought.

The new model also allows researchers to determine why individual coffee plants may have high or low yields each year.

Some coffee plants with high yields may belong to high-yielding varieties. However, the plants of high-yielding varieties may produce low yields during recovery years.

Cunha and colleagues used a computer simulation to test the effectiveness of their model. "The simulation allowed us to confirm our findings on real data," says Cunha. It also helped researchers test conditions in which the model performed well and when it ran into difficulties.

Cunha is now trying to incorporate more genetic information into the current model. This would allow researchers to study genetic control of the biennial effect. Understanding the genetic basis of the biennial effect could be very useful. For example, it might allow breeders to identify coffee varieties with more uniform yields across multiple years.

Coffee isn't the only crop to show biennial effects. Apple trees, for example, also exhibit biennial effects. Findings from Cunha's work could also apply to these other crop varieties.

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AURI ASKS FOR YOUR PARTNERSHIP

BY SHANNON SCHLECHT

Farmers and ranchers are facing some difficult challenges today, ranging from commodity prices to export markets to weather and more.

AURI and its staff of experts actively work to address low commodity prices and new market opportunities. It accomplishes this by helping develop new, value-added solutions in collaboration with state entities and private entrepreneurs to increasing awareness of existing value-added products that have commercial potential.

I'm proud of the work AURI has done for Minnesota over the past 30 years and am thankful for the Minnesota Legislature's ongoing support of this work. But today, we need your help to make our efforts go even further!

If you've read my article at the beginning of this quarter's Ag Innovation News, the article on AURI's Ag Innovation Partnership program, or the Seeing Around Corners column, then you understand AURI has big aspirations to benefit the entirety of the state and further its impact. However, to accomplish these goals in as short a time as possible, we need resources and help.

That's why, beginning this month, AURI is launching a fundraising campaign to help bring additional benefits to Minnesota agriculture and communities throughout the state. And by participating in this campaign you can help AURI develop opportunities to the challenges faced by our friends and neighbors in the food and agriculture sectors.

In fact, your partnership is crucial to our efforts in acquiring new equipment and resources, which enables us to offer a wider set of services and solutions to those we work with in developing new value-added products.

That's why I'm asking you, our dedicated reader, to donate today. If you believe in the work we are doing and the positive impact value added innovations bring to the agricultural industry, then please consider supporting us by giving even a small amount of \$10 this year. Donating is easy, all you have to do is visit our Give to the Max donation portal and with a couple of clicks, you will have made a meaningful contribution to AURI's efforts.

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