Ag Innovation News

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25 years of bringing agricultural innovations from idea to reality

Pages 6-7

PHOTOS BY ROLF HAGBERG

resource assisted good new

From excellence to economic impact

BY AMANDA WANKE

For 25 years, AURI has been an essential resource for businesses and entrepreneurs in Minnesota, helping with the development of new and improved products and processes. From research and development to market development and networking resources, AURI staff have helped numerous Minnesota businesses so that those businesses can grow Minnesota's economy, strengthen rural and urban communities and create new jobs. Read what just a few clients have to say about AURI's assistance.

"AURI researchers think

outside-the-box

very well and their exposure to a wide variety of agricultural related industries gives them both a depth of knowledge and a breadth of knowledge that is valuable to utilize."

Vincent Copa,
Chippewa Valley Ethanol Company

"AURI's services cannot have a dollar value placed on them… When I tell people I worked with AURI for product development, they have a stronger sense of security in working with me. I am not sure I could have continued without them. This is the kind of government program that should be expanded, because this is the kind of program that does

nothing but good."

Katie Sanchez,
RAES Foods, Inc./Bee Free Honee

"We learned, with the assistance of AURI, the best-case scenerio for developing our

new business

in terms of the optimum manufacturing process, setup and implementation.

Eric Kriedemacher,
Alternative Energy Solutions

Outcomes

$414,000,000
of capital investments

$218,000,000
in non-AURI dollars for new projects

281,000*
tons of commodities used

**Results of AURI's work in just eight years of the last 25, with only 16% reporting. It can be assumed that actual impact is even greater.*

"Growan Energy is very grateful for the partnership with AURI. The partnership has allowed us to move our innovative biodiesel technology towards commercialization faster than we could have done on our own…..It has been a very

valuable partnership

and we hope the relationship will continue."

Jerad Poling,
Growan Energy

"The process of taking a 'good idea,' to developing a great product, to selling at retail is a very time-consuming process. AURI's staff and resources

have assisted

with most stages of development including: R&D, market development and technical analysis required for our new facility.

Rob Fuglie,
Fergus Foods LLC, maker of Nots! Snacks

"At the time of our first encounters with AURI, we had nothing but an idea and some brief conversations with pelleting industry people…AURI helped us through the

discovery phase

of technology testing, formulation optimization and commercialization testing. We would not be at the stage of development we are without AURI."

Brian Caldwell,
American Biolabs

"AURI has given us the ability to pursue projects and technologies outside of our core business. They are a

great resource

helping us develop byproduct streams into additional value-added products. Their experience and network in Minnesota has enabled us to reach further outside our locale to new markets, ideas and customers."

Aaron Bjerke,
American Crystal Sugar

AG INNOVATOR

BY JONATHAN EISENTHAL

More than a **decade** of the AURI Ag Innovator Award

For more than a decade, AURI has recognized those businesses and small entrepreneurs who have excelled in innovation with its Ag Innovator of the Year Award. To look down the roll of honorees is to see inspiration and invention. Often these businesses take something that's waste, or a product that's undervalued, and transform it into something of great value and a sought-after product that generates sales and jobs. There is also the willingness to take risks—one award winner is no longer in business, and another never saw its project come to full fruition. But this spirit of entrepreneurship, and the risk-taking that goes with it, is an important part of creating an innovative culture.

PHOTOS BY ROLF HAGBERG

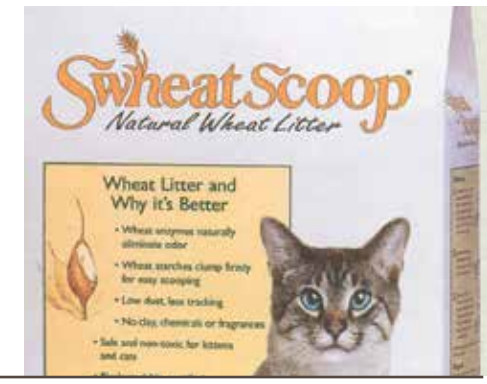
2002

Pet Care Systems

Swheat Scoop, a renewably-sourced cat litter, was initially made by Pet Care Systems—now part of Farmers Union Industries.

"Our product is all natural, because it's 100 percent wheat," says Tom Moses, director of operations for Pet Care Systems, located in Detroit Lakes, Minnesota. "The natural side of the market is growing, and we're positioned to take advantage of it."

"AURI and their laboratories have been instrumental in improving the cost factors of the product," explains Farmers Union Industries' Chuck Neece. "They have worked on the processes that impact the efficacy of the product, tightening down quality control specs, so the product became more consistent for the consumer."



2003

Mississippi Topsoils

What's better than turning a sow's ear into a silk purse?
How about turning chicken processing plant waste into rich garden soil?

Mississippi Topsoils, located in Cold Spring, Minnesota, takes the protein-filled waste—a substance called secondary activated biosolids—from GNP Company, makers of Gold'n Plump Chicken, and turns it into a consistent, high-performing soil amendment marketed under the trade name "Soil Essentials."

"The innovation in our approach comes in the use of a non-traditional method of composting, called an in-vessel containerized compost system," says Brad Matuska, who founded the company with Math Miller. Each year, Mississippi Topsoils makes 3,000 cubic yards of Soil Essentials.

"The biosolids proteins from the chicken plant are of an extremely high quality," Matuska says. "To take concentrated centers of organic waste materials and make it into a value-added product just makes a lot of sense."

2004

Minnesota Soybean Processors

The farmers who formed the board of Minnesota Soybean Processors (MnSP) in Brewster in 1999 immediately joined an effort to convince the Minnesota legislature to support a new, greener form of fuel called biodiesel. It's now a 63-million gallon a year industry in the state.

MnSP is a cooperative owned by 2,400 farmer-members. It has the capacity to crush more than 100,000 bushels of soybeans and produce 100,000 gallons of biodiesel each day.

In addition to AURI's initial work with MnSP on biodiesel, AURI recently performed a feasibility study looking at a potential glycerin refinery for the co-op. Currently the MnSP sells its crude glycerin, a byproduct of biodiesel production, as an animal feed additive, or ships it to refineries in Chicago to process it for use in dozens of products.

awards continued on page 4

awards continued from page 3

PHOTOS BY ROLF HAGBERG

2005

SoyMor

In 2005, SoyMor opened as the nation's largest biodiesel manufacturing facility and the second to be built in Minnesota. The refinery has the capability to produce 30 million gallons of biodiesel per year from soybean oil, processing 3,150 gallons per day from 1,700 acres worth of soybeans — for an annual total of about 18 million bushels of soybeans.

The company was idled in 2008, but was purchased in 2011 by Renewable Energy Group, the nation's largest biodiesel producer, resulting in 20 new jobs at facilities in Albert Lea, Minnesota. In October 2012 the company announced that it would embark on a $20 million dollar upgrade to the Albert Lea plant to accommodate multiple feedstock sources to produce biodiesel. That upgrade was completed in August 2013. Today the southern Minnesota plant continues to produce biodiesel for customers in Minnesota and also ships it to other markets in the US.

2006

FUMPA BioFuels

FUMPA BioFuels (part of Farmers Union Industries) was one of the pioneers of Minnesota's biodiesel industry. Organizers began the process of setting up the plant and getting all the necessary certifications in order to help launch Minnesota's 2 percent biodiesel mandate in 2005.

"The Minnesota Legislature had passed a 2 percent biodiesel requirement for all the diesel supply in Minnesota, but, in order for the requirement to kick in, there had to be a certain level of in-state production," recalls Chuck Neece, the director of regulatory compliance for Farmers Union Industries. "Our plant was first, followed by two others."

The biodiesel production part of the company wrapped up in 2010, but Farmers Union Industries (FUI) continues to diversify and prosper and has brought 350 jobs to Minnesota communities including Detroit Lakes, St. Cloud, Redwood Falls and Long Prairie.

Learn more about AURI's work in biodiesel on page 6.

2007

USA Solutions

"I was in the hog business for 25 years before launching USA Solutions," remembers Darryl Metcalfe. "No matter how hard you tried you couldn't get the rubber mats clean enough, and it caused health issues. I was working with the veterinarians one day, and they commented that the industry could really use a disposable mat to start with a fresh, clean one each time. I just ran with the idea."

Metcalfe and and his business partner Tony Schmitt designed a mat made from pressed corn stalks and wood products for use in farrowing barns, to replace the rubber mats, explains Metcalfe. "It's designed to be broken into small pieces and fed back to gilts (female pigs prior to breeding and farrowing)."

The mats are made in Minnesota and Wisconsin and sold across the US and Canada. "Without AURI we probably would not exist," says Metcalfe of AURI's assistance.

2008

Northern Excellence Seed

Grass grows well in northwestern Minnesota. Being a turf seed producer like Northern Excellence Seed still means being choosy, though. It rejects about 20 percent of the seeds coming through its plant for conditioning.

Instead of treating this biomass as waste, Northern Excellence became excited by the promise of biomass gasification as a form of electrical generation. For its engagement in the development of this potentially important source of energy for rural Minnesota, AURI recognized Northern Excellence Seed with its Ag Innovator Award.

"This was a cutting-edge thing, and we put a lot of time and effort out there," explains Brent Benike, the general manager of Northern Excellence Seed, who is both proud of that effort, and disappointed by the fact that the project never came to full fruition because other partners in the process stepped away.

Despite the disappointment, Northern Excellence remains strong in its forte: perennial rye grass, timothy and other turf seeds for lawns, roadside mixes, golf courses and sod contractors.

2009

Alternative Energy Solutions

Diversification is clearly a deeply held value at the Kreidermacher Farm in Altura, Minnesota. The farm is home to a heritage hog operation, a greenhouse/nursery retail company and a biomass energy pellet manufacturer.

AURI recognized the pellet business, Alternative Energy Solutions, for being a pioneer in renewable home and commercial heating. Owned by siblings Eric, Paul and Maria Kreidermacher, the company manufactures fuel pellets from a combination of native grasses, wood and agriculture residues. The Kriedermachers also serve as dealers for biomass-capable boiler heating systems.

"Being a greenhouse grower in a northern climate means heat is one of our main expenses," explains Eric Kriedermacher. By using the biomass pellets to heat their 65,000 square-foot greenhouse, Kreidermacher estimates they save between 50-60,000 gallons of propane. AURI worked with the Kreidermachers to develop the dies and die-specs needed to produce the fuel pellets and to configure the milling system.

PHOTOS BY ROLF HAGBERG

2010

Suntava

Twin Cities-based Suntava regards its proprietary hybrids of purple corn as a treasure trove of healthful food ingredients, from a natural red colorant, to milled components for everything from snack bars to cereals. The company also has plans to announce a groundbreaking neutraceutical.

"The key ingredient in our purple corn is anthocyanin, which is both a natural ingredient and an antioxidant, with twice the antioxidant capacity of blueberries," says Bill Petrich, CEO of Suntava. "Our purple corn is traditionally bred, not genetically modified. We have meticulously hand-bred our corn to get it to grow in the northern tier of the Corn Belt, and we continue to make improvements each year on our hybrids, each geared to different uses."

Another recent addition to Suntava's product list is nectar, a slightly sweet extract that can be used as a binding agent for snack bars, or as an ingredient in jellies and jams. Beer lovers fear not—one beer based on Suntava's purple corn extract has launched and another will offer its brew by the end of the year.

2011

North American Fertilizer

FibroMinn burns about 700,000 tons of poultry litter collected from local farmers to produce 55 megawatts of power. The ash from the plant travels a 500-foot conveyer over to North American Fertilizer. Once there, North American Fertilizer takes the ash—which already contains a rich, well-balanced package of macro and micro nutrients—and processes it into fertilizer. It is the only operation of its kind in the United States, and only the second in the world.

While North American Fertilizer employs just four people to run its operation, "there's a trickle-down effect, in that the product goes out to dealers and supports lots of folks involved in the fertilizer and input business," says Steve Miller, the general manager of the plant. CEO Randy Tersteeg started up the business seven years ago.

"What keeps North American Fertilizer vital is that we continually look for value-added markets—new uses for this package of nutrients," explains Miller. "In that way we can grow our revenue for it."

Read more about North American Fertilizer on page 7.

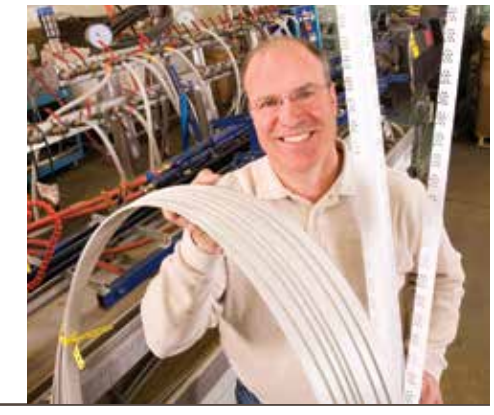
2012

Bio-Plastic Solutions

After years of development, this Blooming Prairie, Minnesota-based custom plastic extruder is now commercializing its products for the building and trades, and medical industries.

"Over the past 13 years we have been working with various organizations, suppliers and partners, to develop bioproducts from durable bioresins," said Gary Noble, founder and CEO/president of Bio-Plastic Solutions. Bio-Plastic Solutions, which employs 13 people, takes raw material derived from corn, called Polylactic Acid, or PLA.

"We buy the raw material from NatureWorks, then we alter it and compound it to the specs we need for the performance we are after," said Noble. "AURI is helping us to perfect our polymer blend. We're also working with soybean-based polymers, and we're branching out to organic fibers like straw and inorganic material such as glass or crushed rock."



2013

Protein Resources, LLC

Soybean meal, while an excellent animal feed, still can't be fed to a whole range of animals as soluble sugars in soybean meal are very disruptive to the digestive tract of baby pigs and carnivorous fish, in particular. That's where Protein Resources, LLC, saw an opportunity to innovate and provide a feed ingredient that the market has been waiting for.

"We felt that the market was looking for a soy-based, high-protein feed supplement that could be used in a variety of applications such as baby pig diets, poultry, aquaculture, and possibly several other formulations," says John Pollock, president of Protein Resources, LLC.

Nutrivance, the brand name of the product, is headquartered in Marshall, Minnesota.

Read more about Nutrivance on page 6.

2014

EarthClean Corporation

The EarthClean Corporation is being honored in 2014 for their work in creating an environmentally friendly fire suppressant using corn and soybeans.

The company creates TetraKO, a biodegradable water enhancer that changes plain water into an adhering gel that knocks down fires faster than water or foam—without harming the environment or wildlife. TetraKO also increases firefighter safety and decreases firefighting costs.

Watch for more about EarthClean in a future edition of *Ag Innovation News!*

From idea

HOW AURI DEVELOPS NEW USE

BY LIZ MORRISON

Start with good ideas. Research their commercial potential. Get that research into the hands of entrepreneurs who can run with it. Follow up with hands-on technical assistance to bring innovations to market.

For 25 years, this has been AURI's approach to commercializing new value-added agricultural products.

It starts with the "initiative" phase, where new ideas are generated and tested. Each year, AURI organizes more than 50 meetings with Minnesota farmers and the ag processing industry to identify needs and opportunities in four core areas: food, renewable energy, coproducts and biobased products. "This is one of the things that makes our approach unique," says Michael Sparby, AURI senior project strategist. It ensures that "we are doing research that addresses real needs and current issues," adds Al Doering, AURI coproducts scientist.

Promising ideas advance to the applied research stage, which is often done in collaboration with other research partners such as the University of Minnesota. For example, in AURI's early years, an oversupply of soybean oil, along with growing interest in renewable fuels, offered an opportunity for soybean growers: biodiesel. AURI's research on biodiesel processing laid the foundation for a new Minnesota industry, now generating over $900 million in economic activity.

In the next phase of development, "dissemination," AURI puts the applied research results into the hands of entrepreneurs and businesses who can use it. "We don't want our research just sitting on the shelf," Sparby says. AURI's biodiesel processing work, for example, led to a practical handbook on how to build a biodiesel plant. "Lots of people wanted to know how to do it," says Mike Youngerberg, senior director of field services for Minnesota Soybean. The research not only guided three successful Minnesota ventures, but also "kept some people from making biodiesel investments that weren't right for them," Youngerberg says.

In the final phase, "commercialization," AURI provides contacts with industry experts, plus hands-on technical assistance. Product testing, processing and plant design, materials sourcing and pilot lab access are just a few examples. As Minnesota biodiesel production geared up, for instance, AURI provided quality control expertise when plants didn't yet have their own specialists.

AURI can come in at any stage of this journey, Sparby says, and is often a partner throughout the entire process. Here are three examples of how AURI helped entrepreneurs take innovations from idea to reality.

Renewable fuel from soybean oil

Product:
Biodiesel, a transportation fuel made primarily from soybean oil

Initiative:
In the early 1990s, a huge glut of soybean oil drove a nearly two-decade-long effort to develop a major new use for low-value soybean oil. Working together, the Minnesota Soybean Growers and AURI laid the groundwork for Minnesota's biodiesel industry. AURI fats and oils chemist Max Norris and scientists from the University of Minnesota Center for Diesel Research evaluated and refined biodiesel processing technologies.

Dissemination:
AURI and the Minnesota Soybean Growers put together the first practical guide to commercial biodiesel production, called "So You Want to Build a Biodiesel Plant." The handbook analyzed the economics of biodiesel production and offered guidance on permitting, infrastructure requirements, processing plant design, equipment and feedstock sourcing.

In 2002, the state required diesel fuel sold in Minnesota to contain at least 2 percent biodiesel, creating a market for the renewable fuel. Commercial biodiesel plants were built in Albert Lea, Brewster, and Isanti, Minnesota, with a combined production capacity of about 63 million gallons of fuel. In July 2014, Minnesota became the first state to mandate a 10 percent biodiesel blend.

Commercialization:
In the early days of biodiesel production, fuel quality issues were common. AURI scientists served as technical advisers to plant operators, assisted in setting up a biodiesel "help line," tested fuel quality and created a quality assurance program.

AURI continues to play an important role in the biodiesel sector, developing and testing new uses for glycerin, a biodiesel coproduct.

2

years of bringing innovations from

to reality

ES FOR AGRICULTURAL PRODUCTS

PHOTOS BY ROLF HAGBERG

Easy eatin' soybean meal

Product:
NutriVance, a high-protein soybean meal, produced by Protein Resources, LLC, a joint venture of Midwest Ag Enterprises of Marshall, Minnesota, and TechMix of Stewart, Minnesota

Initiative:
Livestock feeders were looking for a high-protein, low-fiber feed to replace expensive fish meal in livestock rations.

Standard soybean meal has large amounts of fiber and carbohydrates, called oligosaccharides, which interfere with digestion in young animals. Low-oligosaccharide soybean meal looked like an attractive replacement for fish meal—if a cheaper method for removing the indigestible fiber and sugars could be developed.

But first, livestock growers and feed suppliers needed to know how low-O soybean meal would perform in livestock diets. AURI and the Minnesota Soybean Growers sponsored three sets of nutrition trials at the University of Minnesota, feeding low-O soybean meal to nursery pigs and turkeys. The results: increased feed efficiency and cost savings in piglet and turkey diets, compared to standard fish meal diets.

Dissemination:
AURI has hosted low-O network meetings around this topic to share information and expand knowledge on the topic. Jim Moline, founder of Midwest Ag Enterprises, looked at the research findings and thought low-O soybean meal would be a good fit for his company, which manufactures specialty feeds for export.

Commercialization:
Working with AURI scientists, Protein Resources developed a cost-competitive, proprietary process to remove the fiber and sugars from soybean meal, leaving a digestible, high-protein feed. The extracted carbohydrates are used in dairy and beef cattle rations. The branded feed, sold as NutriVance Soybean Meal, is marketed domestically and internationally to hog, poultry and aquaculture producers.

Fertilizer from biomass ash

Product:
NAFMicro, a biomass ash fertilizer derived from incinerated poultry manure, produced by North American Fertilizer of Benson, Minnnesota

Initiative:
Minnesota's biomass energy sector produces large amounts of ash from incinerated plant and waste material. The ashes contain nutrients, such as phosphorus, potassium and sulfur. Energy companies needed to know the fertilizer value of the ash they were producing.

AURI sponsored biomass ash fertilizer trials on corn at the University of Minnesota. The field trials found that ashes from two sources—the Corn Plus ethanol plant in Winnebago, Minnesota, and the Fibrominn poultry litter power plant in Benson, Minnesota—were good alternatives to conventional fertilizer.

Better handling methods for powdery ashes were also needed. AURI helped identify an ash granulation process that could be mixed with commercial fertilizer and spread with conventional equipment.

Dissemination:
AURI made the fertilizer trial data available to Minnesota biomass energy producers and also demonstrated the granulizing process. A group of entrepreneurs led by Randy Tersteeg of Olivia, Minnesota, saw a market in central Minnesota for the 110,000 tons of ashes coming out of Benson's Fibrominn power plant each year.

Commercialization:
AURI helped North American Fertilizer with plant set-up and sponsored additional fertilizer trials to refine rate recommendations for corn and other crops. The biomass ash fertilizer—worth more than $10 million in retail sales—is sold as NAFMicro through Midwest fertilizer suppliers.

SCIENCE OVER THE YEARS

An essential component of AURI's service is its hands-on scientific assistance and research and development that it offers small businesses and entrepreneurs. Science has changed dramatically in the 25 years since AURI began its work. Here is what AURI's scientists believe are some of the most impactful changes they've seen:

The changing face of microbiology

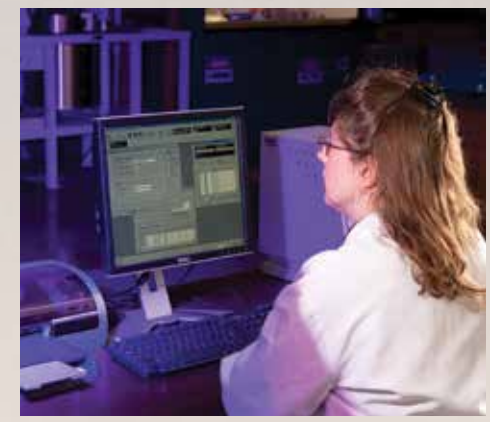
Humanity has relied on microbial fermentation for thousands of years for the production of wine, beer, yogurt and bread. Today, the significance of microbiology has not diminished with microbes still being used for the production of food and increasingly fuels and chemicals. The reduction in cost for genetic tools and high throughput screening equipment has made microbial products more readily available to an increasing number of markets (enzymes in feed markets). You can expect in the next 25 years this trend will only continue as we increasingly turn to microbial systems for sustainable solutions to some of the nation's most challenging problems.

Jimmy Gosse, Microbiologist

Coproducts industry

For years, coproducts have been utilized by agriculture and industry. Centuries ago, farmers used straw, a coproduct from grain, for livestock bedding. In the last 25 years, we have greatly increased the focus on adding greater value to coproducts. One example is dried distillers grains with solubles (DDGS), a coproduct of ethanol, which is great for livestock feed because it is high in energy and high in protein. Today, ethanol plants are looking to add even greater value to DDGS by removing additional corn oil for other uses such as an energy source for poultry diets or for biodiesel production. Glycerin, a byproduct of biodiesel, is also being used for its value as feed source or in human health care products. These are just a few of very many ways that coproducts are adding value and decreasing waste for manufacturers and farmers.

Alan Doering, Senior Associate Scientist – Coproducts



Real-time analytical data

In order to maintain quality control in manufacturing, businesses used to pull samples from the production line, take them to labs and do the necessary analysis there. Today, there are instruments with probes that can be placed right in the manufacturing stream. Add to that the software, calibration information and standard libraries now available, and manufacturers can take continuous analytical measurements. This real-time analytical data allows them to correct problems faster, saving time and money, and creating better products.

Ranae Jorgenson, Analytical Chemist

Food safety and regulation

In 1993, there was a critical event in the history of food safety. The E.coli O157:H7 outbreak in the Pacific Northwest associated with the Jack in the Box restaurant chain brought about some major changes to how food safety is handled in this country. That outbreak served as a catalyst for increased attention to food safety from a farm-to-fork perspective. E.coli O157:H7 was deemed an adulterant following the 1993 outbreak. Meat processors who produce beef trimmings or ground beef products have to test for its presence. In addition, in 1996 legislation was passed requiring meat and poultry processors to have a Hazard Analysis and Critical Control Points (HACCP) plan in place. AURI has teamed together with the University of Minnesota to offer HACCP courses on a regular basis. In addition, AURI's meat scientist regularly consults with processors on food safety programs and planning.

Carissa Nath, Meats Scientist

Renewable energy and biobased products

In renewable energy, the biggest developments have been ethanol and biodiesel as a significant replacement to petroleum-based transportation fuels. We now have biobased transportation fuels that are cost competitive to manufacture, can be blended into the existing transportation fuels supply and have good environmental benefits. Minnesota and AURI have occupied leadership positions with these fuels. Continued development of transportation fuels and biobased chemicals like butanol and dimethylether (DME) are on the horizon as a result of the success of ethanol and biodiesel. In the biobased products area, the development of polylactic acid, which is made from corn and can be turned into plastic, has cracked the door for a renewable, biobased replacement to the traditionally petroleum-based plastics. It's taken more than 15 years to get polylactic acid from basic research out into the market, and it could have a big place in our future.

Doug Root, Senior Scientist of Biomass & Renewable Products Technologies

The Power of Protein in Food

Beyond traditional sources of protein, such as meat, fish and poultry, consumers are seeking new protein options, and dairy and plant-based proteins are moving front and center in product development. The Institute of Food Technologists (IFT) recently named protein as one of 2014's functional food trends that will likely shape new products in the food and beverage industry in the coming year. According to Mintel, dairy leads with the most protein claims in food products, but the snack industry also shows growth with breakfast, beverages and bakery trending. Protein claims now appear in virtually every product category, indicating its demand and wide consumer appeal. Dairy products contribute nearly 20% of the protein in the U.S. diet and are nutrient-rich foods with an appealing "good for you" health halo. Nearly 80% of U.S. consumers want more protein in their foods and look to a wide range of sources to meet this need. The global protein market is projected to reach $24.5 billion by 2015 and about half of that market is estimated to be dairy proteins, but a strong focus is on plant-based proteins. Rising costs, clean labels and sustainability concerns are the reasons behind the nondairy, meat-free moderate shift. The power of protein and its health benefits now impacts a broad range of food product types and consumer demographics.

Donna O'Connor, Scientist of Food & Nutrition

Health and nutrition

The biggest change I've seen in the last 25 years in the area of food technology has been the positive shift towards health and nutrition. As a result, AURI has had many projects in this area including the development of functional foods, which are known for their health benefits beyond basic nutrition. Functional ingredients, including protein, omega 3, Beta-glucan and many others, each have specific benefits such as disease prevention or health promotion. AURI has helped with the development of functional foods, such as helping French Meadow Bakery formulate their Men's Bread® with ginseng and soy protein and Woman's Bread® with soy isoflavones and cranberries. In addition to functional foods, we've seen increased development in low-fat, low-carb, reduced-salt-and-sugar, sugar-free, organic, all-natural and allergen-free products.

Charan Wadhawan, Senior Scientist of Food & Nutrition

PHOTOS BY ROLF HAGBERG

Small meat processing industry at a crossroads

Succession, facility upgrades are looming issues, AURI survey finds

BY LIZ MORRISON

Minnesota's small meat processing industry is entering a critical transition period, as aging owners approach retirement, and aging facilities need modernizing.

That's according to a new AURI survey of Minnesota's 280 small meat and poultry processors.

The study, released in May, found that two-thirds of the owner-operators of small meat processing plants in Minnesota are at or near retirement age. But just one-third have succession plans to ensure that the business continues to operate after they retire.

And it's not just the owners who are getting older. Half of the state's small meat processing plants are over 40 years old, the survey found.

These processing businesses — often longtime fixtures of small towns — are an essential part of Minnesota agriculture, says Paul Hugunin, an official with the Minnesota Department of Agriculture's Minnesota Grown program. "A vibrant livestock economy requires access to meat processors."

The Department of Agriculture requested and sponsored the survey to get a handle on the needs of this sector, which is largely made up of sole proprietorships and family-owned companies having fewer than 10 employees and annual profits under $200,000. These companies buy nearly 80 percent of their slaughter animals from local livestock farmers, according to the survey, and sell 60 percent of their products within their counties.

"We're at a crossroads for this industry," Hugunin says. "We don't want to see a plant that's been an important part of the community close its doors" when the owner wants to retire. "That's a loss to the community, to local livestock producers and to hunters," who rely on small meat plants to process wild game.

Other challenges, too

The survey reveals other challenges, too, says Randy Hilliard, AURI project manager, who oversaw the research.

Highly seasonal supply and demand, which peaks in the fall and early winter, leads to erratic cash flows and labor issues, he says.

Small processors are also hard-hit by the cost of regulatory compliance, says Carissa Nath, AURI meat scientist. Survey respondents acknowledged that regulations had improved documentation, product tracking and safety. But many also complained about time-consuming paperwork, a shortage of inspectors and operating restrictions that weigh on profitability. Meanwhile, consumers' increasing focus on food safety creates pressure for expensive new regulations, Hugunin adds.

Cumbersome regulations, and a lack of expertise in financing, marketing and product development also discourage "the new entrants that are necessary to sustain and grow the small meat processing industry," Nath says.

Opportunities exist

At the same time, the survey highlights opportunities in this sector, Hilliard says. For example, about a third of respondents said they are considering expansion.

The burgeoning local foods movement is creating opportunities for small processors to connect with consumers through branded products, Hugunin says. Demand for pre-cooked or pre-assembled main dishes, nutritious snacks and ethnic foods is also sparking innovation, Nath says. More than half of survey respondents, for example, make marinated meat products that are ready for the oven or grill.

The survey findings suggest that Minnesota's small meat processing industry could benefit from assistance with:

Succession planning
Nearly three-fourths of survey respondents said they will need to address succession within the next decade.

Mentorship
for people entering the profession.

Marketing
programs to link small processors with both consumers and livestock farmers.

Facilities improvements
The Minnesota Department of Agriculture has funds available for physical plant and equipment upgrades through the Agricultural Growth, Research and Innovation program (AGRI). [*http://www.mda.state.mn.us/en/grants/grants/valueaddedgrant.aspx]* Improvements are eligible for a value-added grant of up to 25 percent of the project cost.

"The survey tells us that this is a time-sensitive issue," Hugunin says. "There's a window where we want to make sure there is opportunity to expand, upgrade and transition to the next generation."

To read the entire report, "The State of Minnesota Small Meat Processors, May 2014," go to auri.org.

The AURI survey of small Minnesota meat processors found that:

- Two-thirds of owners are at or near retirement age;
- Two-thirds of owners have no facility succession plan in place;
- Half of processing facilities are over 40 years old;
- One-third of processors have plans to expand;
- Regulation changes have resulted in more paperwork and documentation, impacting business and;
- A shortage of inspectors is limiting processing at some facilities.

AURI and Meat Processing Industry

Idea to reality:

The statewide survey gathered information on the needs of small meat processors.

AURI's role:

AURI designed and managed the survey, which was carried out by Southwest Minnesota State University's Marketing Advisory Center in Marshall, Minnesota.

Outcome:

The Department of Agriculture and AURI will use the information to improve services for Minnesota's small meat processors.

Partners:

Minnesota Department of Agriculture; Southwest Minnesota State University.

Standing on the shoulders of giants

BY TERESA SPAETH
AURI EXECUTIVE DIRECTOR

As AURI celebrates 25 years of growing small businesses and supporting Minnesota agriculture, it is a time of looking back and looking forward. I'm reminded of the metaphor of "standing on the shoulders of the giants who came before us," which means to discover truth by building on previous discoveries. AURI and our partners have been working together to discover new uses for agriculture commodities. Those discoveries, and the people who made them, are an integral part of AURI's story and success.

Many times, we don't realize that our day-to-day work may make history. For example, it was in AURI's first decade that some staff worked with Minnesota Soybean on the implementation of biodiesel in the state. Thanks to the work in that arena, biodiesel is now generating $900 million in economic activity for Minnesota and offers a renewable, environmentally friendly fuel option. In addition, AURI and others continue to find new uses for the byproducts that result from the generation of the fuel, adding even more value to soybeans.

In another example, an AURI scientist worked on the development and marketing of soy-based Preference and Destiny surfactants, which are now sold by WinField, a subsidiary of Land 'O Lakes. The product increases pesticide effectiveness.

While we build in part off of the work of our scientists, just as important are the networks and experience of current and past staff and board members. We hear repeatedly from clients how AURI staff helped to connect them to resources they didn't know about and thereby increased the speed and success of their efforts to bring a new product or process to market. It takes time and diligent work to build these connections and resources that serve our clients, and we're grateful for the staff, board members and many partners and supporters around the state who are an important part of our network.

AURI was created in part as the result of a farm crisis—to help find new uses for and increase the value of Minnesota's agriculture commodities. Today, building on those who came before us, AURI is helping to create opportunities that go well beyond the farm—to all parts of Minnesota, rural and urban—to ensure a strong future. Farmers are helping create economic development across the state, growing the economy through made-in-Minnesota products and processes.

ABOUT AURI

The Agricultural Utilization Research Institute (AURI) helps develop new uses for agricultural products through science and technology, partnering with businesses and entrepreneurs to bring ideas to reality. AURI staff are skilled to walk clients through the entire development journey of bringing a new product or process from idea to reality.

Service Areas: What We Provide

Applied Research and Development

Through practical, applied research we identify emerging opportunities to add value to agriculture products. This information is publicly available in order to help entrepreneurs and businesses generate ideas for new products and processes.

Innovation Networks

When deciding the feasibility of a new product or process, it is critical to have access to industry experts and a science-based network of people. With a broad range of networks, AURI can help bring together the right people at the right time.

Hands-on Scientific Assistance

Scientists are available to provide consulting and technical services in the areas of:

- Product and process development
- Product evaluation and testing
- Sourcing materials, equipment and services

Labs are available to clients for hands-on testing and development.

Learn More

- Contact one of the AURI Offices to speak with a project development director about your business.
- Visit *auri.org* to see the latest research and learn about upcoming events.
- Sign up to receive the *Ag Innovations News* or the AURI electronic newsletter to stay informed about AURI projects and clients.
- Follow AURI on Facebook and Twitter to get notices about new research, upcoming events, where to find AURI at tradeshows and much more.

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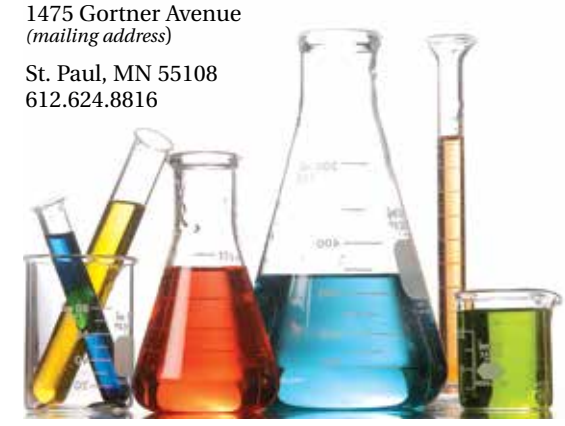

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No increased Listeria risk in sodium reduced processed cheese

BY LIZ MORRISON

The salt content of cheese may be lowered without compromising food safety, new research shows.

Salt in cheese limits the growth of harmful bacteria. But, reducing the salt content of American cheese slices did not increase the survival of a virulent pathogen, Listeria monocytogenes compared to regular cheese, according to a University of Minnesota study, sponsored by AURI and the Midwest Dairy Association.

"This study provided the first actual data on Listeria cell survival on commercially available, sodium reduced American processed cheese," says study leader Francisco Diez-Gonzalez, University of Minnesota professor of food science and nutrition. "Our results indicated that there were no differences in L. monocytogenes survival patterns on slice-on-slice or individually wrapped process American cheese at different temperatures."

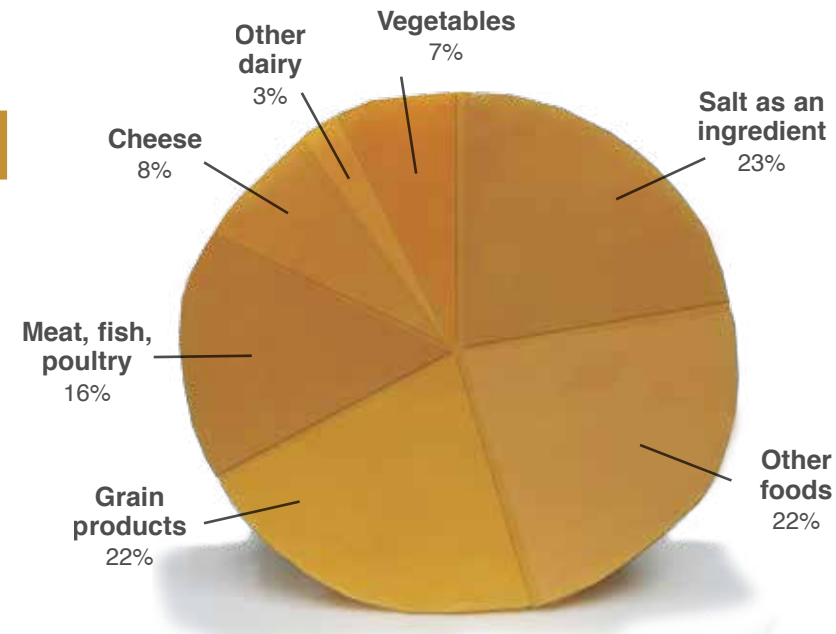
This finding is important because Listeria can cause serious food-borne illness, says Charan Wadhawan, AURI senior scientist of food and nutrition. Although processed cheese has rarely been involved in Listeria outbreaks, a recall of processed Swiss cheese in Canada in 2010 shows that the potential for contamination exists. Now, the new research assures consumers that sodium reduced processed cheese carries no more food safety risk than regular cheese.

The development of sodium–reduced processed cheese is part of a larger food industry drive to cut the salt content in processed foods. "Most Americans consume far more sodium than health experts recommend," Wadhawan says, and that can lead to health problems like high blood pressure.

The dairy industry is a key part of this effort, says Mary Wilcox, vice president of business development for the Midwest Dairy Association (MDA), Minnesota's dairy check-off organization. In 2009, U.S. cheese makers formed the Cheese and Sodium Best Practices Task Force to work on ways to reduce sodium in cheese.

This is a complex challenge, involving far more than simply putting in less salt. "Reducing sodium in processed cheese requires innovative, research-based solutions," says Bill Graves, senior vice president of product research at the Dairy Research Institute.

Salt contributes to flavor and texture, melting characteristics and shelf life, Wilcox explains. Salt also "limits the growth of pathogenic — or unwanted — bacteria" and retards spoilage.



Sources of Salt in American Diets

Source: Innovation Center for U.S. Dairy, National Dairy Council

The Listeria study was one of many initiatives organized by AURI to help Minnesota's cheese industry with research and development, says Jennifer Wagner-Lahr, AURI senior director of innovation. The state has 41 companies that manufacture cheese — many of them producer cooperatives.

Cheese makers are taking a gradual approach to reducing sodium in cheese, says Donna O'Connor, AURI food and nutrition scientist. Sodium reduced processed cheeses are now being sold in grocery stores, although they are not usually labeled as reduced sodium, O'Connor says.

Some examples of sodium reduced processed cheeses now on the market include:

- Velveeta: 10% salt reduction
- Kraft Singles American Slices: 18% salt reduction
- Most processed cheese for schools from the USDA: 25% salt reduction

Read more about this and other dairy research at auri.org.

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