



Ag Innovation News

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The newspaper of the Agricultural Utilization Research Institute



Kay's Naturals

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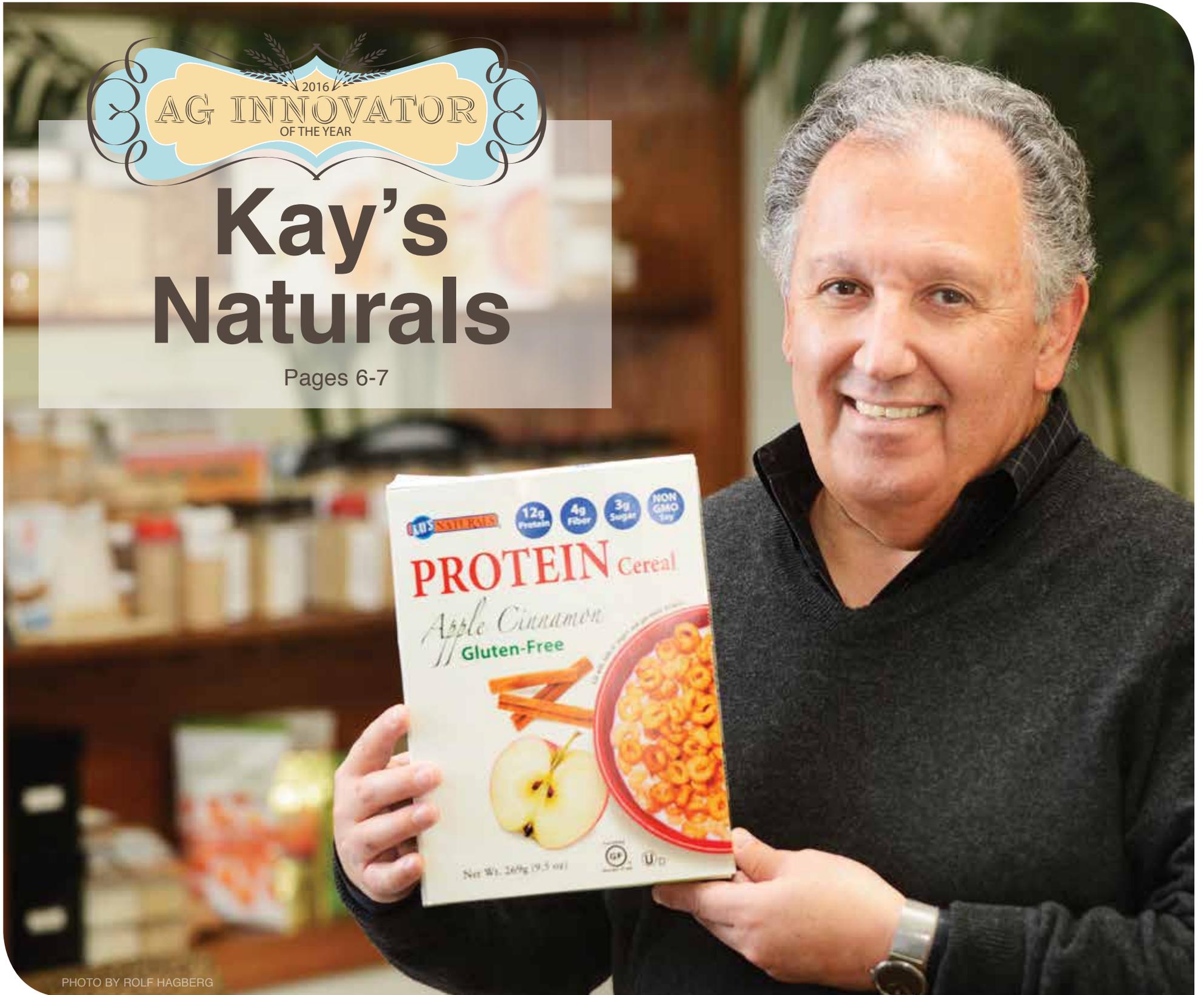
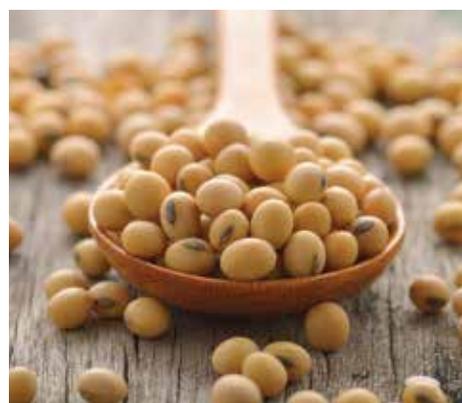


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BY SHANNON SCHLECHT
AURI EXECUTIVE DIRECTOR



Ag Innovation News celebrates 25 years

I would like to open the first 2017 issue of *Ag Innovation News* with a thank you to our dedicated readers—especially those who have been with us since the beginning. Your support over the years is the reason why AURI is celebrating the paper's 25th year of publication. I think this is definitely a noteworthy milestone deserving celebration. To that end, I would like to take some time now, and in future issues, to look back on the storied history of the *Ag Innovation News* (AIN).

The paper definitely set the right tone from the beginning. The first issue in 1992 included the following headlines:

- CENEX/Land O'Lakes introduces corn, soybean-based surfactant developed in partnership with AURI
- Le Center utilized new organic oil processing technology
- Minnesota producing beans for Japanese markets
- Lactic acid from waste starch to be used in degradables
- High starch potato is developed for paper industry
- AURI explores new opportunities in fish farming
- Omega-3 fatty acids from fish make for health foods

Looking back at these articles, I think it is safe to say AIN raised awareness levels of new and innovative happenings and was definitely ahead of its time.

Since then, the paper has grown to become an information resource for more than 12,000 farmers, processors, entrepreneurs and legislators in the Midwest, while continuing to report on important topics. I think a major element of the paper's longevity is its success in making research and technical information easy to read and enjoyable for readers of all backgrounds and interests.

Consistently achieving this goal has been a point of pride for everyone at AURI throughout the past two-and-a-half decades. As I write this, I cannot help but wonder if Executive Director Nelson had any idea that a quarter century later the AIN would still be a trusted voice in the arena of value-added agriculture.

Now, as we move into 2017, I hope you will join me in celebrating AIN's Silver Anniversary. Over the coming months, there will be more articles highlighting the past 25 years of the publication with retrospectives and unveiling of new plans for the publication's future. It is sure to be an exciting year for AURI as we highlight the many innovative food and ag happenings in Minnesota and the region.



The first edition of Ag Innovation News from 1992.

“Your support over the years is the reason why AURI is celebrating the paper's 25th year of publication.”

It all began in January of 1992 when the first issue went out to 4,000 subscribers who read former Executive Director Richard Nelson's thoughts on what the paper would be. He wrote "... these pages will offer a sampling of AURI's accomplishments in ag product commercialization, technology transfer and applied research...there will also be news of important progress in agricultural utilization wherever it occurs.”



BY AURI

This month the Agricultural Utilization Research Institute will say goodbye to John Goihl one of its longest sitting board members. Goihl has served three consecutive terms (the maximum allowed by AURI), representing agribusinesses and Minnesota Pork Producers. Recently *Ag Innovation News* sat down with him to talk about his business, his time with AURI and some of the highlights from his nine years on the board of directors.

AIN

What made you want to get involved with AURI?

JG

Our company, Agri-Nutrition Services, is primarily involved in providing nutritional consulting and nutritional products to swine producers. Evaluating research information is an important part of our services.

Getting involved with AURI was a logical step to become involved with the various research projects being conducted by AURI staff.

AIN

In which projects have you been most interested?

JG

Of course, I would be a little biased, but any projects related to animal nutrition would be of most interest. However, I find all products to be interesting.

AIN

What have been some highlights from your time on the AURI board?

JG

The highlights have been many from the initial years of utilizing distiller dried grains and solubles (DDGS) in livestock diets to the current influx of the many food related projects and the utilization and processing of various byproducts.

AIN

What will you miss most about not being on the AURI board?

JG

A person's life is made up of many clusters of people. I.e. family, church, work, etc. AURI has been one of these clusters for me and members of the board and staff will be missed.

AIN

What has it been like working with AURI staff?

JG

I like the close relationship the board members have with the staff, which helps one understand the responsibility of each in providing the AURI services.

AIN

What are your plans for the future?

JG

My plans are to continue to be involved in the swine industry and doing nutritional consulting.

AIN

What do you see as being AURI's biggest asset?

JG

AURI's biggest assets are its people and the services it can provide to Minnesota agriculture in terms of R & D services to its many clients.

AIN

One last question—looking forward, what do you see for the future of value-added agriculture?

JG

The future of value added agriculture and food products looks very positive when we look at the food needs for the increasing world population. However, it will be more difficult because of the anti-agriculture activists, increased regulations, increasing costs, and meeting the many demands of the consumer.

AURI thanks John for his dedication to the organization, its board and all of value-added agriculture. His contributions have been many and his impact significant. Please join AURI in wishing John well in his future endeavors.



Minnesota's BioEconomy Production Incentive

A significant advantage for Minnesota

BY AURI

Minnesota has built a strong foundation for the biofuel and forest products industries, so the Minnesota legislature's passing of the BioEconomy Production Incentive in 2015 was a significant step in advancing the state as a global center for bioeconomy project development. The goal is incentivizing utilization of the state's abundant agricultural and forestry feedstocks to add value to local economies and develop sustainable fuels and chemicals.

According to the BioEconomy Coalition of Minnesota, an economic analysis in 2015 showed the potential for the bioeconomy to contribute more than \$830 million in new economic activity to Minnesota as well as add 3,000 new jobs. Coalition partners already support numerous commercial-scale projects in Minnesota, resulting in hundreds of millions of dollars in new commercial projects. The coalition successfully supported passage of a new BioEconomy Production Incentive in Minnesota, which offers up to \$60 million in financial assistance over ten years for the production of renewable chemicals, advanced biofuels, and biomass thermal energy, depending on feedstock.

How does the incentive work?

Production Incentive Levels

Advanced Biofuels are renewable fuels designated by the Environmental Protection Agency under the Renewable Fuel Standard to have lifecycle greenhouse gas emissions that are at least 50 percent less than gasoline. These fuels may be derived from either cellulosic, sugar, or starch feedstocks. Facilities must produce at least 95,000 MMBtu (approximately 1 million gallons) per year to be eligible. Incentive Payments are calculated on a per million btu (MMbtu) basis at the following levels;

- \$2.1053 per MMBtu (equal to \$0.16/gal) for advanced ethanol biofuel from cellulosic biomass
- \$1.053 per MMBtu (equal to \$0.08/gal) for advanced ethanol biofuel from sugar or starch (other than corn starch).

Producers of cellulosic biofuels from agricultural biomass must also submit a responsible sourcing plan to the Minnesota Department of Agriculture. At the fifth year of production, they must demonstrate that their feedstock is comprised of no less than 50 percent perennial biomass crop.

Renewable Chemicals are chemicals, polymers, monomers, or plastics not sold primarily for food, feed, or fuel and that are at least 51 percent biobased, as determined by testing representative samples using American Society of Testing and Materials specification D6866. Facilities must produce 750,000 pounds per quarter to participate in the program and incentives are offered at the following levels:

- \$0.06 per pound of cellulosic-derived renewable chemical
- \$0.03 per pound of sugar-derived renewable chemical
- \$0.03 per pound of cellulosic sugar (defined as sugar derived from cellulosic biomass from agricultural or forestry resources)

Maximum Payments

The production incentive program is structured to offer an annual payment to eligible facilities for a maximum of ten years. The program went into effect July 1, 2015 and facilities have until June 2025 to come online. The program sunsets June 30, 2035.

	Annual Payment Cap	Lifetime (10 year) Facility Cap
Advanced Biofuels		
Sugar or Starch	\$3 million	\$30 million
Cellulosic	\$6 million	\$60 million
Renewable Chemicals		
Sugar	\$3 million	\$30 million
Cellulosic	\$6 million	\$60 million

Biomass Thermal Production Incentive

Facility Eligibility

Eligible facilities have a 10 year window, from July 1, 2015 – June 30, 2025 to begin operation. Once production begins, the clock starts on an annual incentive payment for 10 years. Any production that occurs after June 30, 2035 is not eligible for the incentive payment. Eligible facilities must source at least 80 percent raw materials from Minnesota and must be from agricultural or forestry sources. If an eligible facility is located 50 miles or less from a state border, raw materials can be taken from up to a 100 mile radius from the production facility. Biomass thermal facilities must produce at least 1,000 MMBtu (enough to heat approximately 20,000 square feet of building space) of biomass thermal energy to be eligible for the program.

Incentive payments

Payments are calculated on a btu basis of \$5.00 per MMBtu with a minimum production of 250 MMBtu per quarter. The maximum payout per year is 30,000 MMBtu per year or \$150,000.

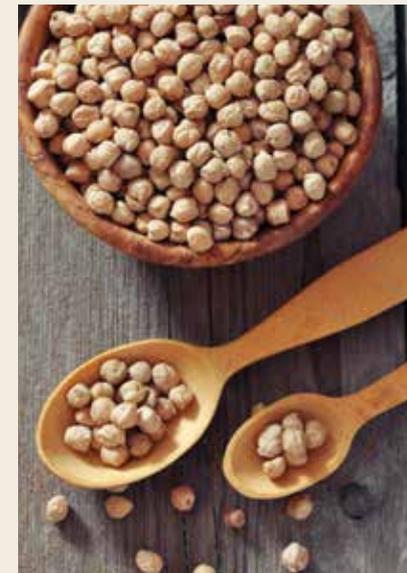
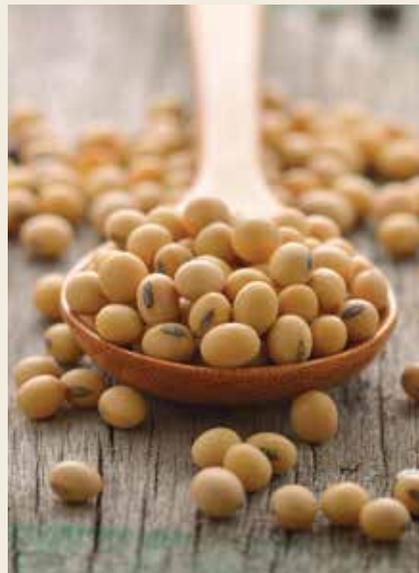
Incentive payments are available for 10 years from the start of production. For example of a facility begins operation in 2019, incentive payments are available until 2029. There is a 20 percent bonus payment for each MMBtu produced from agricultural perennial biomass crops and agricultural residues grown on lands with cover crops. This would increase the per MMBtu payment from \$5.00/MMbtu to 6.00/MMbtu.

This is an annual incentive payment of \$150,000 per facility. Total payments to all eligible facilities may not exceed the amount necessary for 150,000 MMBtu of biomass thermal facilities. This would provide incentive payments to a maximum of five (5) biomass thermal facilities.

AURI's Project Development Director, Harold Stanislawski believes these incentives are important to the advancement of further value add agricultural and forestry processing in our state. "The current investment and venture capital environment in the bioeconomy area is challenging. The Minnesota BioEconomy Production Incentive is a big help in moving bioeconomy projects forward as it reduces risk." Mike Youngerberg on behalf of the Minnesota Soybean Growers Association, said "I would like to commend the foresight of the Minnesota Legislature for continuing to create opportunities to produce renewable products from agricultural crops through the BioEconomy Incentive program. While this first incentive program is a good start I think that there is more opportunity for other crops, like soybeans, to contribute to even more renewable products that could be produced and consumed right here in the State of Minnesota. We look forward to having that conversation to expand this kind of incentive programs."

Further details and questions on the incentive can be found at the Minnesota Department of Agriculture Website at mda.state.mn.us/grants/agri/bioincentive.aspx.

Alternative Protein is a Growing Market in the Food Arena



BY HAROLD STANISLAWSKI

AURI is seeing much more activity in the alternative protein arena thanks to significant innovations in food products. This is a global trend recently explored by Lux Research who reported that “the demand for alternative proteins, beyond fish and meat... will grow at 14 percent annually by 2024.” Many food innovators are exploring new formulations to impact the existing protein supply chain. Total protein demand will double to 943.5 million metric tons in 2051, according to the new report.

The report indicated three primary protein sources (soybeans, pea and oat) are poised to dominate the space. Additionally, lupin, chickpea, fava bean, flaxseed and hempseed are high- protein next generation opportunities.

Lux research analysts studied the factors affecting supply and demand of protein for human consumption, and highlighted some key findings

Soy will dominate the alternative protein space for the next ten years. This protein source which is so plentiful in Minnesota has seen a compound annual growth rate of 5.1 percent and has captured more than 80 percent of the alternative protein market by 2024.

Second generation proteins extracted from peas, rice, and canola are predicted to see greater market adoption in the coming decades. Third generation proteins such as algae and insect protein will also see growth.

“Demand for alternative proteins, beyond fish and meat... will grow at 14 percent annually by 2024.”

Lux Research predicts that 100 million additional acres of protein crops will be growing worldwide by 2024. Rice and canola are projected to see the fastest growth in terms of acreage planted.

Plant protein is trending for a variety of reasons according to Canadean Consumer Innovation Insights Director, Tom Vierhile:

- Animal protein has had perception issues with antibiotics and growth hormones.
- Flexitarian diets (those that eat plant and meat proteins) are consuming higher plant protein products in their diet.
- The emerging taste preference for plant based protein sources seems to be guiding new product innovation in categories such as meat substitutes, yogurt, milk and milk alternatives, pasta, and snacks.
- 2016 was deemed “Year of the Pulses” by the United Nations and may be spurring innovation.

[AURI and plant based innovations]

Minnesota food innovators are working with AURI to introduce new plant based products. One such plant based introduction is a product called the “**The Amazing Chickpea**” is a butter spread that can be used similar to peanut butter without peanut allergen concerns. Lolly Occhino, AURI food scientist is working with the Sunil Kumar, the product’s developer, on formulation, product sensory analysis, and nutritional labeling.

AURI is also working with the Minnesota Soybean Research & Promotion Council on a soybean product that closely mimics meat and mixable into meat products at various levels. AURI recently tested the soy analog products in its Marshall, MN lab. AURI plans to make its studies and formulations known to small meat processors across the state who wish to offer flexitarian options for their customers.

Innovation



(LtoR): Head of Operations Kathy Swenson, Company Founder Massoud Kazemzadeh and his wife and Company President Ann Jones Kazemzadeh show some of Kay's Naturals most popular, high protein products.



BY DAN LEMKE

As the saying goes, sometimes the leading edge is also the bleeding edge. Many Minnesota businesses and entrepreneurs know that axiom all too well. However, those innovators may find that, in the course of successfully navigating the difficulties of developing a new product or process, they have carved out a niche for themselves.

Since 2002, AURI has recognized these kinds of businesses with the Ag Innovator of the Year award, presented to a Minnesota company that has shown innovation in the development of an ag-based product or process. The goal is to recognize the accomplishments of one deserving business and draw attention to value-added agriculture's contributions to the state.

"We present this award to recognize innovation and excellence in Minnesota's food and agriculture space," says AURI Executive Director Shannon Schlecht. "AURI sees many great ideas from across the state and the award provides an opportunity to highlight a unique idea and innovative business."

Ag Innovator award recipients are AURI clients who use Minnesota agricultural commodities. In choosing a winner, various elements are considered. Have they created a unique or disruptive use? Have they been successful or are they on the verge of greater utilization of Minnesota agricultural commodities in a higher value product manufactured locally?

"If you look at a good portion of AURI clients and past Ag Innovators, a lot of them have been ahead of their times and ahead of trends," says Michael Sparby, AURI senior project strategist.

AURI focuses its resources in coproduct utilization, renewable energy, food and biobased materials. Past Ag Innovators have come from all of AURI's focus areas and are representative of the diverse environment in which the organization operates.

"AURI is fortunate to be able to work with many great companies covering a range of products such as cat litter, biodiesel, biomass energy, food coloring, bioplastics, fishmeal replacements and firefighting products," Schlecht says. "We recognize just one company of the dozens AURI works with every year and still the recipients are this diverse. The award list highlights that Minnesota has many creative individuals and companies."

Previous Ag Innovator of the Year Award recipients include:

<p>Pet Care Systems: Manufacturer of Swheat Scoop, wheat-based cat litter</p>	<p>Soy-Mor: Biodiesel plant now owned by Renewable Energy Group</p>	<p>Suntava: Natural food ingredient and colorant from purple corn</p>	<p>EarthClean Corporation: Environmentally-friendly, ag-based fire suppressants</p>
<p>Minnesota Soybean Processors: Farmer-owned soybean processing plant and biodiesel refinery</p>	<p>USA Solutions: Manufacturer of Compost-A-Mat hog and pet mats</p>	<p>Protein Resources: Soy-based feed ingredient</p>	



PHOTOS BY ROLF HAGBERG

Various stages of production for Kay's Naturals and Kay's Processing products. LtoR: A Kay's Naturals employee inspecting the quality of protein snacks before packaging; Protein Pretzel Sticks fresh out of the oven; A sampling of Kay's Naturals various protein-rich snacks; Kay's Naturals Protein chips (available in parmesan, lemon herb and chili nacho)



The range of award recipients reflects diversity and highlights the breadth of AURI's assistance and expertise in helping equip businesses for success.

"It also shows the importance of AURI's impact over our 25-plus years and how early technical and project assistance across a breadth of areas yields innovative advancements in utilizing the state's agricultural production to create jobs and economic activity," Schlecht says. "I believe we help de-risk ideas and shorten the idea-to-commercialization time period."

A Natural Choice

The 2016 Ag innovator of the Year winner has overcome many of the challenges that welcome entrepreneurs, and carved out a successful business producing healthy food products now in demand nationwide.

Massoud and Ann Kazemzadeh own Kay's Processing of Clara City, Minnesota, which produces a variety of unique, healthy food products, including those made by Kay's Naturals, a company owned by 27 investors but operated by the Kazemzadehs.

Massoud, a processed food expert and former college instructor, had developed several snack food items that were high protein, high fiber and low in sugar because his first wife was diabetic and had few healthy snack choices. After she passed away, Massoud continued the quest to provide healthier food options for diabetics and other health-minded people.

Challenging Start

Kay's Naturals products were originally made in Clara City, but the plant they were using closed and reopened several times their first several years, throwing production and marketing into upheaval.

"We had a tremendous amount of difficulty," Massoud says. "Every time we advanced in one area, we fell behind because of manufacturing or something. We would spend money to advertise our product and then we wouldn't be able to deliver."

Eventually the Kazemzadehs made investments of cash and sweat equity to purchase the facility. Ann, an attorney, developed the business plan while Massoud designed and equipped the facility.

The company has put those early difficulties behind them to find success in the marketplace. Kay's Naturals produces a range of products balancing protein, carbohydrates, fiber and fats. Kay's Naturals produces 18 all-natural, gluten-free products that have low calories, high protein, zero cholesterol, lower carbohydrates and high fiber. The line includes three types of cereals, three varieties of chips, three cookies and three kinds of pretzels. They also make other snacks including trail mix and even a complete meal plan. Products are available at over 9,000 stores nationwide. Kay's Processing also produces snacks marketed under other private labels, including for some weight management companies.

Innovative Focus

Kay's Naturals products found earliest success in the sports nutrition area, but they're well positioned in the market as consumers give more attention to nutrition.

"Kay's Naturals is a good example of a company identifying trends before they're popular," says Michael Sparby. AURI has provided technical assistance to Kay's Naturals and Massoud is part of AURI's food industry thought leaders team.

Massoud Kazemzadeh says Kay's Naturals was probably 10 to 15 years ahead of their time, but being innovative is key to staying in the market. That's why new products are continuously in development and several new items will be added to Kay's offerings in 2017.

"Innovation is the backbone of success in this market," Massoud says. "Most products have about five years in the market and then you have to come up with something new."

Massoud says he doesn't have a crystal ball to see the future, but he does pay attention to trends. Markets such as organic or non-GMO products that were once niche products are now becoming more mainstream. He sees the growing world obesity epidemic as an opportunity for food processors like Kay's Naturals to play a role in the solution.

"The only way to solve this problem is to make healthy food available that isn't full of empty calories," Massoud says.

To learn more about Kay's Naturals or to order products, visit kaysnaturals.com.

Vinegar drinks **making**

Tangy thirst-quenchers get a modern twist

Pucker up!

BY LIZ MORRISON

Vinegar is making a splash in cocktails and soft drinks.

Minnesota food innovators are producing hip, handcrafted shrubs and switchels from muddled fruit, sugar and vinegar. These traditional drinks have roots in Colonial times, when people used apple cider vinegar to preserve fruit for the winter.

Modern shrubs—coming from the Arabic word “sharab,” meaning “to drink” — are intensely flavored syrups that mix well with spirits, water or club soda. They are an easy way to add sweet and sour flavors to drinks, as well as salad dressings and sauces.

“There’s a renaissance in small-batch, artisanal beverages,” says Harold Stanislawski, AURI project development director. Shrubs and switchels are following “the same path as craft brewers and distillers.”

Heritage vinegar drinks are “another value-added opportunity for Minnesota-grown fruits and vegetables,” Stanislawski says, “a new piece of agricultural commerce.” AURI helps nurture this budding sector by offering technical assistance in recipe development, processing and quality control, food safety protocols, shelf life testing, packaging and labeling, ingredient sourcing and licensing.

Here’s a look at a few of the entrepreneurs that AURI has worked with in Minnesota’s emerging shrub and switchel scene.



The Twisted Shrub Edina

Be a “bartending hero at home!”

That’s Scott Dillon’s mission. Dillon, of Edina, an amateur mixologist and food industry veteran, is founder of The Twisted Shrub.

He first heard about shrubs in a cocktail class at Minneapolis’s Parlour bar, in June, 2015. “It was one of those epiphany moments,” he recalls.

At the time, he was looking for a new food venture, after having spent 20 years in sales at General Mills. “I love cocktails and interesting drinks. And I knew that vinegar was a hot food trend, especially among millennials.”

Over the summer, Dillon experimented with shrub recipes, testing some 80 or 90 combinations, and experimenting with a variety of vinegars before settling on apple cider vinegar. He worked with AURI on processing, food safety and licensing. “I had the back-end expertise in sales and marketing,” he says. “But I needed help on the front end and AURI is this amazing resource. They were instrumental in helping me get going. I didn’t even know where to start, and they connected me to the experts I needed.”

In the fall of 2015, just five months after his epiphany, Dillon premiered Twisted Shrubs at the Linden Hills Farmer’s Market. Soon after Dillon began retail distribution. He is aiming Twisted Shrubs at home mixologists. “People want to make more interesting drinks,” he says. With shrubs it’s easy to make interesting and different cocktails at home.”

thetwistedshrub.com/



Saint Paul Switchel St. Paul

“Before sports drinks, there was switchel,” says Colleen Schlieper of St. Paul, founder of Saint Paul Switchel.

Switchel is a traditional American drink, brewed on farms from ginger, apple cider vinegar, and honey, maple syrup or molasses.

Schlieper first learned about switchels when she had a cold and googled natural cough remedies. “A version of switchel came up. I made it, and it was really kind of good!”

She had a hunch that there would be a market for a less-sweet alternative to soda and energy drinks.

Combing old cookbooks, Schlieper experimented with switchel recipes. She settled on one that uses hot-brewed fresh ginger tea and wildflower honey, plus cultured apple cider vinegar, “a very rich product with a great flavor.” She worked with AURI on processing, product testing, bottling and labeling.

stpaulswitchel.com/



a splash



Gardenaire Rochester

Gardener extraordinaire Amy Lorber packs the bounty of her gardens into hand-crafted organic shrubs, cocktail syrups, herb teas, and spice mixes.

Lorber, of Rochester, and her mom, Linda, are the founders of Gardenaire. Their mission: "To create delicious products using sustainable growing practices and authentic preservation techniques."

The Lorbers raise 80 varieties of organic herbs, 30 kinds of pollinator-friendly flowers, and 35 varieties of fruits and vegetables, plus honeybees.

They market a wide variety of shrubs, whose flavors change with the seasons: rhubarb basil, tomato basil, apple tarragon fennel and pear rosemary. Gardenaire also makes veggie-based shrubs, and Amy is developing winter shrub recipes. "I love creating new flavors, playing in the kitchen," she says.

She worked with AURI Food Scientist Lolly Occhino on testing methods and process regulations. This assistance was important because Lorber ferments fruit, herbs and apple cider or white balsamic vinegar in glass containers for several weeks, then strains off the solids, adds sugar and bottles.

gardenaire.co/



Sharab Shrubs Minneapolis

Veteran mixologist Alex Zweber is betting on his insider's knowledge of the craze for creative cocktails.

Zweber, of Minneapolis, launched Sharab Shrubs in 2016. Early this year, he will begin selling three flavors of the vinegar-based cocktail mixers: strawberry, apple rosemary, and Asian pear with ginger and cinnamon.

Zweber worked with AURI Food Scientist Lolly Occhino to figure out the nutritional information and sugar content of his beverage. After fermenting fruit and sugar for several days, he strains out the solids and adds white vinegar or apple cider vinegar. Sharab Shrubs "work well in cooking and in drinks," he says, "giving a bit of sugar, a bit of tang, and some fruit flavor."

Zweber, a longtime bartender at Surdyk's Flights in the Minneapolis-St. Paul Airport, is up on craft cocktail trends. "I could see the need for a product like this in the market," he says. He started experimenting with fruit and vinegar combinations at home. As word got around, liquor sales reps started asking him about shrubs.

sharabshrubs@gmail.com/



Versatile vinegar

Humble vinegar is a remarkably important and versatile food, says Lolly Occhino, AURI food scientist.

One of the few acidic condiments, it has been used for centuries to flavor and preserve foods. Acetic acid, the primary ingredient in vinegar, is a potent anti-microbial, which inhibits the growth of bacteria and mold, she says. It's used to preserve vegetables and fruits, meat, baked goods, sauces, and many other foods.

Occhino points to vinegar's many advantages as a food ingredient: it is water soluble, inexpensive, widely available, non-toxic, slows browning, and imparts deep, complex flavors.

In addition, "Vinegar is an easy-to-understand, natural ingredient" that consumers readily recognize, says Jeannie Milewski, executive director of The Vinegar Institute, a trade association. That's important as consumers look for "simpler, cleaner food labels with ingredients they can understand and pronounce," Occhino says.

Today, researchers are investigating the potential health benefits of vinegar, Occhino says. Recently, for example, scientists have been testing vinegar's effects on blood glucose. Other studies are looking at using vinegar to treat ear infections. Animal and cell studies are exploring vinegar's effects on weight, cholesterol and cancer cells.



New Uses Forum

You may have read about the upcoming New Uses Ag Innovation Forum in this past October's issue of the newspaper. This month AURI has an update on this big event with information on its location, registration and panel lineup.

The New Uses Ag Innovation Forum will happen on March 22 at the Crowne Plaza with a welcome reception for all attendees on the evening of March 21 at the same location. The day's events include a breakfast and lunch, networking opportunities and a number of panels from different sectors of new uses agriculture.

The day's topics and presentations will include:

- Minnesota's Value-Added Agricultural Industry Perspective
- The Agbioeconomy
- Investments in Food and Agriculture Innovation
- University and Industry R&D Commercialization Efforts
- Minnesota's Value-Added Food and Ag Activities
- Minnesota Entrepreneurial Success
- Global Food and Ag Innovation Happenings

It's sure to be a premiere value-added ag event for the upper Midwest, so be sure to register today! It's easy, you can register now by visiting auri.org. Also, AURI has worked out a discounted rate for those who wish to stay at the event hotel, the Crowne Plaza. To learn more about this exciting event, register and take advantage of the special room rates, [visit auri.org](http://visit.auri.org).



The event is being held at the Crowne Plaza in Plymouth Minnesota. Call 763.559.6600 to take advantage of special room rates available to attendees.

Welcome Reception

Tuesday, March 21, 2017
Crowne Plaza in Plymouth

New Uses Ag Innovation Forum

Wednesday, March 22, 2017
Crowne Plaza in Plymouth

To learn more and register for the event, visit auri.org

ELSEWHERE IN AG INNOVATIONS

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.

Nanobionic spinach plants can detect explosives

Spinach is no longer just a superfood; by embedding leaves with carbon nanotubes, MIT engineers have transformed spinach plants into sensors that can detect explosives and wirelessly relay that information to a handheld device similar to a smartphone. This is one of the first demonstrations of engineering electronic systems into plants, an approach that the researchers call "plant nanobionics."

In this case, the plants detect chemical compounds known as nitroaromatics, often used in landmines and other explosives. When one of these chemicals is present in the groundwater sampled naturally by the plant, carbon nanotubes embedded in the plant leaves emit a fluorescent signal that is visible with an infrared camera. The camera attaches to a small computer similar to a smartphone, which then sends an email to the user.

So far, the researchers have also engineered spinach plants that can detect dopamine, which influences plant root growth, and they are now working on additional sensors, including some that track the chemicals plants use to convey information within their own tissues.

October 31, 2016, EurkeAlert!

Scientists discover way to give milk chocolate the health benefits of dark chocolate

Dark chocolate can be a source of antioxidants in the diet, but many consumers dislike the bitter flavor. The taste of milk chocolate is more appealing to a greater number of consumers, but it doesn't have the same antioxidants properties as dark chocolate. In a recent *Journal of Food Science* study, researchers found a way to use peanut skin extracts to make milk chocolate that has more nutritional benefits of dark chocolate without affecting the taste.

Researchers from the Department of Food, Bioprocessing, and Nutrition Sciences at North Carolina State University extracted phenolic compounds from peanut skins, a waste product of peanut production, and encapsulated them into maltodextrin powder, which researchers incorporated into the milk chocolate.

Consumer testing of 80 subjects who compared samples of both milk chocolates with peanut extracts and without stated they liked the fortified chocolates as well as the untreated milk chocolate. The researchers noted they did not investigate peanut allergenicity, but that work is now ongoing.

October 13, 2016, *Journal of Food Science*

New kind of local food grows in your own kitchen

A home appliance that grows the ingredients for a healthy meal within a week from plant cells is no longer science fiction. VTT Technical Research Centre of Finland Ltd's first 3D-printed CellPod prototype is already producing harvests.

VTT and its plant biotechnology research scientists have the vision of developing a home appliance for the markets that makes it possible to grow food in a new way. Growing plant cells in a bioreactor is not a new idea as such, but only the latest technologies have enabled the development of a plant cell incubator for home use that yields a harvest within a week. The appliance resembles a design lamp and is ideal for keeping on a kitchen table. Researchers are in the process of developing different product ideas in collaboration with consumers, with the aim of commercializing the concept.

October 13, 2016, *Science Daily*

Goodbye brown apples

The first commercial crop of Arctic Apples—apples that will not turn brown when sliced—are about to hit the market. According to Good Fruit Grower, Okanogan Specialty Fruits is expecting to harvest its first commercial crop of about 50 bins of Arctic Golden Delicious in Washington this year. Neal Carter, company president and founder, told Good Fruit Grower that his company has planted roughly 15 acres of Golden in Washington, which will yield a small crop this fall.

The non-browning trait is the result of inserting extra copies of genes that the apple already possessed. These genes normally create an enzyme called polyphenol oxidase, which is responsible for the chemical reaction that causes browning. Yet when extra copies of the gene are present, the apple reacts by shutting down all of them, stopping production of the enzyme and preventing the browning reaction.

The blossoming venture plans to add more acreage mostly in Washington this year for its Arctic Golden and Arctic Granny varieties, with even more in other states and Canada in the following few years. Carter said that the first apples will be test marketed in select stores this year. As production ramps up, distribution will expand to more locations in the U.S. and Canada.

June 8, 2016, *EcoWatch*

AURI'S FOCUS AREAS QUIZ

How much do you know about AURI's core four areas: food, renewable energy, coproducts, and biobased products? Take the below quiz.

Food Products

How many pounds of turkey were consumed in the U.S. during Thanksgiving?

- a. 25 million
- b. 523 million
- c. 736 million

Answer: c

Renewable Energy

What percent of the United States' corn is used for ethanol?

- a. 17%
- b. 29%
- c. 40%

Answer: c

Coproducts

Biomass can potentially be used for both heating and cooling.

- a. True
- b. False

Answer: True

Biobased Products

The USDA estimates biobased products contribute how much to the economy?

- a. \$79 billion
- b. \$393 billion
- c. \$624 billion

Answer: b

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 at walking clients through the entire development journey of bringing a new product or process from idea to reality.

Service Areas: What AURI Provides

Applied Research

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.

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

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 to help bring new products and processes to market.

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.

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Agribusiness

AURI to Conduct Survey



The Agricultural Utilization Research Institute (AURI) is dedicated to making its *Ag Innovation News* the most interesting, engaging and informative publication in the value-added agriculture sector. However, as it enters its 25th year of publication, the paper's editorial staff understands that sometimes changes are necessary to stay current and meet the readers' wants and needs. Every so often, it is important to consider the paper's strengths, weaknesses and areas of opportunity for the future.

Your opinions as a reader are an important element of this, so we want to hear your thoughts on the paper. What does it do well? Where could the editorial team make improvements? What can AURI do to make this publication even better?

To that end, AURI is conducting a special survey and would like you, a valued AIN reader, to participate.

The survey, which should only take 5-10 minutes of your time, will ask a variety of multiple-choice questions about your preferences with regard to the newspaper. In order to make the survey as accessible as possible, AURI has made it available online at: auri.org/AIN.

The best part is that every reader who takes the survey is entered into a random drawing for one of three \$50 Visa gift cards—a thank you gift from AURI for taking the time to complete the survey.

The survey will be open through end of January, so don't wait to give AURI your thoughts on this newspaper! Taking the survey and entering the drawing for one of the three gift cards is easy! All you have to do is visit: auri.org/AIN.



Share your opinions and be entered to win one of three Visa gift cards!

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