

# GROWING OPPORTUNITY

Canada's plant-protein potential

Improving carbon  
footprints (pg.8)

Diversifying retail  
options (pg.6)

Benefiting all  
Canadians (pg.10)



**PROTEIN  
INDUSTRIES  
CANADA**



# MESSAGE FROM CEO BILL GREUEL

Achieving significant growth in Canada's plant-based food, feed and ingredients sector doesn't happen instantly; the road ahead of us will take time to traverse, and doing so successfully will require a collaborative, engaged effort from every member of our sector's value chain.



To help us get there, Protein Industries Canada recently initiated work on a Sector Roadmap. Outlining key actions that will help the sector reach its goals, this Roadmap is constructed based on the needs, capabilities and feedback of companies, organizations, academics and researchers across the country. It is intended to propel the country forward in a strategic manner, while utilizing and amplifying the full spectrum of skills found throughout our sector.

Together, we can achieve the actions set out in the Sector Roadmap and help make Canada a global leader in the supply of plant-based food, feed and ingredients. This includes providing the ingredients for up to 10 per cent of the global demand for plant-based foods by 2035—totalling approximately \$25 billion for Canada's economy, based on projections made in a report we commissioned from Ernst and Young.

Importantly, we'll accomplish this while ensuring the sector remains sustainable. Innovative companies across Canada are working together to make a difference in this area, strengthening Canada's economy while helping us reach our carbon neutrality goals and providing healthy food for Canadians.

I hope you enjoy reading some of their stories.

## ADVANCING CANADA'S PLANT-BASED FOOD, FEED AND INGREDIENTS SECTOR... TOGETHER



# 39

TOTAL PROJECTS



# 300+

ORGANIZATIONS INVOLVED IN PROJECTS



# 388

EXPECTED PRODUCTS, SERVICES & PROCESSES



# 6,200\*

DIRECT & INDIRECT JOBS

\*from 15 analyzed projects

# HOW GRAINFRAC IS HELPING MAKE THE PLANT-BASED INGREDIENTS SECTOR MORE SUSTAINABLE

Brad Shapka believes the technology that turns Canada's crops into plant-based protein ingredients can be optimized into something even more sustainable than what's already in use.

President of GrainFrac, Shapka and his team develop protein isolates made from Canadian-grown pulses, particularly peas. What makes their end ingredients different from others' in their field, however, is the processing technology behind them.

Developed by the University of Alberta, GrainFrac's patented technology optimizes traditional flour milling processes. Using a dry processing technique, the technology separates a commodity's starches and protein, allowing GrainFrac to extract as much protein as possible into concentrate and isolate ingredients.

"We identified that we had a new technology, which would enable us to significantly lower the cost of producing plant-protein ingredients," Shapka said.

He explained this cost reduction comes about due to a reduction in energy use, including water and chemical inputs and greenhouse gas outputs.

At the same time, however, the technology prioritizes taste and texture, meeting the needs of food manufacturers and consumers alike.

This multi-faceted approach led to the company's collaboration with Ripple Foods and Tomtene Seed Farm. Focused on utilizing GrainFrac's technology to turn Tomtene Seed Farm's crops into protein ingredients for use in Ripple Foods' dairy-alternative beverages, the project is focused on meeting consumers' rising demands for plant-based products that are both healthy and environmentally friendly.



"Most people are choosing plant-based either because they're concerned about animal welfare or because they're concerned about the environment," Shapka said. "Another driver is because they're concerned about their own health. Our process is a very clean process, as well. So we had looked at the fundamental drivers that are leading to this demand in this arena, and we set our sights on trying to overcome some of the challenges and meeting that demand."

While it will be some time before GrainFrac's ingredients are ready for product use, Shapka said the work to develop them has been moving along well—particularly that involving Tomtene Seed Farm and Ripple Foods.

"The collaboration between the farming community and the consumer-packaged-

goods industry is, in our opinion, a critical aspect of our project," Shapka said. "It enables us to follow demand directly and coordinate that demand directly with the producer."

This collaborative work is helping bring Shapka's original vision to life. As it does, Canada's selection of healthy, sustainable plant-based ingredients will grow, as will the opportunity for more innovation and new collaboration.

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# CLEAN TECHNOLOGY, AT EVERY STEP IN THE PROCESS

*Photo provided by Canadian Protein Ingredients Ltd.*

There are many ways a company can go about growing and ensuring its environmental sustainability. When it comes to plant-based food and ingredient processing, one of the most significant is utilizing technology that's as clean as possible.

"Avena Foods Limited specializes in crops and processing methods that have low environmental impact," Avena Foods Limited CEO Gord Flaten said. "Our dry milling techniques require lower energy than other processing methods. In addition, we specialize in whole grain products, which create nearly zero product waste with by-products being up-cycled into useable ingredients."

This idea of "clean technology" extends beyond in-facility machinery and processes. Flaten described ways in which farmers' production practices and even the types of crops they grow contribute toward a product's description as clean-tech. This includes the use of precision agriculture and the growing of sustainable crops, such as pulses and oats.

Jim Millington, CEO of Canadian Protein Ingredients Ltd. (CPI), agreed, explaining that CPI considers clean-tech to appear at every step of its processing method. This starts with its soybean inputs, which he said have more

usable protein per acre than other crops, includes its waste-reducing processing technology and ends with its bio-based plastic packaging.

"We have researched and developed a process for developing and extracting the protein from soybeans which is environmentally friendly, which is a proprietary process, but it will produce a clean-label soy protein isolate," Millington said. "We're developing this industry in Canada, and it fits into the idea of being close to home. We can have a smaller carbon footprint because of less shipping to our customers."

**Our sustainability platform ultimately increases the value added to Canadian raw materials and benefits all of us, from the farmer to the end-user.**

Both Flaten and Millington cited research as being an important step in both discovering and using appropriate crops and clean-tech to achieve their sustainability goals. This research has been beneficial to both companies. They're not only seeing significant steps forward in their sustainability goals, but also in projects with other Protein Industries Canada members.

The Avena team has developed a range of functional pulse flours using their proprietary tempering process, with their first products already on the market and more to come as the project progresses. While CPI is further



out from commercialization, Millington said pilot runs of their ingredient processing have been successful, and he expects this trend to continue.

The collaborative approach of their projects, each said, has been a significant contributor toward their success.

“The people that we have in the collaboration, each bring a level of expertise in their specific area,” Millington said. “We’re bringing the whole supply chain into one project, or one business. And I think that’s novel in Canada, because, typically, agriculture does agriculture and food does food, and this project is really bringing agriculture and food together in a cohesive partnership.”

Flaten agreed, adding that Avena’s partners have been critical in identifying how their ingredients are best utilized while maintaining their sustainability and clean-tech efforts.

“The Protein Industries Canada consortium is proving hugely supportive in guiding and carrying out research and development,” he said. “As we discover the most effective parameters to use for specific products, we

continue to adapt and refine our ingredients to find the best solutions for each partner. Through these partnerships, we are more quickly finding out which ingredients, or combinations of ingredients, work best for specific product formulations.”

Their clean-tech success so far won’t mark the end of either company’s sustainability efforts. Millington explained that CPI is looking forward to choosing a facility site that has a renewable energy source such as hydroelectric power, particularly in either Manitoba or

Quebec. Avena, meanwhile, has initiated a Field to Market Canada innovation project, which tracks sustainability outcomes of both pulses and oats and supports regenerative agriculture initiatives.

“Without quality grains and seeds, we would not be able to effectively exploit

the functional properties of pulses,” Flaten said. “Our sustainability platform ultimately increases the value added to Canadian raw materials and benefits everyone in the supply chain, from the farmer to the end-user.”

*Photo provided by Avena Foods Limited*

**We’re developing this industry in Canada, and it fits into the idea of being close to home. We can have a smaller carbon footprint because of less shipping to our customers.**





# BLUE HERON CREAMERY: DIVERSIFYING CANADA'S VEGAN CHEESE SELECTION

When Karen McAthy began working with vegan cheese as a chef in 2013, she found the available options weren't satisfactory to her or her customers. This led her to experiment with the development of her own recipes, and eventually the establishment of Blue Heron Creamery.

"I started looking at dairy methodologies, and that's when this whole world opened up that I hadn't really thought about," McAthy said. "I looked at the Codex Alimentarius on how they define what cheese is, and that's really where it occurred to me that it's about some form of coagulating a protein, transitioning something, like an ingredient, from one thing into another. The outcome is the name we give it, but how we get there is the part that matters."

Utilizing a similar method as dairy processing to develop her plant-based cheese has served McAthy and her growing team well. Demand for Blue Heron Creamery cheese outpaced supply within the company's first year

of operation, leading McAthy to pursue additional capital and an expansion of the business. The raise in capital was quickly accomplished after McAthy reconnected with a former business contact: books for their first private placement closed after only 36 hours, and McAthy has established multiple new connections that will help her strengthen her business in the future.



Karen McAthy  
Photo provided by Blue Heron Creamery

Photo provided by Blue Heron Creamery





Expansion of Blue Heron Creamery, meanwhile, has occurred over time. The company's selection of cheeses is now available via an online shop and in two Vancouver storefronts—one owned by Blue Heron Creamery and one dedicated to local foods. Demand still outpaces supply, however, and McAthy sees room for the company to grow in a way that benefits everyone on her team.

"We focus on trying to create an environment that's inclusive, and then trying to create an atmosphere in which we can provide mentorship and leadership opportunities," she said.

"We're really wanting to create an environment in which it's about the team, it's about how the team comes together, it's about 'How do we create opportunities within the team for leadership?'"

To help achieve this growth, Blue Heron Creamery is striving toward its B-Corp certification. Receiving this certification would signify that the company prioritizes social and environmental performance, transparency, and legal accountability in its work, and requires Blue Heron Creamery to meet specific requirements related to each area.

This isn't their only ambitious goal, however. McAthy said she and her team are looking forward to tackling upcoming R&D projects, launching products that feature new ingredients, and expanding into national and North American product distribution.



*Photo provided by Blue Heron Creamery*

"We are wanting to build an R&D lab; we're definitely looking for partnerships in the R&D space," McAthy said.

"We are also really excited about this realm that precision fermentation is offering around the creation of casein and whey proteins via microbial fermentation. We've been really seeking to take some of our prototypes that we've been working on and find partners to really be able to do that within the Canadian landscape."

Building these partnerships extends beyond R&D. McAthy and her team envision establishing mentor-mentee relationships within the vegan cheese community, with the

larger goal of establishing a Canadian vegan cheese association that will help strengthen the sector.

Throughout her work to achieve those big-picture goals, however, McAthy is determined not to lose sight of what set her on the path to Blue Heron Creamery: the desire to develop a delicious, satisfying vegan cheese that meets the needs of vegan chefs and consumers alike.

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# ACHIEVING CARBON NEUTRALITY THROUGH INNOVATIVE RESEARCH AND DEVELOPMENT

Plant-based foods and beverages have a strong reputation related to sustainability, thanks largely to the crops used to develop the ingredients used in such products. Companies and organizations across the value chain believe the sector can go further, though, taking the production of plant-based foods and beverages from sustainable to fully carbon neutral.

“Carbon neutrality is one of four pillars for us,” Lovingly Made Ingredients General Manager Chris Shields said. “The first thing we’re planning to do is we wanted to offset all of our emissions this year ... so we’ll essentially be pretty close to net zero.”

The company is making impressive strides in each of their four pillars, which also include land use, water and conservation. In the area of conservation, for example, they’re making steps to achieve their goal to restore five per cent of their suppliers’ farmland to its natural state by increasing yield and protein content of the commodities they grow.

The carbon neutrality pillar has seen some of their most significant achievement, however. While the company expects their facility to be close to net zero carbon emissions by the end of 2021, there are also plans to continue their carbon neutrality work outside of that goal. The largest involve their partners and suppliers, who they hope will take on similar work.

In particular, Shields said, Lovingly Made Ingredients is aiming for a set of standards related to sustainability across the company’s partners, to ensure carbon neutrality and other goals are being met.

“The core of it will be with the suppliers,” Shields said. “It’s great to do these things, but how do you find the right partners from a certification point of view? We base all of our decisions on ‘What’s the right thing to do?’ But I think, certainly, more frameworks around this would be helpful, or at least a standard.”

This collaborative approach to achieving carbon neutrality isn’t unique to Lovingly Made Ingredients. Pulse Canada, which represents the country’s pulse farmers, processors and exporters, also believes that the only true way to



*Photo provided by Lovingly Made Ingredients*

achieve carbon neutrality across the plant-based food, feed and ingredients sector is to have everyone along the value chain working together.

Pulse Canada is primarily focused on spreading the message behind the carbon-neutral benefits of pulses, in particular, as an ingredient. This involves ensuring applicable research is being conducted, spreading the resulting data to the right people, then ensuring the messaging behind that data is being spread consistently, clearly and by a community of voices.

One particularly important message is how much carbon pulses displace across Canada each year.

“To date, the sector as a whole probably displaces what we would call a mega-tonne,” Pulse Canada Director of Sustainability Denis Tremorin said. “A million tonnes of carbon [per year] is what we’re displacing as an industry.”

Regardless of which crop a company or organization focuses on, striving toward carbon neutrality goals helps not only its own business success, but that of the sector as a whole. Shields and Tremorin both stressed the importance of small impacts, including research and partnerships, making a big difference, leading to Canada becoming a global leader in the plant-based food, feed and ingredients space.

“Canada can get ahead of a lot of the world in this space. Having data that’s robust, representative and of high quality in this area is something that we can do very well,” Tremorin said. “Collaboration is the other one that’s going to be key—working with as many partners as you can that are like-minded.”



# COLLABORATIVELY SECURING CANADA'S FOOD SUPPLY CHAIN

From a healthier environment to a stronger economy, expanding Canada's domestic processing and manufacturing capacity comes with plenty of domestic benefits. One of the most significant, however, is a boost to the security of our food supply chain.

The truth behind this was no more apparent than during the COVID-19 pandemic. As borders closed and companies here at home scrambled to meet demand, the plant-based value chain became keenly aware of the combined opportunity and necessity that was unfurling. Achieving both, however, requires a collaborative, strategic approach.

"Creating a linkage and collaboration across the value chain is so valuable because without these connections we might not know a supplier exists," Big Mountain Foods Ltd. President Jasmine Byrne said. "Linking the value chain allows for manufacturers to keep their ingredients sourced in Canada."

Collaborating in this way can come with a variety of other benefits, as well. Farm Credit Canada's Canada Director of Industry and Stakeholder Relations, Marty Seymour, said one of the most important is the way a partnership pushes each side to learn from the other. This sort of skill-building aligns well with Farm Credit Canada's mandate, which includes enabling companies along the value chain to grow and scale through the advancement of business skills.

"So, once again, celebrating them for their innovation, but finding partnerships for the skill-gap that they don't have—maybe that's scaling,

maybe that's access to manufacturing, maybe that's just understanding how to write a marketing plan," Seymour said.

However, partnering to advance these skills will only go so far without collaboration on a larger scale.

By working along the value chain to build collaboration, Seymour said the sector can also increase transparency and achieve greater efficiency, without sacrificing food safety or supply. Doing so, however, will also require increased capital within the sector.

"Are we attracting early-stage investment, is probably the biggest gap for me," Seymour said. "How do we help companies that have an idea, or IP, and get them the right financing tool to bridge the gap until they're scalable or where

they have some sales? That space between concept or early R&D to where you actually have customers or selling stuff can be a long time or it can be a short period of time, and I would say that, if you look at it through the lens of finances, that's the gap in industry. There's a role for government in it, definitely a role for private sector and a role for Farm Credit Canada."

Together, companies along Canada's plant-based food, feed and ingredients chain have already seen some success in growing their sector while securing Canada's food supply. With continued collaborative work, this success can be expanded to build further processing and manufacturing capacity,

helping bring safe, healthy food to consumers across Canada.

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# BENEFITING CANADIANS, FROM FARM TO FORK

Growing Canada's plant-based food, feed and ingredients sector provides as many benefits as plant-based products themselves. And with everything from new market options for farmers, to a wider selection of healthy products on grocery shelves, there's something for every Canadian to enjoy.

As more businesses and organizations across Canada become more involved in the plant-based food, feed and ingredients sector, these benefits will only become more plentiful.

"The sector has been growing in leaps and bounds and market reports indicate there's lots more to come. This has led to an increasing interest in agriculture and new innovations including plant-protein products," Enterprise Machine Intelligence and Learning Initiative (EMILI) Managing Director Jacqueline Keena said. "This is being demanded all over the world, from all age demographics, and especially young people. Even before the pandemic, millennials were being more intentional about what they ate, what the ingredients were, where it came from and how it was produced. COVID-19 placed this spotlight on our food supply chains and systems and this has only amplified young people's interest in their food and their consumption decisions."



Hailey Jefferies  
Photo provided by Prairie Fava

Maynard Kolskog, research chef with Northern Alberta Institute of Technology's Centre for Culinary Innovation, has had a first-row experience in this growth in demand. While 90 per cent of the work he does in his kitchen now revolves around plant-based foods, it hasn't been long since he didn't work with the products at all.

**Key collaborations with the private sector, government and especially academia will help lead the way in the development and especially the integration of new innovations for the industry.**

"That's pretty much all I've been working on ever since I started doing this almost eight years ago," Maynard said. "The majority of our clients want plant-based food products developed. That's kind of where my expertise has grown into, whereas I really didn't know anything about this at all 10 years ago. So for me, I have this great job that has to do with the plant-based boom and market."

As part of building this expertise, Kolskog has been looking for ways he can help add to the benefits plant-based foods and ingredients present to Canadians. In particular, he's interested in their health benefits. He explained that while plant-based foods present several nutritional benefits, there's work that can be done to enhance their protein contents, particularly to those of animal products, which are considered to be high-quality proteins due to their amino acid profiles.

Eric Zimmerman, co-founder and CEO of Enhanced Medical Nutrition (EMN), agreed with this sentiment, adding that Canada could benefit further by expanding its full plant-based foods value chain domestically.

"If the sector were to grow, improvement could be made to expand Canada's ability to keep all activities that comprise a plant protein's value chain within this country," he said. "Additionally, a growing sector would also allow for more research to be conducted on the characterization of novel plant proteins, including protein extraction processes that preserve protein quality and functionality and formulation advances to overcome flavour, texture and solubility challenges. More research could also be conducted on the nutritional benefits of plant proteins, particularly those that have been processed such as plant protein isolates."

Collaboration across the entire plant-based food and ingredients value chain can help achieve these goals.



“Key collaborations with the private sector, government and academia will help lead the way in the development and especially the integration of new innovations for the industry,” Keena said. “The pace of innovation is moving too quickly; we need all sectors of the industry to collaborate in order to seize the opportunity.”

This starts at the farm level, where processors like Hailey Jefferies, co-founder and CEO of Prairie Fava, are working directly with companies involved in fava breeding and testing new varieties that have the potential to boost everything from the protein content to the taste of plant-based ingredients. And while this leads to some impressive end results for consumers, it also means important benefits for processors and farmers.

“Because of the plant-based movement, it’s given farmers more options for crop rotation,” Jefferies said. “More research is being directed to the development of fava varieties, not only to improve agronomics, but also important quality attributes such as protein. We are excited to be assessing whether there are certain traits that are better for ingredient processing than other traits.”

These benefits don’t just affect farmers and processors, however. A more varied crop rotation leads to healthier soils and a stronger environment, while new crop varieties lead to plant-based ingredients with qualities such as higher protein content and improved texture.

This ripple effect is appreciated by consumers, ingredient processors, food manufacturers and other companies along the value chain. This includes EMN, which builds nutrition products for the healthcare population, and Infnit Nutrition Canada (INC), which specializes in sport nutrition for ultra-endurance athletes. Together, EMN and INC are working with McMaster University to clinically validate a new plant-based protein supplement utilizing Canadian-grown crops. Protein content and texture are both important factors for this development, which targets consumers for whom the consumption of high-quality proteins is necessary for a successful recovery from surgery and intense athletic events.



*Part of the Enhanced Medical Nutrition team*

“Although the plant-based population is willing to compromise on taste, texture and other sensory attributes, if we really want to see expanded growth in this area, the products have to be better,” INC CEO Darcy Haggith said. “Our early prototypes have shown that we can produce a ready-to-mix plant-protein supplement that tastes great, is not gritty and has the same levels of protein and key amino acids as the very best whey isolates on the market.”

Haggith and Zimmerman, along with their teams, look forward to the day their plant-protein supplement can help patients and athletic individuals across Canada achieve their protein needs. For now, however, they’re

enjoying the benefits that the growth of the country’s plant-based foods sector has brought their companies.

This includes everything from an easier path toward commercializing their products, to an increased number of jobs available on their teams.

“This growth has spurred an interest among consumers to learn more about plant

proteins and a demand for more nutritious, better-tasting and versatile products,” Zimmerman said. “This demand, combined with investment from Protein Industries Canada, has resulted in the creation of new jobs within our company, allowing us to take a competitive stance in the healthcare market with the development of our plant-based protein supplement.”

**Our early prototypes have shown that we can produce a ready-to-mix plant-protein supplement that tastes great, is not gritty and has the same levels of protein and key amino acids as the very best whey isolates on the market.**

# \$25 BILLION BY 2035

Canada can supply the ingredients for 10 per cent of the world's plant-based food and beverage products by 2035 — a \$25 billion boost to our economy. This growth will help Canada transition to a zero-carbon economy, address food security and nutrition challenges, and provide long-term stable employment opportunities.



**39 PROJECTS**

In our Technology and Capacity Building programs



**300+ MEMBERS**

From Canada's coast to coast and abroad



**\$8.9B\***

Canadian GDP impact in the next ten years



**\$425M**

Total project value



**\$26.5 Million**

To help farmers target pests more sustainably.



**\$63.6 Million**

To develop innovative plant protein ingredients.



**\$1.9 Million**

To create a highly innovative plant-based fish filet.



**6,200\***

Direct and indirect jobs expected through projects



**\$198M**

Follow-on investment in project partner companies



**\$264M**

Leveraged investment through industry partners



**OVER 300**

Organizations working together on projects

\*from 15 analyzed projects.

For more information, visit [proteinindustriescanada.ca](http://proteinindustriescanada.ca)



**PROTEIN INDUSTRIES CANADA**