

New Canola Seed Technology Is Good for Canada's Economy

Corteva Agriscience and collaborators' focus on optimizing canola seed composition could be a major driver of the canola industry's future economic growth.

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Often referred to as the “Cinderella crop” of Canadian agriculture, canola is a success story for both Canadian agriculture and global consumers.

Since it was introduced about 50 years ago, canola has transformed from an obscure and undervalued plant to one of Canada's leading crops and one of the world's most important oilseeds.

Grown primarily across Western Canada, the canola plant produces distinct yellow flowers, which produce tiny pods that hold canola seeds. Each seed is made up of about 45 percent oil which is used to make heart-healthy cooking oil, while the remaining 55 per cent solid parts of the seed are protein and fibre co-products that can be processed into canola meal and used as a protein source for dairy, swine, poultry, and fish.

About 20 million tonnes of canola are produced annually in Canada, generating about one-quarter of all farm crop receipts. While canola acreage has remained at roughly 23 million acres over the past decade, total production has increased thanks to modern agricultural farming practices, which have led to increases in average yield.

But consumer demand continues to grow, and for Canada to provide the ingredients for 10 per cent of the world's plant-based food products, it will need to grow its food, feed, and ingredient sector by \$25 billion by the year 2035. Achieving that goal requires investments in innovative ways to derive even more value from major food crops like canola.

Canadian plant protein sector, Protein Industries Canada recently funded a consortium of three industry partners — Corteva Agriscience, a seed developer; Bunge, a canola processor; and Botaneco, a protein processing innovator — on a project to create high protein and reduced fibre canola seed varieties.

The project — the first to focus specifically on protein quality improvement — has been underway for nearly three years. “We started off by looking at how to elevate the protein in the canola seed that would allow us to serve a much broader food and feed market,” says Tyler Groeneveld, North American Director for Grains and Oils at Corteva Agriscience, the partner company which led the project.

Higher value protein concentrate can elevate value of canola crop

Since then, the three collaborators have discovered that using advanced plant breeding technologies can increase the protein and decrease the fibre in the canola seed without compromising the quality, quantity, or composition of the oil — which is the key value driver of the canola crop. “The value creation opportunity comes from increasing the protein content in the by-product while maintaining the high-value oil component,” says Groeneveld. The protein is increased in part by reducing the fibre in the seed. “What's best about this innovation is that the seed oil can be increased at the same time as the protein content is being increased,” he says.

The result is a much higher-value protein content that can elevate the crop value per acre for everyone involved — from grower to processor to end user — and create new markets in human food, high-value animal feed markets, and renewable energy. “If you can get the entire canola crop to have a much higher level of protein in the seed, we can generate over half a billion dollars in incremental value for all participants and completely transform this crop to a much higher value feedstock that can support not only the traditional livestock and dairy markets, but meet the increase in North American demand for plant-based human foods and renewable fuel,” says Groeneveld.

Innovation opens door to new markets

The technology is still a work in progress, but Groeneveld believes it's just a matter of time before the canola meal can be turned into a nutritious edible protein for human consumption. “The amino acid complex of canola meal and protein is exceptional and

enabling advanced processing to turn the protein into an isolate, which can be another upside to this project,” he says.

Recent announcements of increased processing capacity in the next four years will result in a surplus of canola protein to an already saturated North American animal feed market. Groeneveld believes that the potential to offer elevated protein that's more nutritious for swine, poultry, or aquaculture diets will result in more opportunities to participate in higher-value markets.

The increased processing capacity could also lead to an increase in demand for the oil in renewable diesel markets. “This renewable fuel market development is exciting for the growth of the industry, and our ability to increase value by altering the composition of what we're already growing is an example of how the Canadian grower can solve for a lot of new needs in food, feed, and energy without having to use more acres,” says Groeneveld. “It's truly an exciting opportunity to innovate in a crop that we already have a global leadership position in,” he says.

Leadership from Protein Industries Canada exceptional

The Global Innovation Clusters program — including Protein Industries Canada — receive federal funding and are matched dollar-for-dollar by industry. “The co-investment funds from the Global Innovation Supercluster Program, administered by Protein Industries Canada, were critical to us in being able to increase the scale of the plant breeding program and reduce the timeline for this project,” says Groeneveld. “Their leadership in this area is exciting from a Canadian perspective because this project offers potential for incremental value in terms of jobs, GDP, new markets, and increased profit,” says Groeneveld. “Anyone eating new plant-based foods or using feed directly benefits from this type of innovation for protein technology from canola,” he says.

This is just the beginning of the journey, which will continue for several years, and the consortium of partners plans to make the technology and outputs available to all developers of canola seed. “Gaining that critical mass and collaboration with traditional competitors is what's really going to make the Canadian canola industry expand in value,” he says. ■



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First project of its kind leads to interesting discovery

Protein Industries Canada, one of Canada's five Global Innovation Clusters, is an industry-led, not-for-profit organization whose mission is to position Canada as a global source of high-quality plant protein and plant-based co-products. In keeping with its mission to invest collaboratively to accelerate innovation and competitiveness in the Can-



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This article was sponsored by Corteva Agriscience.

