

Potential industrial uses spell market opportunity for new soybean  
Renowned Guelph soybean breeder first discovered variety 20 years ago

By Lilian Schaer

Guelph - A soybean variety first identified at the University of Guelph twenty years ago is now seeing a future as a possible feedstock for industrial uses.

Currently known as OAC 13-55C-HL, the soybean is high in linoleic fatty acids, lending itself particularly well to industrial material applications like paints, coatings, polyols and epoxies.

Renowned University of Guelph soybean breeder, the late Dr. Gary Ablett first discovered the variety two decades ago while he was working to develop soybeans with oil profiles more suited to the food industry, but market demand at the time wasn't strong enough to warrant pursuing it further.

Ablett developed more than 50 soybean varieties during his career before passing away in 2012, and shared his discovery with fellow Guelph soybean researcher Dr. Istvan Rajcan. Dr. Rajcan continued Ablett's work in conjunction with a team of graduate students.

It was Rajcan's involvement with the BioCar Initiative - a partnership between the automotive industry and researchers to accelerate using plant-based ingredients to manufacture car parts – that led him to discover that OAC 13-55C-HL's profile might be interesting for industrial uses and proceed with further development.

"Nobody was interested in high linoleic at the time when Gary developed this variety, but he allowed me to study it further with my grad students," explains Rajcan. "We made crosses between Gary's original variety and some high yielding soy varieties so we could improve the yield as well as have the high linoleic oil profile."

Oil from the new soybean has a fatty acid profile that is approximately 33 per cent higher in linoleic acid than commodity soybean oil; all other fatty acid levels, including saturates, are lower. It also has a 12 per cent increase in double bonds compared to commodity soybean oil – and the more double bonds, the more reactive the oil, which should allow for improvements in production efficiency and material synthesis.

The new soybean variety presents a unique opportunity for the University of Guelph, according to Steve De Brabandere, Interim Director of the institution's Catalyst Centre.

"Traditionally the bean breeding program at Guelph has been focused on soybean growing in Ontario, and there hasn't been a lot of specific trait breeding for anything other than what farmers would need, like disease resistance, yield improvement or cold tolerance," explains De Brabandere.

"This high linoleic oil extends the range of industrial products that can be made compared to regular soybean oil and expands the ease with which companies can make products like coatings, paints and plastics using biobased ingredients," he adds.

They've managed to have a small quantity of the oil pressed and made available for new product development purposes and are now working with Soy 20/20 to get it into the hands of interested companies for testing.

Soy 20/20 has a mandate to encourage and grow both industrial and food-based market opportunities for Canadian soybeans.

"We're seeing growth in the use of soybeans in paints and coatings, and the potential of this new high linoleic oil for industrial applications is promising," says Soy 20/20 CEO Jeff Schmalz. "It has the potential to be a better feedstock for existing biobased products, as well as new product development, which bodes well for the future of Canada's soybean industry."

If early stage trials with the oil are successful, De Brabandere says they'll look at partnering with a seed company to help move the variety into commercial production with farmers willing to grow the soybeans under separate contract. He estimates that could be as early as the 2018 growing season.

Rajcan says the variety is currently still undergoing field trials to test for agronomic characteristics, and although it is not as high yielding as some of the top soybeans, it could be an attractive option for farmers looking to grow a specialty soybean.

"The real interest is in the industrial application and not for commodity production," he says, adding the bean's future will depend on the outcome of the early stage industrial product development trials.

The soybean breeding program at the University of Guelph receives funding from the Ontario Ministry of Agriculture, Food and Rural Affairs and the University. Soy 20/20 is supported by *Growing Forward 2*, a federal-provincial-territorial initiative, and by Grain Farmers of Ontario.

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