

NAIT EXPLORING USE OF FERMENTATION TO ADD VALUE TO ALBERTA-GROWN PULSES



Natto is a traditional Japanese dish made of fermentation of soybeans with Bacillus spp. In this case, NAIT made it with peas.

NAIT researchers are utilizing traditional fermentation to add value to locally grown pulses including yellow pea, faba bean and chickpea by developing misos, shoyu, shio koji and amazake.

Established in 2018, NAIT's Centre for Culinary Innovation (CCI) is a Canadian leader in food product development. Located in Edmonton, AB, this diverse team combines culinary, food science, and market insight to bring leading-edge food product ideas to life. CCI supports companies in a variety of ways at any stage in a product's pathway to market. CCI endeavours

to use Alberta grown ingredients in its formulations and works to transform Alberta commodities into value added ingredients and products. In partnership with Alberta Pulse Growers (APG), CCI is developing new fermented pulse-based food ingredients to evaluate their flavour profiles and use in food products.

The two-year project, funded by APG, is led by certified research chef Maynard Kolskog. He has nearly 40 years of industry experience, 18 years instructing at NAIT, and an extensive track record of developing various food prototypes using

alternative ingredients, novel co-stream, and alternative proteins and pulses. He is an expert in ingredient substitutions and implementing innovative techniques for new product formulations and process optimization.

As the second year of the project approaches, Kolskog has been fermenting locally grown Prairie pulses using traditional methods to create flavour pastes and powders.

"The novel food ingredients have a strong umami flavour profile and can be used in a variety of different foods," Kolskog explained. "Local chefs have tested them in their menus to great success. Umami flavours are highly desired for their savoury notes. These pastes and powders can be upscaled to produce ingredients for formulators of larger companies as well."

Kolskog, utilizing traditional fermentation and locally grown pulses, has produced misos, shoyu, shio koji and amazake. Miso is a fermented paste and traditionally produced using soybeans and koji (a starter culture). It is aged for months or even years. NAIT has developed three different types of miso using locally grown pulses: faba bean, chickpea and yellow pea. Its culinary implications are endless, and it can be used where traditional miso is used. It can also be incorporated where savoury flavours are desired.

The plant-based meat analogue industry continues to look for naturally produced flavours that are not yeast-based. Miso, made from other pulses, would be a great addition to this industry because of the varying flavours produced. Other products that were made with locally grown pulses and cereals were shoyu (Japanese-style soy sauce), shio koji (marinades for poultry, meat and seafood) and amazake (traditional Japanese drink). The result of these experiments and product development shows the versatility of the cereals and pulses grown in Alberta. Utilizing traditional fermentation and applying the ingredients and end products to modern formulations allows the creation of unique food products that would otherwise not exist.

Fermentation of locally grown pulse and cereal grains adds value to Alberta crops, and can be promoted for their unique flavour profiles. Future studies will include understanding the flavour volatiles that are produced during these fermentations to optimize usage of these pastes and powders in food formulations. Kolskog plans to produce other value-added products such as Prairie-based nattos and vinegars.

This initiative aligns with APG strategic objectives as it promotes and showcases how versatile Alberta pulses can be and how value can be added by using traditional fermentation. These value-added ingredients can be promoted to open new markets and increase profitability in our value-added food chain.

Lastly, it provides an understanding of what consumers acceptance of pulses, value-added pulse ingredients and provides a basis for farmers and manufacturers to make more informed decisions in future production.



Koji is a starter culture (not unlike bacteria used in cheese) – Aspergillus oryzae. This starter culture is responsible for shio (Japanese soy sauce), fermented rice drinks, and miso. Traditional koji is grown on rice but here NAIT has grown it on barley. The koji was applied to Alberta pulses (peas, chickpeas, and faba).

Project

Development of fermented pulse-based food ingredients and evaluation of their flavour profiles and suitability for use in model food systems

Industry Funder

Alberta Pulse Growers, RDAR

Cost

\$200,925

Project Completion Date

Completed 2024