ALBERTA INNOVATES

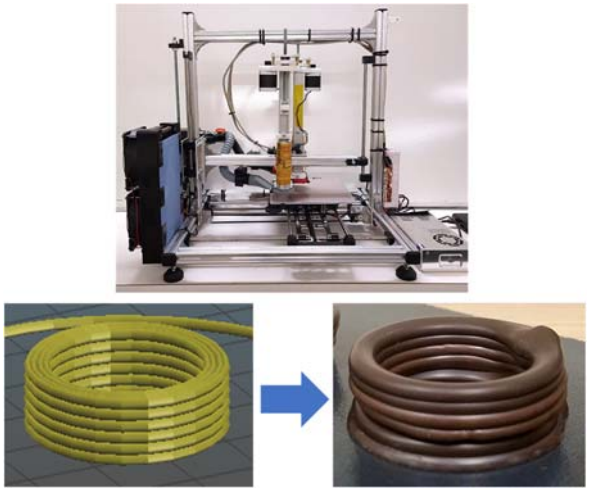
CLEAN RESOURCES

AGRI-FOOD INNOVATION

FOOD INNOVATION

Development of Novel 3D Printed Foods from Alberta-Based Starch and Protein Sources

3D Food Printing (3DFP) is an emerging technology that allows for customizable food preparation and manufacturing. It offers the benefits of personalized nutrition for institutional and home use, as well as creation of unique food aesthetics. Using 3DFP as a starting point for the development of healthy, customized snack products made from protein, starch and fiber-rich materials has been demonstrated. Its potential for a wide range of applications needs further research on: the food types that can be printed; required ingredients and formulations to ensure structural stability, safety and shelf-life testing; and consumer acceptance of 3D printed foods. This project aims to understand the application of novel 3DFP technologies and assess its potential use and acceptance by various Alberta stakeholder groups including food producers/processors and end-users.



FUNDING DETAILS

RECIPIENT:
University of Alberta
PI: Dr. John Wolodko

PARTNERS:
Alberta Agriculture and Forestry Food Processing Development Center

TOTAL BUDGET:
$395,500

AI FUNDING:
$180,500

PROJECT DATES:
APR 2021 – SEP 2023

PROJECT TRL:
Start: TRL 2
End: TRL 7

APPLICATION

3DFP has a number of potential applications including novel food product design and production for food producers, restaurants, bakeries, and the potential delivery of personalized and enhanced nutrition for healthcare providers, athletes and households.

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PROJECT GOALS

- Understand potential applications and limitations of 3DFP technology.
- Assess the use of various Alberta crops in 3DFP applications through product development and testing.
- Introduce 3DFP technology to different stakeholders in the Alberta food sector.

BENEFITS TO ALBERTA

- Development of new food formulations from Alberta-grown starch and protein producing crops.
- Building of knowledge base on the range of food products and ingredients that can be processed using 3DFP.
- Opportunity for the Alberta food manufacturing sector to produce and export value-added products.
- Opportunity for Alberta food companies to play multiple roles as both users of 3D food printers to support their operation (e.g. as product development tool) or as suppliers to the growing 3D printing sector (e.g. pre-made ingredients for 3D food printers).
- Increased awareness of 3DFP technology to the Alberta food manufacturing sector.

4-6 Publications

3–4 Students Trained

3–4 Project Jobs

CURRENT STATUS

JUN 2022

The project team has conducted preliminary experiments to identify the printability of an Alberta-grown pulse (pea). Results so far showed that pea protein isolate can be used in 3D food printing (3DFP) applications when processed using Plasma Activated Water and heat gelation. In addition, the team has also initiated the development of a comprehensive database to catalogue 3DFP technologies and products for the Alberta food sector. Work is also ongoing to conduct an interview study with current adopters of 3DFP technologies in Summer/Fall 2022, and to conduct an online survey with the Alberta food industry to assess opportunities and barriers for the adoption of 3DFP (Winter 2022).