



ALBERTA INNOVATES CLEAN RESOURCES

BIOINDUSTRIAL INNOVATION

OPPORTUNITIES SUB-PROGRAM

FUNDING DETAILS

Use of Alberta-based Bio-Products as Additives in Green Polymers for Packaging

Biopolymers are increasingly being utilized to mitigate environmental effects of plastics, including the accumulation of environmental waste. However, biopolymers often exhibit inferior properties to conventional polymers. The purpose of our work is to use Alberta-produced, environmentally friendly fillers (including hemp fibers and plant oil) to modify the properties of biopolymers, with the aim to develop biopolymers with mechanical properties suitable for use in packaging applications.



RECIPIENT:

**University of
Alberta – Anastasia
Elias**



AI FUNDING:

\$183,000



TOTAL BUDGET:

\$273,000



PROJECT DATES:

**January 2018 –
December 2020**

APPLICATION

Consumers are increasingly demanding the use of biopolymers in applications such as straws, food packaging, and agricultural films. The results of this work can be applied in each of these sectors. The biopolymers produced in this project are based on Alberta-sourced fillers, which are completely degradable at the end of their lifetime.

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PROJECT GOALS

- Develop materials and methods that improve mechanical and barrier properties of biopolymers.
- Investigate use of hemp fibers as a low-cost additive in biopolymers.
- Develop inexpensive methods to process hemp fibers for use in composites.
- Determine if epoxidized canola oil can be used as a plasticizer to improve the flexibility of biopolymers.
- Characterize physical and thermal properties of composites
- Measure degradability of resulting materials.

BENEFITS TO ALBERTA

- Agriculture is the second largest industrial sector in Alberta; with opportunities for growth.
- Alberta is a major Canadian producer of both industrial hemp and canola.
- Our work will create new value-added products from agricultural materials that are typically considered low in value.
- We are working with local industries to identify applications for biopolymers and biopolymer composites, and to tailor materials for their specific needs.



2 Publications



**4 Students
Trained**



1-2 Project Jobs



**1 New
Products/Services**



5-6 Future Jobs

CURRENT STATUS

JUNE 2020

Obstacles to incorporating plant-based fibers (such as hemp) into polymers include their limited miscibility and thermal stability. The team has developed an effective surface treatment method to process hemp-based fibers; the resulting fibers can be blended with biopolymer pellets to form composites with favorable thermal and mechanical properties. The team has also met with numerous local stakeholders and new partnerships are being established.