

Clean Resources

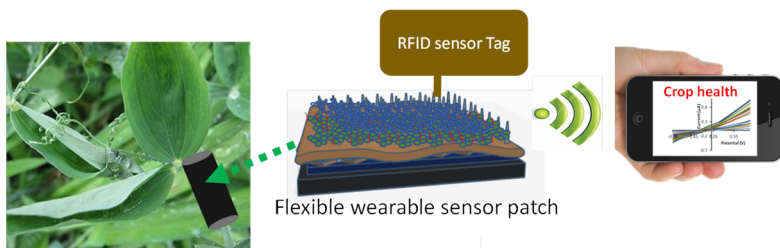
Smart Agriculture and Food Innovation

Smart Agriculture

FUNDING DETAILS

Validation of an Electrochemical Plant Wearable Sensor Clip for Real Time Plant Analytics

In response to plant-protein diet trends, the international market for pulse crops is growing. Pulse crops are susceptible to abiotic stressors, such as extreme heat and moisture, and to fungal root rot and stem and foliage diseases. Field scouting and manual foliage inspection are common approaches for identifying crop infestation, but these are inefficient and unreliable. The reactive approach of indiscriminately spraying fungicides on entire fields is expensive and environmentally harmful. This project seeks to validate a low cost (<\$30) electrochemical sensor, with Bluetooth technology and smart phone data analytics software, as a wearable device for real-time monitoring of pulse (peas) crop quality and health. The sensor will quickly determine locations of stressed plants due to moisture excess, drought, or disease onset. This smart tool will empower farmers to promptly intervene when pea crops are stressed, maximizing pulse crop yield.



RECIPIENT:

**MacEwan
University**



PARTNERS:

**Stream
Technologies**



TOTAL BUDGET:

\$91,000



AI FUNDING:

\$70,000



PROJECT DATES:

**Mar 2020 –
Apr 2023**



PROJECT TRL:

**Start: 4
End: 7**

APPLICATION

The project will demonstrate two variations of microneedle electrochemical plant wearable sensors for real-time monitoring of plant stress molecules in indoor and outdoor settings. Monitoring of pulse crops will alert the farmer of plant stress indicators empowering farmers to make rapid and informed appropriate intervention. The sensor technology will minimize cost, and maximize yield, plant quality and revenue.



ALBERTA INNOVATES

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PROJECT GOALS

- Validate and deploy a smart electrochemical sensor tool principally targeted to peas. The inexpensive (<\$30) miniaturized device will be an accessory to wearable electrochemical sensors, which allow for rapid detection of plant stress.
- Increase understanding of diagnostic indicators for overall plant health in pulse crops.
- In the long term, the validated sensor tools will be deployed for precision/smart agriculture of non-pulse crops, such as wheat, barley, and canola.

BENEFITS TO ALBERTA

- This smart sensor will allow producers to make proactive crop management decisions related to plant health before the crops get infested and degrade. This will increase pulse crop quality and quantity and will tap into increased market demand for pea protein isolate, increasing revenue for Alberta pulse growers.
- The smart sensors will minimize the indiscriminate use of fungicide by providing real-time, site-specific data related to plant health status. The device will decrease crop management costs and increase social responsibility and environmental sustainability.
- The deployment of this smart technology will strengthen Alberta as a global leader in smart agriculture technology. The devices fall in the field of flexible electronics (current worldwide market ~ \$3 billion). Their successful development could further Alberta's economic diversification by building ecofriendly high-tech specialty products for a green economy.



2 Publications



**9 Students
Trained**



1 Patent



**1 New
Product/Service**



9 Project Jobs

CURRENT STATUS

September 2020

The team is working on the laboratory fabrication of the sensors and on a preliminary field testing on the pea crops.