Pronto

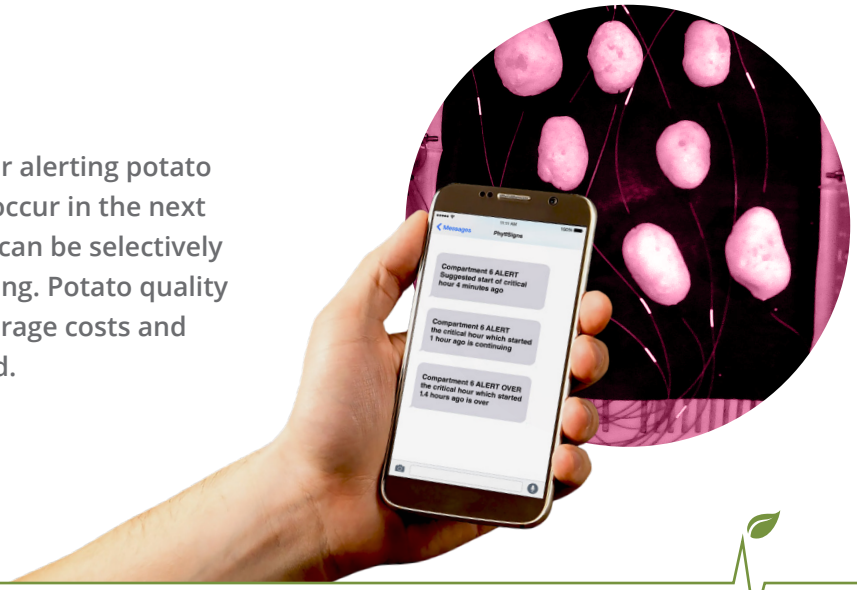
Predicting Potato Sprouting to Optimise Tuber Storage

Challenge

Potatoes, the world's 4th most important crop are stored for long periods before processing. Sprouting during storage reduces the quality and value of stored potatoes. Most stored potatoes are treated with products to extend the storage life but recent regulatory changes in Europe have significantly increased the cost of anti-sprouting compounds (ASC). There are no effective technologies for reliably predicting sprouting in advance so ASCs are applied preventatively, more often than required leading to higher costs and environmental impacts.

Solution

Develop a reliable, low-cost method for alerting potato storage managers that sprouting will occur in the next 1 – 3 weeks so storage compartments can be selectively treated or potatoes moved to processing. Potato quality and value will be maintained while storage costs and environmental impacts will be reduced.



Funding:

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Research Partners:

Schweizerische Eidgenossenschaft
Confédération suisse
Confederazione Svizzera
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Agroscope

FFHS Fernfachhochschule Schweiz
Mitglied der SUPSI

Scuola universitaria professionale della Svizzera italiana
SUPSI

Implementation Partners:

fenaco

ZWEIFEL

UPL

Vivent Biosignals

Method

A Swiss collaboration of experts in the key fields of agronomy, crop protection, plant electrophysiology, potato physiology, potato storage and processing, and data science will develop an Artificial Intelligence-based system that uses electrophysiological measurements recorded directly from stored potatoes which alerts storage facility managers that sprouting (potato germination) is imminent.

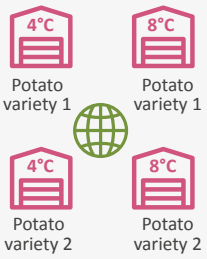
Storage managers will receive early alerts of sprouting and can then either apply ASCs only when needed or move the tubers to processing without treatment. Different potato varieties stored in typical large format storage chambers are being monitored using Vivent's biosensors and infrared cameras. Recorded data is being processed using the most advanced machine learning (ML) techniques.

PRONTO: Cutting Edge Innovation

Combination of Plant's Electrophysiological Signals and ML technologies

Understanding plants behavior through electrophysiological signals and ML technologies

Generalization of sprouting detection to potatoes under different conditions



Transparency and explainability of the solution

We build transparent and explainable ML models

We know signs of sprouting weeks ahead

We know when and when not to rely on our ML model predictions

Optimization of potatoes storage

Alert managers that sprouting will occur in next 2 weeks so batches can be removed or treated

Benefits

Confidence in early detection of sprouting with enough notice to take action, by either removing stored tubers or treating with sprouting inhibitors will reduce energy consumption and the application of crop treatments. In addition, we expect to reduce storage losses and to improve the quality of stored potatoes.

Key Facts

Start: 01.07.2023
Duration: 27 Months
Total Budget: CHF1.9M
Innosuisse Contribution: CHF950,000
Number of partners: 7
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