Early Detection of Potato Storage Disease by Gas Analysis

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Introduction

- Potato 'soft rot' disease is caused by bacteria, such as *Pectobacterium atrosepticum,* and results in losses of ca. £30 million per year to the UK potato industry.

- Current disease diagnostics relies on human sensorial analysis and qPCR (real time polymerase chain reaction), which are both costly and can be destructive. Therefore, there is a need for an alternative technique that can provide more rapid, accurate and reliable non-destructive detection of potato diseases (at an early stage) to help manage stores.

- The purpose of our current research is to assess the potential to "smell" infected tubers to identify the potato disease using gas sensing technology.

Objectives

- Assess the potential of gas analysis for detection of potato soft rot.
- Evaluation of strengths and limitations of various gas analysis technologies.
- Implementation of a robust but simple data analysis procedure for quantitative assessment of results.

Methods

- The basic approach of our current research relies on gas sensing technologies that attempt to mimic the human sense of smell, such as Ion Mobility Spectrometry (IMS), PID (Photoionization) and electronic noses.

- In laboratory experiments, control and infected tubers have been tested before and after sensory signs of disease progression.

- We are now currently developing methods to deploy these systems in commercial potato stores.

Results

Laboratory results to date show that detection can be achieved in laboratory settings for all technologies.
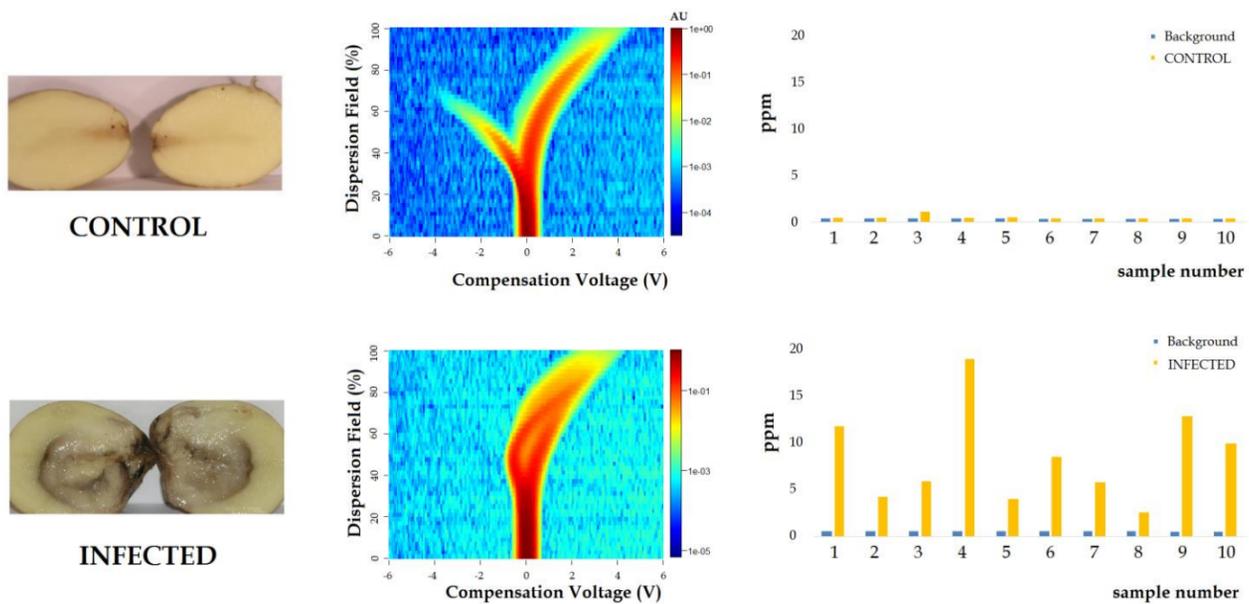
Experimental results at a set time point (5 days post inoculation) for IMS and PID technologies.

Implications for the Industry

The desired outcome of our current research is that in the future, gas monitoring for potato infections in stores becomes standard - as CO_2 monitoring is today. Using such technologies will result in less visits to the stores and give a real-time indication of the health of the crop.

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