

Potential of selective harvest based on mycotoxins content assessment in cereal crops (POSHMyCo)

The project aims at the use of proximal and remote sensing that encapsulate advanced imaging technologies with the combination of artificial intelligence (AI) for the effective management of Fusarium Head Blight (FHB) and the mitigation of mycotoxin contamination through selective harvesting in cereal crops.



Fig 1. Comparison between healthy wheat kernels (left side) and infected with FHB (right side)

What happens when you consume contaminated food with DON?

DON, an important mycotoxin produced by FHB infection, causes vomiting, abdominal pain, diarrhea, nausea, headache, and fever in humans. To protect public health, safe maximum levels of DON in foods are enforced in European Union Regulation (EC) No 1881/2006, which range between 0.2 and 1.75 mg/kg (depending on the food types). In POSHMyCo, we will set a novel method for selectively harvesting the grains based on DON level into three categories: human consumption (≤ 1.25 mg/kg), fodder ($1.25 \leq 8$ mg/kg), and Bioenergy (>8 mg/kg)



Fig 2. Fusarium head blight symptom on wheat ear

What technology POSHMyCo will use to make the food safe?

Today, technology is causing a drastic change in the agricultural industries, which is significantly improving the farmer's productivity and quality. However, improvements to technology needs to be consistently made to meet the growing populations' food demands. There is enormous potential in advancing technology to further increase the production efficiency, improving quantity and quality, whilst reducing mycotoxin contamination. The proposed methodology to make the food safe for consumption consists of the following items:

1. A multi-sensor platform to measure soil properties to assess its role in disease incidence.
2. A hyperspectral camera combined with a thermal camera for early detection of FHB infection.
3. Utilizing sophisticated machine learning /deep learning algorithms for disease forecasting.
4. Advanced variable rate technology for fungicide application, and selective harvest mapping.

What benefits Poshmyco will provide?

1. Reduced mycotoxin contamination in grain, providing greater quantities of healthy and safe food.
2. Advanced variable rate technologies will reduce the quantity of applied fungicides, thus reducing the associated negative environmental impacts.
3. Improved farm profitability, providing better economic returns for farmers.