

Testing for DON

Achieving a consistent, accurate DON test result



WHAT IS DON?

Deoxynivalenol (DON) is a mycotoxin naturally produced by the fungus that causes Gibberella ear rot in corn. Infection begins through the corn silk and grows in warm (27 - 28° C), humid weather.

DON SAMPLING ISSUES: Accurate and efficient sampling, detection, and quantification of mycotoxins have been challenging. The toxin is not uniformly distributed in grain, or grain samples, but is critically important. Effective sampling leads to fewer false readings and better grain management during grain delivery. Following the record outbreak in 2018 of Gibberella ear rot in Ontario, research at the University of Guelph identified several necessary improvements to the DON sampling protocol, intended to help with the accuracy of testing. •



SAMPLING PROTOCOL

By following these recommended sampling steps, DON testing can have consistent and repeatable results from the grain that is being represented by the sample. Reduction of sample testing variation improves confidence in the grain sector.

Step 1: Collect a representative grain sample of no less than two kilograms

Mycotoxins are not distributed evenly in grain loads; therefore, multiple samples should be taken from a single load to obtain a representative two kilogram sample. Best practices for various scenarios are described below:

For **delivered grain**: Before dumping, ensure at least **four** pneumatic probe samples are taken. Sampling should comprise the entire vertical profile of the load. Take four separate pneumatic probe samples, from different areas across the delivery truck length.

For sampling while **dumping grain**: Dip a 250 millilitre cup into the continuous grain flow multiple times (20 minimum) while

grain is unloaded to obtain the required two kilogram sample.

For sampling **stored grain**: Be sure to sample using a probe and pull cores as deep as possible from multiple depths between the bottom and top of the probe depth. Sample in multiple locations around the bin until a two kilogram sample is collected.

Step 2: Grind the two kilogram grain sample
Due to the high variability in mycotoxin content between individual grain kernels, it is crucial to take a grain sample of **at least two kilogram** and **grind the entire sample** before **remixing the meal** and taking the final subsample for DON testing.

Step 3: Sub-sample the two kilogram ground sample

From the two kilogram ground sample, collect a 10 - 30 gram subsample (based on the specific test kit instructions) to be used in DON dip test. It is crucial that the test kit instructions are followed accurately to reduce test kit operator error. Note that two different types of rapid tests are marketed – ELISA

(enzyme-linked immunosorbent assay) and LFD (lateral flow device), both of which are suitable for on-site testing.

Step 4: DON dip test

It is crucial that the test kit instructions are followed accurately to reduce test kit operator error. Follow the test kit manufacturer's instructions as reagents and time exposure for the dip strips may vary. As the concentration of DON goes up in the samples taken, the variability in the test kit also increases.

Testing at the University of Guelph Ridgetown Campus confirmed the accuracy of test kits and determined that variability in results is within an acceptable range. ●

The DON testing project was funded in part through the Canadian Agricultural Partnership (the Partnership), a federal-provincial-territorial initiative. This project was also funded in part by Grain Farmers of Ontario. The research was carried out by the University of Guelph Ridgetown Campus with support from the Ontario Ministry of Agriculture, Food and Rural Affairs (OMAFRA) and the Mycotoxin Coalition (Ontario Agri-Business Association, Grain Farmers of Ontario, University of Guelph, and OMAFRA).

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Version: 25-10-2023.

Grinding an entire two kilogram sample significantly reduced the variability in results when compared to the traditional protocol of sub-sampling of whole kernels. By grinding and mixing an entire two kilogram whole grain sample, only one subsample is required to be within 20 per cent of the actual DON concentration of the grain. In comparison, 11 subsamples using the traditional DON processing methods of whole kernel samplings would be required to obtain this same level of accuracy.