

October 16, 2012

Midwest Grain Elevator, Iowa USA Analysis

An analysis was conducted of matching grain storage silos containing feed corn utilized for poultry production. Silos were located on the same property adjacent to each other with a total capacity of 30,000 bushels capacity each.

Silo "A" was a standard metal framed silo and Silo "B" was of similar construction with the addition of a micro-vaporization system to vaporize "Path-Away®" Anti-Pathogenic Solution, a plant based formulation scientifically developed by Arthur V. Martin of GICC LLC, a USA based consulting firm.

Silo A: Corn was loaded and stored in the normal manner and time frame as in the past. The silo was not mechanically conditioned for temperature and/or humidity.

Silo B: As the silo was loaded the micro-vaporization was in operation misting the Path-Away® Anti-Pathogenic Solution at 2-5 microns. This gave the effect of "layering" treated grain as the silo was filled. The micro-vaporization had the effect of maintaining a constant level of temperature and humidity within the stored space.

Fungal Biota Silo A: Samples were collected from various levels within the stored location and checked for the most common bio-burden affecting stored corn. Typical results confirmed the presence of *Aspergillus*, *Alternaria*, *Drechslera*, *Nigrospora*, *Periconia* and a small concentration of *Penicillium*. Initial levels on day 15 after storage were assumed due to ubiquitous fungal genera being present geographically based on the time of year. All *CFU* readings were in the 50-120 range per bushel randomly sampled. At day 35 the *CFU* levels had increased to the 150-350 range. Moisture content was measured at 17.5% on average in random bushels sampled from random locations within the storage silo.

At the 500 *CFU* level sufficient mycotoxin production would begin to render the grain harmful to poultry. The transmission of viable fungal biota to the living poultry results in cellular mutagenesis rendering the life of the birds highly shortened. This results in product loss with a potential to cross contaminate an entire shed of up to 25,000 total birds.

Fungal Biota Silo B: Samples were collected from various levels within the stored location and checked for the most common bio-burden affecting stored corn. Typical results confirmed the presence of *Aspergillus*, *Alternaria*, *Drechslera*, *Nigrospora*, *Periconia* and a small concentration of *Penicillium*. Initial levels on day 15 after storage were assumed due to ubiquitous fungal genera being present geographically based on

the time of year. All CFU readings were in the 50-120 range per bushel randomly sampled. This was consistent with finding in **Silo A**. At day 35 the CFU levels had decreased to the 25-75 range.

The ability of the micro-vaporized Path-Away® Anti-Pathogenic Solution infused at 2-5 microns not only stopped an increase in fungal quantification but it actually decreased the bio-burden on the stored corn.

Results: Although a small experiment, proof of concept was scientifically proven. Length of storage is normally 6-8 months depending on production at the poultry operations and the number of growers accessing the storage. At the 6 month time period there was a significant gain in viable corn in **Silo B**. My estimate was a saving of approximately 23% versus the loss of edible grain in **Silo A**. It was judged that the increased cost on the installation would be offset in 2-3 growing seasons.

Path-Away® Anti-Pathogenic Solution is Registered with the New Zealand EPA and New Zealand Food Safety Authority and under current USA EPA rules is exempt due to the active ingredient being natural based and listed as exempt from registration as a fungicide and/or biocide.

A larger trial should be conducted and due to the nature of the product it can be utilized on other feed and food stocks.