Black light testing
Black light testing for aflatoxin has significant limitations compared to newer technologies. It can also create problems when used as a test method. Using newer technologies can help facilities avoid:

- Rejecting truckloads of materials due to inaccurate results (both high false positive and false negative)
- Blending or using material that contains high aflatoxin
- Using feed that reduces feed efficiencies or harms reproductive systems

Although black light testing is inexpensive, the total cost for false results can be higher than implementing a testing program. Historically, black light testing was used because it does detect kojic acid in grains. Kojic acid, a by-product of various molds, will fluoresce if cracked corn is placed under a black light. Other false positives can be due to Aflaguard® and rodent droppings.

Molds that produce kojic acid include the aflatoxin-producing molds Aspergillus flavus and A. parasiticus. A “glower” under a black light may indicate the presence of kojic acid and this kojic acid may be from the aflatoxin-producing mold. If this is the case, there may be aflatoxin present. As a result, the black light test has been occasionally used as an indirect indicator of the possible presence of the aflatoxin producing mold and aflatoxin. But, a black light test by itself does not indicate if aflatoxin is present.

Studies have shown very poor correlation because the black light test doesn’t test for aflatoxin and actually tests for a secondary by-product that may or may not be produced. For instance, it is possible to get a negative result of non-glowing particles but actually have aflatoxin. This could be due to kojic acid not being produced or kojic acid degraded during grain drying and storage. Conversely, it is possible to have glowing particles and yet not have aflatoxin. For this reason, the black light test is not recommended for aflatoxin.

The following illustrates possible results with black light tests on corn:
Black light research findings

The following are quotes from various researchers regarding the black light test for the detection of aflatoxin:

“The problem with the black light test is that fluorescence is produced by Aspergillus which is actually caused by a secondary by-product known as kojic acid, not the aflatoxin itself...Because the two products are produced by separate pathways in the fungus, there can be high levels of kojic acid and little or no aflatoxin. In this case, the corn will fluoresce and be rejected when it is actually safe. In the reverse scenario, there can be little or no kojic acid, but high levels of aflatoxin. In this case, the grain will pass inspection, but could lead to feeding problems with livestock later on.”


“One of the methods that has been suggested to test grain...is to run a black light over the grain. The studies I conducted suggest this method is accurate only about half the time when actual aflatoxin concentrations range between 50 and 500 ug/kg. Black light test may be inexpensive and quick, but is not a reliable method for determining aflatoxin presence until aflatoxin concentrations exceed 700 ug/kg. However, the method does not indicate the actual concentration of aflatoxin on the grain, which makes the method essentially useless.”


“This (black light) is only a presumptive screen, and false positives and false negatives are very common...Because of the inaccuracy of this test, it is generally not recommended.”

University of Kentucky, Dr. Paul Vincelli, Dr. Darrell Johnson, Dr. Cynthia Gaskill. Options for Mycotoxin Analysis in Corn and Feed. Plant Pathology Fact Sheet. PPFS-MISC-01.

“This (black light) is not an accurate test for any toxin (including aflatoxin), as there are natural compounds in grain that fluoresce under black light.”

Ohio State University, Dr. Katelyn Willerd, Dr. Pierce Paul, Dr. Peter Thomison, Dr. Dennis Mills. Gibberella Ear Rot and Mycotoxins in Corn Sampling, Testing and Storage. Ohio State University Fact Sheet Agriculture and Natural Resources, AC52–10.

Conclusion

The risk of using the black light is the high probability of rejecting a load with low or zero aflatoxin or accepting a load with high aflatoxin. If a high load is accepted, there can be economic, health and regulatory ramifications. Once again, economic and safety risks include:

• Rejecting truckloads of materials due to inaccurate results
• Blending or using material that contains high aflatoxin
• Using feed that reduces feed efficiencies or harms reproductive systems