

Guidance on Collecting Dust Samples for Mycotoxins

What is the objective of testing for mycotoxins? Simple question, but what do you want to learn? Are there mycotoxins in your home? Yes, probably, if you search hard enough you can probably detect them somewhere. But a “contaminant of concern” is something that (1) is present, and (2) at a concentration that is capable of causing an adverse health effect. Many mycotoxins are present at higher concentrations in our food chain than in our house dust.

However, this document provides some guidance for homeowners that want to collect dust samples for mycotoxin testing. I hope it will help them obtain higher quality results that have more utility.

Question: Are the mycotoxin tests available through several labs sufficiently accurate to tell us if we are being exposed to mycotoxins at home or not?

Let’s start with a brief look at laboratory testing of mycotoxins. A trustworthy test, such as a medical test, is “validated.” Validation means that a third-party certification organization has established that the reported test results have been shown to be accurate and have an acceptable precision – the test is measuring what we expect it to be measuring.

If for example 10 micrograms (mcg) of bacterial endotoxin is injected into a blood sample and the blood is then analyzed by a laboratory instrument, and 10 mcg of bacterial endotoxin is detected in the blood, then the test procedure is accurate. The FDA may be the organization that validates and certifies this method. If only 5 mcg of endotoxin had been recovered from the blood sample, for example, then the test method would have been shown not to be accurate.

If known amounts of mycotoxins in house dust are compared against standards developed by the laboratory, and those amounts are recovered using the test protocol and instrumentation, then the accuracy of that test method has been validated. We can have some confidence in the results reported by the laboratory, but neither the test method nor the results may be “certified”.

Problem 1: The accurate detection of mycotoxins in biological fluids is a complex task. A laboratory may claim “certification”, but it is the test procedure that is certified and not the reported sample result.

Question: How are dust samples collected for mycotoxin testing?

Instructions from mycotoxin-testing laboratories for collecting dust samples for mycotoxins include using a Swiffer duster, Swiffer cloth, swab, gauze pad, or filter cassette. Some labs tell us to sample visible mold and others tell us not to sample visible mold; to sample water-damaged areas and not to sample water-damaged areas; to combine surfaces from multiple spaces in the home or to only sample similar surfaces.

The laboratory testing procedures are at least standardized and the results from a single laboratory are probably at least consistent. However, it does not appear that the sample collection process has been standardized, validated, or certified, does it? The real problem with mycotoxin testing is that the helter-skelter sample collection process can negate the sophisticated laboratory analysis of the submitted dust sample. The dust collection step can, and frequently does, invalidate the validity of the laboratory report.

Problem 2: The non-standardized sample collection process can negate the sophisticated laboratory analysis of the submitted dust sample. The dust collection step can, and frequently does, invalidate the validity of the laboratory report.

If the homeowner has been asked to collect the dust sample, then the steps are:

- Define the objective,
- Define a Sampling Plan,
- Select a laboratory,
- Collect the samples.

Objective

1. Are there mycotoxins in the dust throughout my home? Then sample the dust.
2. Are mycotoxins on water-damaged material or in visible mold that I can see? Then sample those materials in one sample and the colonies of visible mold in another sample.
3. Are there mycotoxins in a particular section of my home and not others? Then separate the home into sections based on rational criteria and test each section separately. Sections can be HVAC zones, occupied spaces vs basement vs garage vs attic, first floor vs second floor vs basement, etc.
4. Can mycotoxins be detected in my biological fluids? Several laboratories can provide test results to answer this question.
5. Are the reported mycotoxins detected in my biological fluids due to the mycotoxins detected in the dust samples from my home? There is no known test or test result that I am aware of that can answer this question.

Sampling Plan

Things change, from surface to surface, from one area of the home to the other, from day to day, and from season to season. These factors lead to a lot of variability in mycotoxin concentrations between samples. Collecting one sample from one surface on one day during one season will obviously result in a biased sample. However, if only one sample can be collected, then try to include a diverse number of surfaces in the sample to be as representative of the indoor environment as possible. Yes, it's true, sample collection is one of the the weak points in assessing occupant exposures to environmental mycotoxins.

The "sample area" is the space within the home in which a dust sample is collected. It is defined by the homeowner before the sample is collected. Examples of Sample Areas are:

1. HVAC Zone 1 and HVAC Zone 2 may be defined as separate areas,
2. First floor and Second floor as the same or separate areas,
3. "Bedrooms/Bathrooms" and Living room/Dining room/Kitchen as the same or separate areas,
4. First floor and Basement as separate areas,

5. Hard surfaces and soft surfaces as separate areas (and different sampling methods),
6. People walk on carpet and flooring and should be considered a separate sample area.

Testing Laboratory

Several laboratories offer tests for mycotoxins in dust and/or biological fluids. Find a laboratory that supports your objectives and needs. Then assess their procedures, review an example laboratory report, and become familiar with their sampling guidance. Finally, call them and ask questions, most will be glad to discuss any questions you may have.

Sample Collection

The homeowner may want to consider the following guidance when collecting dust samples:

1. Do not waste money sampling garages, basements, attics, or crawl spaces unless there is a specific reason to sample those spaces. Are those occupied indoor spaces? Do you really spend a lot of time in those spaces? Do you clean them when you clean the living room?
2. Surfaces from occupied and unoccupied spaces should not be included in a single sample. They should be sampled using separate sampling media.
3. Do separate the occupied indoor spaces into separate sampling areas based on logical criteria. When collecting any one dust sample, do not include surfaces from multiple sampling areas in that sample (dust from the first floor and the basement, for example).
4. If the objective of a particular sample is to characterize the indoor environment, do not include areas of water damage or visible mold. Sample those areas using separate samples (better yet, schedule a mold inspection if such areas exist).
5. Dust from hard surfaces (table-top, door jamb), soft surfaces (couches, bedding), and personal items (clothing, toys) should be collected in separate samples when possible.