Mycotoxins in Indoor Environments

Go beyond visible mold with advanced mycotoxin testing for indoor environments.

Summary: Go beyond visible mold with advanced mycotoxin testing for indoor environments. EnviroBiomics tests settled dust for a broad range of mycotoxins and emerging fungal metabolites that may remain in water-damaged buildings, even when active growth is not obvious.

At EnviroBiomics, we believe a meaningful indoor environmental evaluation should look beyond visible mold alone. In water-damaged or contaminated environments, microbial fragments and byproducts can persist in the air and in settled dust even when active growth is not obvious. One of the most important categories to evaluate in these situations is mycotoxins.

Why Mycotoxin Testing Matters

Mycotoxins are toxic compounds produced by certain fungi. These substances may be present in spores, small mold fragments, and settled dust, where they can remain part of the indoor environmental burden.

For individuals concerned about water-damaged buildings, CIRS, and other inflammation-related conditions, mycotoxin testing can provide valuable additional insight beyond standard mold analysis.

What We Test

We test for a broad range of mycotoxins and fungal metabolites, including compounds of emerging concern for CIRS and other inflammatory conditions.

Samples are collected from settled dust using either a dry Swiffer method or a vacuum collection method. Our environmental dust analysis is performed using high-sensitivity LC/MS/MS ion-trap technology, offering advanced analytical performance and strong detection capability.

Our Testing Approach

At EnviroBiomics, we focus on environmental dust samples rather than biological samples.

- We do not test urine mycotoxins.
- We do not test airborne mycotoxins.

Our expertise is centered on indoor environmental dust testing, where we use state-of-the-art analytical methods and highly sensitive detection limits to provide reliable results.

Sample Collection Recommendations

For the most meaningful results, we recommend collecting dust from general living areas rather than directly from a visible contamination source. This collection approach is similar to the method used for the ERMI and Actino tests and is typically performed using a dry Swiffer duster.

Turnaround Time

Mycotoxin test results are typically available within two weeks of sample receipt.

Classic vs. Emerging Mycotoxins

Based on our experience performing many thousands of indoor dust tests, we often detect relatively few of the classic mycotoxins commonly discussed in food safety. Instead, we more frequently identify compounds considered emerging toxic fungal metabolites.

One important reason is that many classic mycotoxins are more strongly associated with food contamination, especially in staple agricultural products such as corn, peanuts, wheat, and tree nuts. These toxins are commonly produced by fungi such as Aspergillus and Fusarium before harvest or during improper storage.

Emerging concern now surrounds a broader category of masked and emerging mycotoxins, including compounds such as enniatins, beauvericin, fusaric acid, mycophenolic acid, and usnic acid. These compounds and others like them may contribute to chronic toxicity, immune suppression, and hormonal disruption. Because many of these metabolites can escape traditional screening methods, they may be overlooked in more limited testing approaches.

Mycotoxins Commonly Associated with Water-Damaged Buildings

In water-damaged buildings, mycotoxins from Penicillium and Aspergillus species are among the most commonly detected toxic metabolites. Their prevalence is tied to the fungi that colonize damp building materials and accumulate in settled dust.

Emerging Concerns vs. Established Mycotoxins

Recent research also highlights less-characterized compounds that may co-occur in damp indoor environments.

- Bacterial metabolites: Emerging research has identified toxic bacterial metabolites, such as monactin and staurosporin, produced by Streptomyces species that may grow alongside mold.

- Spirocyclic drimanes: These abundant Stachybotrys metabolites are often present at higher concentrations than the better-known trichothecenes, though they are less commonly included in standard home inspections.

Settled dust acts as a reservoir for these toxins, and levels may be significantly higher in moisture-damaged areas than in dry areas. This is one reason dust testing can provide useful information when evaluating a building for microbial contamination.

Examples of Emerging Fungal Metabolites

In addition to well-known toxins such as aflatoxins and trichothecenes, a number of emerging fungal metabolites are increasingly discussed in the context of indoor environments and contaminated food supplies.

Frequently Asked Questions About Fusarium and Mycotoxin Exposure

Questions often arise around Fusarium-associated mycotoxins, especially when results appear in urine testing or when the exposure source is unclear. Below are some of the most common topics raised by clinicians, indoor environmental professionals, and patients.

1. When Fusarium-associated mycotoxins appear in urine testing, where is the source typically found?

Fusarium-associated mycotoxins such as fumonisins B2 and B3, deoxynivalenol (DON or vomitoxin), and diacetoxyscirpenol (DAS) raise an important source question: are they coming from food, the environment, or another route of exposure? Food exposure is often considered because several Fusarium metabolites are well known in agricultural contamination research. In other cases, environmental exposure is also considered, especially when water damage or additional microbial findings suggest a possible indoor source. The most useful interpretation comes from reviewing the complete environmental and clinical picture rather than relying on a single result alone.

2. Is Fusarium believed to colonize, and does antifungal treatment reduce these mycotoxins over time?

Questions about colonization and antifungal therapy continue to be discussed in clinical settings. Practitioners often ask whether Fusarium may colonize in some cases and whether antifungal treatment changes the mycotoxin pattern over time. These questions should be evaluated by qualified treating practitioners and interpreted alongside symptoms, follow-up testing, and broader exposure history.

3. How often is Fusarium found in buildings, and how significant is it when detected?

For indoor environmental professionals, Fusarium is often considered a relatively uncommon building finding compared with other water-damage-associated contaminants. When it is detected, the significance depends on how it was found, the testing method used, the extent

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of contamination, and whether it appears to represent a meaningful indoor source that affects building conditions or occupant health.

4. Are Fusarium-associated mycotoxins usually environmental, or are they most often food-related?

Some observers suggest these compounds frequently point to environmental exposure, while others believe they are more commonly linked to food sources. Because both possibilities may be relevant, interpretation should be made carefully and in context. A complete review may need to consider building history, signs of water damage, other microbial findings, dietary exposure, and the overall clinical presentation.

Why This Matters

When evaluating a water-damaged or contaminated indoor environment, visible mold alone does not always tell the full story. Settled dust may contain a complex mixture of mold fragments, microbial byproducts, and toxic metabolites that continue to affect the environment even when active growth is not easily seen.

Mycotoxin testing can add another important layer of information when a more complete indoor environmental assessment is needed.

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Mycotoxins commonly associated with water-damaged buildings

The table below summarizes common toxin–source patterns observed in moisture-impacted indoor environments.

Mycotoxins commonly associated with water-damaged buildings

Fungal Species	Common Mycotoxins Produced	Typical Location
Aspergillus versicolor	Sterigmatocystin	Concrete, gypsum, and dust
Penicillium species	Ochratoxin A, Citrinin	Insulation, carpet, and dust
Stachybotrys chartarum	Satratoxins (Trichothecenes)	Cellulose-rich materials such as drywall
Aspergillus fumigatus	Gliotoxin	Humid HVAC systems and dust

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Examples of emerging fungal metabolites

Emerging metabolites are increasingly discussed because they may be missed in limited panels and can contribute to chronic mixed exposures.

Examples of emerging fungal metabolites (by source category)

Source Category	Emerging Metabolites	Common Reference Toxins
Fusarium	Enniatins, Beauvericin, Moniliformin	DON, Zearalenone, Fumonisins
Aspergillus	Sterigmatocystin, Emodin	Aflatoxin, Ochratoxin A
Penicillium	Mycophenolic Acid, Citrinin	Ochratoxin A, Patulin
Stachybotrys	Spirocyclic Drimanes, Atranones	Satratoxins

Example: Toxic compounds commonly flagged in indoor dust

In a recent indoor dust dataset analyzed by LC–MS/MS, the toxic compounds detected that are most relevant to human health monitoring were predominantly in the "emerging concern" category.

Detected toxic compounds (example dataset): Alternariol monomethyl ether (also reported as Alternariol methyl ether), Enniatin B, Enniatin B1, and Tenuazonic acid.

These compounds are important to monitor because they are biologically active fungal metabolites, may persist in settled dust, and can contribute to chronic mixed-exposure profiles in moisture-impacted environments.

Note: Presence in dust indicates environmental burden and potential exposure pathways (resuspension, ingestion, dermal contact). Clinical interpretation should be made by qualified practitioners in context.

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Why monitoring specific analytes matters

High-impact toxins

These compounds are prioritized because they are strongly linked to human health endpoints in toxicology and risk assessment.

- Aflatoxins (B1/B2/G1/G2/M1): highest concern group; key focus when detected.
- Ochratoxin A and Citrinin: kidney-focused concern; important in moisture-related profiles.
- Trichothecenes (e.g., DON, NIV, T-2/HT-2): potent bioactivity; mixture relevance.
- Zearalenone: endocrine-active concern; interpret with exposure context.

Emerging and pathway markers

These support source attribution and can be important in chronic, mixed-exposure indoor settings.

- Enniatins, Beauvericin, Moniliformin: emerging Fusarium metabolites often found in surveys.
- Sterigmatocystin and related intermediates (e.g., averufin, versicolorins): toxigenic Aspergillus pathway indicators.
- Gliotoxin-family metabolites: marker of certain Aspergillus activity and bioactive burden.
- Chaetoglobosins: damp-building marker compounds associated with cellulose-rich materials.

How to use these results

If toxic mycotoxins or multiple bioactive fungal metabolites are detected in settled dust, consider a building-focused response: investigate moisture sources, correct water intrusion, remove/contain contaminated materials, improve dust control and filtration, and verify with follow-up testing.

This page provides environmental interpretation support. Medical diagnosis and treatment decisions should be made by qualified clinicians.

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