



The Great Plains Laboratory, Inc.

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GPL-MYCOTOX

Metabolite	Results (ng/g creatinine)	Common Range of Positive Results	
Verrucarin A	0.00	1 - 10	

▲ 1

10 ▲

Fusarium

Enniatin B	0.00	0.07 - 1	
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▲ 0.07

1 ▲

Zearalenone	16.05	0.5 - 10	
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▲ 0.5

10 ▲

Chaetomium globosum

Chaetoglobosin A	0.00	20 - 80	
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▲ 20

80 ▲

Citrinin

Citrinin	7.77	10 - 50	
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▲ 10

50 ▲



Ochratoxin: Ochratoxin A (OTA) is a nephrotoxic, immunotoxic, and carcinogenic mycotoxin. This chemical is produced by molds in the *Aspergillus* and *Penicillium* families. Exposure is done primarily through water damaged buildings. Minimal exposure can occur through contaminated foods such as cereals, grape juices, dairy, spices, wine, dried vine fruit, and coffee. Exposure to OTA can also come from inhalation exposure in water-damaged buildings. OTA can lead to kidney disease and adverse neurological effects. Studies have shown that OTA can lead to significant oxidative damage to multiple brain regions and is highly nephrotoxic. Dopamine levels in the brain of mice have been shown to be decreased after exposure to OTA. Some studies have hypothesized that OTA may contribute to the development of neurodegenerative diseases such as Alzheimer's and Parkinson's. Treatment should be aimed at removing the source of exposure. Agents such as oral cholestyramine, charcoal, and phenylalanine can help prevent the absorption of these toxins from food. Antioxidants such as vitamins A, E, C, NAC, rosmarinic acid, and liposomal glutathione alone or in combination have been shown to mitigate the oxidative effects of the toxin. Bentonite or zeolite clay is reported to reduce the absorption of multiple mycotoxins found in food, including OTA. Studies have also shown that OTA is present in sweat, which supports the use of sauna as a treatment to increase the excretion of OTA. (PMID 17195275, 16621780, 16293235, 27521635, 22069626, 24792326, 22253638, 16140385, 2467220, 16844142, 19148691, 22069658, 16019795, 18286403, 15781206, 11439224, 17092826, 32710148)

Zearalenone: Zearalenone (ZEA) is mycotoxin that is produced by the mold species *Fusarium*, and has been shown to be hepatotoxic, haematotoxic, immunotoxic, and genotoxic. ZEA exposure is mostly through water damaged buildings, although ZEA is commonly found on several foods in the US, Europe, Asia, and Africa. The foods known to be contaminated with ZEA include wheat, barley, rice, and maize. ZEA has estrogenic activity and exposure to ZEA can lead to reproductive changes. ZEA estrogenic activity is higher than that of other non-steroidal isoflavones (compounds that have estrogen-like effects) such as soy and clover. ZEA exposure can result in thymus atrophy and alter spleen lymphocyte production, as well as impaired lymphocyte immune response, which leads to patients being susceptible to disease. ZEA is deactivated primarily through glucuronidation; individuals with impairments to this pathway will be much more susceptible to this compound even at very low levels. Treatment with the antioxidants lycopene and resveratrol has been beneficial in negating the harmful effects of ZEA in several studies. Bentonite or zeolite clay is reported to reduce the absorption of multiple mycotoxins, including ZEA. (PMID: 17045381, 19330061, 11384734, 1387742, 698923, 1599403, 2276698, 22645433, 24632555, 6239410, 6235161, 24503513, 25682699, 27489133, 15781206, 11439224, 17092826, 16095665, 16782537, 17561436, 11245394)



Dihydrocitrinone: Dihydrocitrinone is a metabolite of Citrinin(CTN), which is a mycotoxin that is produced by the mold species *Aspergillus*, *Penicillium*, and *Monascus*. CTN exposure can lead to nephropathy, because of its ability to increase permeability of mitochondrial membranes in the kidneys. The three most common exposure routes are through ingestion, inhalation, and skin contact. CTN has been shown to be carcinogenic in rat studies. Multiple studies have linked CTN exposure to a suppression of the immune response. PMID: 11567776, 24048364, 10788357



MycoTOX Profile

New Markers in the MycoTOX Profile

We are happy to announce the addition of four new mycotoxin markers to our MycoTOX Profile. The test now includes 11 mycotoxins from 40 species of mold, making it by far the most comprehensive and competitively priced mycotoxin test available. It is also still more sensitive and accurate than other tests available, because we use LC/MS/MS technology. Here is an overview of the four new mycotoxin markers:

Gliotoxin

Gliotoxin (GTX) is produced by the mold genus *Aspergillus*. *Aspergillus* spreads in the environment by releasing conidia which are capable of infiltrating the small alveolar airways of individuals. In order to evade the body's defenses *Aspergillus* releases Gliotoxin to inhibit the immune system. One of the targets of Gliotoxin is PtdIns (3,4,5) P₃. This results in the downregulation of phagocytic immune defense, which can lead to the exacerbation of polymicrobial infections. Gliotoxin impairs the activation of T-cells and induces apoptosis in monocytes and in monocyte-derived dendritic cells. These impairments can lead to multiple neurological syndromes.

Mycophenolic Acid

Mycophenolic Acid (MPA) produced by the *Penicillium* fungus. MPA is an immunosuppressant which inhibits the proliferation of B and T lymphocytes. MPA exposure can increase the risk of opportunistic infections such as *Clostridia* and *Candida*. MPA is associated with miscarriage and congenital malformations when the woman is exposed in pregnancy.

Dihydrocitrinone

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Chaetoglobosin A

Chaetoglobosin A (CHA) is produced by the mold *Chaetomium globosum* (CG). CG is commonly found in homes that have experienced water damage. Up to 49% of water-damaged buildings have been found to have CG. CHA is highly toxic, even at minimal doses. CHA disrupts cellular division and movement. Most exposure to CG is through the mycotoxins because the spores tend not to aerosolize. Exposure to CHA has been linked to neuronal damage, peritonitis, and cutaneous lesions.



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The 40 Species of Mold and 10 Mycotoxins They Produce - All Detected by the MycoTOX Profile

	Aflatoxin	Gliotoxin	Ochratoxin	Sterigmatocystin	Zearalenone	Roridin E	Verrucarin A	Enniatin B	Mycophenolic Acid	Citrinin
Species:										
<i>Acremonium sp.</i>				Present						Present
<i>Alternaria</i>		Present								
<i>A. flavipes</i>				Present						Present
<i>Aspergillus flavus</i>	Present									Present
<i>A. fumigatus</i>		Present								Present
<i>A. niger</i>			Present							Present
<i>A. ochraceus</i>			Present	Present						Present
<i>A. parasiticus</i>	Present									Present
<i>A. sydowii</i>				Present						Present
<i>A. versicolor</i>				Present						Present
<i>A. viridictum</i>			Present	Present						Present
<i>Aureobasidium</i>				Present						
<i>Chaetomium</i>				Present						
<i>Cladosporium</i>				Present						
<i>Cunninghamella</i>				Present						
<i>Cylindrocarpon</i>						Present				
<i>Dendrodochium</i>						Present	Present			
<i>Exophiala</i>				Present						Present
<i>Fusarium avenaceum</i>				Present	Present			Present		Present
<i>F. cerealis</i>				Present	Present					Present
<i>F. clumorum</i>				Present	Present					Present
<i>F. equiseti</i>				Present	Present					Present
<i>F. graminearum</i>				Present	Present					Present
<i>F. incarnatum</i>				Present	Present					Present
<i>F. moniliforme</i>				Present	Present			Present		Present
<i>F. solani</i>								Present		
<i>F. verticillioides</i>				Present	Present					Present
<i>Myrothecium roridum</i>						Present				
<i>M. verrucaria</i>						Present	Present			
<i>Penicillium carbonarius</i>		Present	Present	Present					Present	Present
<i>P. nordicum</i>		Present	Present	Present					Present	Present
<i>P. stoloniferum</i>		Present	Present	Present					Present	Present
<i>P. verrucosum</i>		Present	Present	Present					Present	Present
<i>Phoma sp.</i>				Present						Present
<i>Rhodotorula</i>				Present						Present
<i>Scopulariopsis</i>				Present						Present
<i>Stachybotrys</i>				Present		Present	Present			Present
<i>S. chartarum</i>				Present						
<i>Trichoderma viride</i>		Present		Present						
<i>Ulocadium</i>										
<i>Verticillium</i>				Present						Present