

# EMMA Environmental Mold and Mycotoxin Assessment

## Explanation Guide

### Read what the experts have to say

In order to help you understand the results of your EMMA test, information on organisms and/or mycotoxins found are described below along with links to reference sources.

ORGANISM	MYCOTOXIN/PATHOGEN
<ul style="list-style-type: none"><li>• <i>Aspergillus fumigatus</i></li><li>• <i>Aspergillus flavus</i></li><li>• <i>Aspergillus niger</i></li><li>• <i>A versicolor</i></li><li>• <i>Aspergillus ochraceus</i></li><li>• <i>Penicillium brevicompactum</i></li><li>• <i>Stachybotrys Chartarum</i></li><li>• <i>Chaetomium globosum</i></li><li>• <i>Mucor</i></li><li>• <i>Rhizopus</i></li></ul>	<ul style="list-style-type: none"><li>• Gliotoxin</li><li>• Aflatoxin</li><li>• Ochratoxin</li><li>• Sterigmatocystin</li><li>• Ochratoxin</li><li>• Mycophenolic Acid</li><li>• Macrocyclic Trichothecenes</li><li>• Chaetoglobosins</li><li>• Potential Pathogen</li><li>• Potential Pathogen</li></ul>

**Mycotoxins:** World Health Organization (WHO) in its publication: Mycotoxins: Children’s Health and the Environment defines mycotoxins as “Natural products produced by fungi that evoke a toxic response when introduced in low concentrations to higher vertebrates by a natural route.” Note: There is no definition of what “low concentration” means. Also, humans are “higher vertebrates” and inhalation is a “natural route”

<http://www.who.int/ceh/capacity/mycotoxins.pdf>

**Aflatoxins:** NIH, National Cancer Institute web site: “Which cancers are associated with exposure to aflatoxins? Exposure to aflatoxins is associated with an increased risk of liver cancer.” <https://www.cancer.gov/about-cancer/causes-prevention/risk/substances/aflatoxins>

**Ochratoxins:** U.S. Department of Health and Human Services 14th Report on Carcinogens (RoC) lists Aflatoxin as “Known to be a Human Carcinogen” and Ochratoxin A as “Reasonably anticipated to be Human Carcinogen”.

[https://ntp.niehs.nih.gov/ntp/roc/content/listed\\_substances\\_508.pdf](https://ntp.niehs.nih.gov/ntp/roc/content/listed_substances_508.pdf)

**Gliotoxin:** Gliotoxin is an immunosuppressive mycotoxin long suspected to be a potential virulence factor of *Aspergillus fumigatus*.

<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC2043361/>

**Trichothecenes:** CDC Centers for Disease Control and Prevention. Case Definition: Trichothecene Mycotoxin states: “The trichothecene mycotoxins are a group of toxins produced by multiple genera of fungi.” They later state: “Systemic symptoms can develop with all routes of exposure (especially inhalation) and might include weakness, ataxia, hypotension, coagulopathy and death.” <https://emergency.cdc.gov/agent/trichothecene/casedef.asp>

**Mycophenolic Acid:** Mycophenolic Acid: Use during pregnancy is associated with increased risks of pregnancy loss and congenital malformations. Females of reproductive potential must be counseled regarding pregnancy prevention and planning. Increased risk of development of lymphoma and other malignancies, particularly of the skin, due to immunosuppression. Increased susceptibility to bacterial, viral, fungal, and protozoal infections, including opportunistic infections.

[https://www.ncbi.nlm.nih.gov/pubmedhealth/PMH0045948/#DDIC603035.side\\_effects\\_section](https://www.ncbi.nlm.nih.gov/pubmedhealth/PMH0045948/#DDIC603035.side_effects_section)

**Sterigmatocystin:** Sterigmatocystin is carcinogenic in mice (pulmonary adenocarcinomas) and rats (hepatocellular carcinomas at milligram doses of sterigmatocystin per animal per day for 1 year) following oral administration and is classified as an International Agency for Research on Cancer class 2B carcinogen (i.e., as possibly carcinogenic to humans) <http://aem.asm.org/content/68/8/3886.full>

**Chaetoglobosins:** *Chaetomium globosum*, the most common species within this genus, produces chaetoglobosins A and C when cultured on building material. Relatively low levels of these compounds have been shown to be lethal to various tissue culture cell lines. <https://www.ncbi.nlm.nih.gov/pubmed/17551849>

**Mucor:** Mucormycosis is a serious infection caused by *Mucor* or *Rhizopus* that typically affects people with weakened immune systems, such as people who have had an organ transplant. Small outbreaks or clusters of Mucormycosis can occur, and CDC usually investigates one to three clusters each year. <https://www.cdc.gov/fungal/diseases/mucormycosis>. Note: Gliotoxin, produced by *Aspergillus fumigatus* and Mycophenolic acid, produced by *Penicillium brevicompactum* are both immunosuppressive and can further increase the susceptibility to infection in immunosuppressed individuals.

**Rhizopus:** Mucormycosis is a serious infection caused by *Mucor* or *Rhizopus* that typically affects people with weakened immune systems, such as people who have had an organ transplant. Small outbreaks or clusters of Mucormycosis can occur, and CDC usually investigates one to three clusters each year. <https://www.cdc.gov/fungal/diseases/mucormycosis>

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