



DISHING THE DIRT ON MOULD

"Unwelcome Roommates:
The Fungi Chronicles"



A WELL COLLEGE GLOBAL EBOOK
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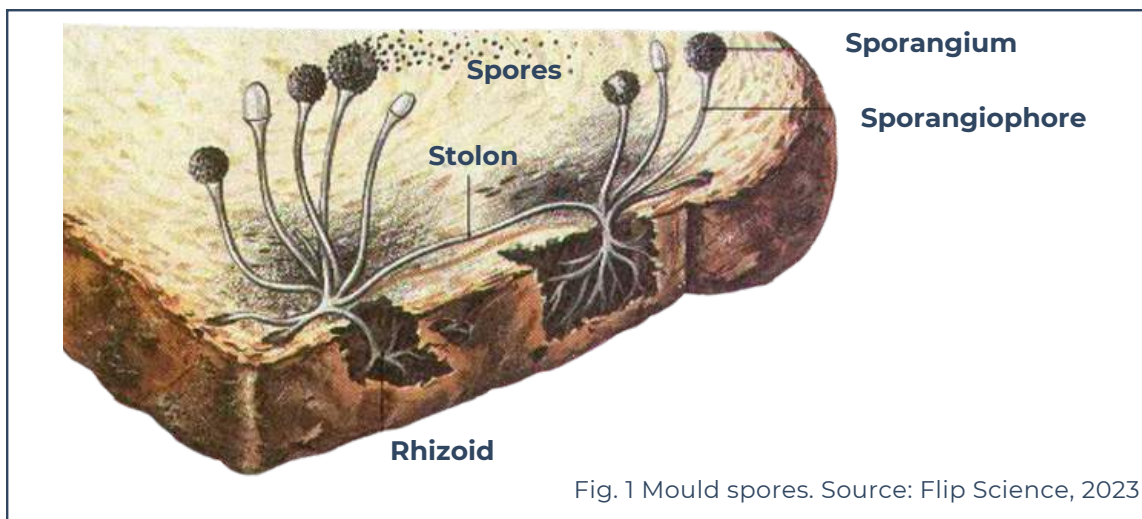
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What are fungi?



Mould is a type of fungi, along with mushrooms and yeast, that are commonly found in various environments, both indoors and outdoors. Moulds start as tiny spores and grow into multicellular structures made of fine, thread-like filaments called hyphae.

Chitin forms part of the fungi's cell wall (much like cellulose does in plants). Found in insects and in parts of invertebrates and fish, chitin is very abundant in our environment. When chitin binds with calcium carbonate, it can form the shell of a clam. This is what gives mould its strength and why it can get into some tough areas, as you can see by the figure below.



Where does mould grow?

Indoor mould growth typically thrives in damp areas with poor ventilation, such as walls, ceilings, bathroom tiles, carpets (especially those with jute backing), insulation, and wood. When moisture is present, mould can develop on indoor surfaces. There are various types of mould, all of which have the potential to pose health risks.

How does it spread?

Mould spreads via spores (see Fig. 1), invisible particles that similar to 'seeds'. These spores travel through the air and can form new mould colonies if they come into contact with moisture or a food source. For example, mould can spread across walls and often you can't even see it.

In many cases mould will spread upwards in a property due to something called the 'stack effect' or 'chimney effect'. When the temperature outside is much cooler than indoors, the warm air rises and escapes through openings in ceilings and roofs, and with this warm air comes mould spores, dust, mites and odours.

How far does it travel and how fast does mould grow?

Mould is very tiny, measuring around 2-100 microns (for reference, a grain of table salt is 120 microns). Mould spores are persistent and can survive indefinitely; even the lightest breeze can carry them long distances, across rooms and buildings.

Mould spores can enter buildings through air conditioners, open windows and doors, or by hitching a ride with you or the dog!

Mould can grow within 24-48 hours of coming into contact with a moisture or food source.

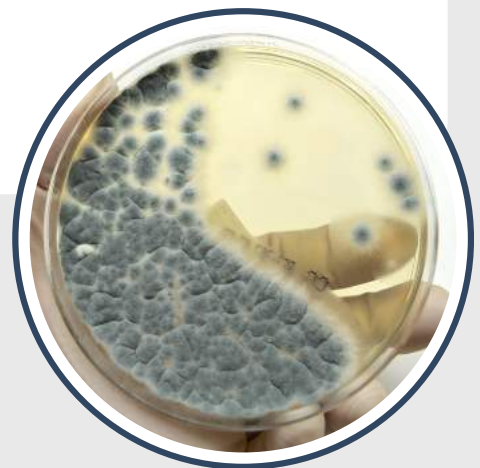
Three common moulds we frequently encounter

- 1 - Aspergillus (*Asper-gil-lus*)
- 2 - Cladosporium (*Clad-o-spore-ium*)
- 3 -Stachybotrys (*Stack-e-bot-ries*)

Let's explore them further.

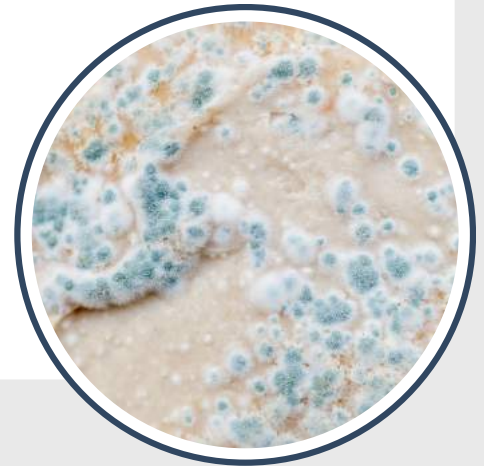
Aspergillus is generally a green or grey coloured mould found on food and in air-conditioning systems. People with compromised immune systems are more likely to experience issues from aspergillosis. There are different types of aspergillosis health issues including:

- 1.Allergic aspergillus sinusitis which typically involves the nose and headaches.
- 2.Allergic bronchopulmonary aspergillosis (ABPA) involving the lungs which may result in breathing difficulties.
- 3.Aspergilloma, or fungus ball which may lead to a cough where a person can cough up blood.
- 4.Chronic pulmonary aspergillosis which involves breathing issues, a cough and weight loss.



Cladosporium is a green or brown mould with a suede-like texture, found in carpet, fabric, food, wood furniture and refrigerators. This mould is the main allergy causing mould. Bread is one of the most common mouldy foods we will come into contact with. Mould can begin to grow when bread comes in contact with air, particularly where the environment is warm and humid.

Mould in your bread? Just cut it out right!?
Unfortunately, it's not that simple. See Fig. 1 on page 2... the mould spores have spread far and wide. Mould loves water and foods like bread have a high water content.



Stachybotrys (black mould) is typically dark green or black in colour with a slimy texture. It's commonly found in damp, wet and humid areas and is the major mould of concern for community health agencies. Any mould found in your home should be safely removed and the area should be checked to prevent reoccurrence.



Mould and my health

Mould enters the body via the skin or mucosal barriers, such as the nose and airways. Mould itself can't enter the bloodstream; instead, it colonises tissue such as the nostrils and lungs. However, the mycotoxins that mould produces can cross into the bloodstream, causing health issues and triggering inflammatory responses in some people.

It's believed mould and mycotoxins compromise our immune system by:

- Altering the barrier of the mucosa (lining of the body cavities),
- Upsetting the microbiome,
- Igniting immune cells, and
- Promoting inflammation.¹

Respiratory issues

Respiratory symptoms of mould exposure range from a blocked or runny nose, sore throat, red, itchy, or watery eyes, to more severe respiratory issues.

Studies, including meta-analyses, have found that exposure to mould increases the risk of severe asthma in adults. In fact, a causal link between asthma (in children also) and rhinitis has been shown.²

Gut, immunity and allergy issues

Moulds can also impact the gut microbiome. Mycotoxins have been shown to negatively impact the gut microbiota via an antimicrobial action and the release of compounds that damage the gut bacteria cells, leading to mycotoxin-induced gut dysbiosis.

Mould and mycotoxins appear to interact with all levels of our immune system, including our first line of defence against pathogens, such as the skin, mucous membranes, cells that line the gut, and phagocytes, which are cells that help remove pathogens from the body.

1 - Thacher, O. Gruzieva, G. Pershagen, E. Melén, J.C. Lorentzen, I. Kull, A. Bergström. Mold and dampness exposure and allergic outcomes from birth to adolescence: data from the BAMSE cohort *Allergy*, 72 (6) (2017), pp. 967-974.

2 - Viljoen, Margaretha, and Nicolaas Claassen. "Pathophysiological aspects of exposure to dampness-associated indoor mould and mycotoxins: a mini-overview." *Journal of Hazardous Materials Advances* (2023): 100228.

Brain and cognition

Studies now show that many mycotoxins easily pass through the blood-brain barrier and affect the central nervous system (CNS) and nerve tissue. In fact, some mycotoxins reduce the integrity of the blood-brain barrier (which controls what is allowed in and out of the brain) itself. Mycotoxins cause cellular oxidative stress, causing cellular toxicity which can result in damaged cells or even cell death.



Signs and symptoms of mould exposure

Mould exposure, like exposure to many unwanted compounds and chemicals, can result in a complex array of signs and symptoms which makes it tricky to determine if mould is the cause. Often, mould exposure is detected through a process of elimination.

Some of the symptoms of exposure to mould include:

- Fatigue
- Unexplained cough
- Shortness of breath
- Bronchitis
- Sinus issues
- Allergic fungal sinusitis
- Headaches
- Wheezing
- Joint pain
- Digestive problems
- Lower respiratory tract issues in children that are ordinarily well³

³ - CDC, Mold, basic facts about mould and dampness, Nov 2022. <https://www.cdc.gov/mold/faqs.htm> Sourced 21/9/2023

Treatment options

Of course, you can grab one of the plethora of mould sprays at the supermarket. However, many contain bleach-derived compounds and chlorine. Others use azole, which can have side effects such as headaches, upset stomachs and diarrhoea, dizziness, stomach aches and changes in taste. It also appears that some products touted as 'mould killers' have such a low dilution of the active ingredient that they are quite ineffective.

Natural remedies are an excellent option. They are generally super safe, very effective, easy to make and affordable. Below is a list of the top most proven plant oils:

- Tea tree oil
- Oil of bitter orange
- Oregano oil
- Clove oil
- Caprylic acid (a constituent of coconut oil)
- Berberine (a constituent of Barberry)
- Solanum nigrescens or chrysothricum

Vinegar is a great base to add these oils to. It's been shown to be an effective cleaning agent against mould, making it a perfect replacement for bleach. While vinegar may not remove the mould stains, it's safe.

Before the area is wiped, the spray should be allowed to sit so that no mould spores can be released into the air. Many people report that post-cleaning a surface with mould, it seems to actually spread. It typically takes a number of applications to notice a significant decline in recurrence but with time these natural options are very effective.

When you decide to clean a moulded area yourself, depending on the mould, its placement and the degree of spread, consider your safety first. Ensure there is good ventilation. You may like to wear gloves, eye protection and perhaps a suitable mask. Where the mould is dry mould avoid brushing it and disturbing and spreading the spores. If you use a vacuum at any stage, ensure that the filter can deal with mould spores (generally, this would require a HEPA filter system).

Natural Mould Prevention Spray Recipe



INGREDIENTS

- White vinegar
- Natural soap
- Clean water
- Peppermint oil
- Lemon oil
- Oregano oil
- Clove
- Spray bottle (preferably glass)

DIRECTIONS

1. Three quarter fill you spray bottle with white vinegar
2. Top with clean water
3. Add a tablespoon of natural liquid soap
4. Add 30 drops of peppermint oil
5. Add 10 drops of lemon oil
6. Add 3-5 drops of oregano oil
7. Add 3-5 drops of clove
8. Shake it up

HOW TO USE

Spray the affected mould area first and leave for around 30-60 mins this prevents the mould spores from releasing into the air. Then wipe the sprayed area with a cloth. Ensure you wash the cloth on its own and thoroughly after the job is done



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