

WHAT'S ALL THE FUSS ABOUT MOULD LATELY?

Haven't we always lived with mould? So why are they suddenly such a major concern?

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Part of our renewed interest in mould is because of the "re-discovery" that mould can degrade our buildings and cause adverse health effects along the way. There are references in the Bible to dealing with mouldy buildings, yet the 1990's has seen the "discovery" that mould is dangerous. In essence, mould can affect us by damaging building materials, making a building unhygienic with foul odours, and by causing adverse health effects in susceptible individuals. A confusing fact is that we have apparently little or no adverse health effects from breathing mould spores outdoors or eating and drinking them in our bread, cheese, beer and wine (in moderation of course). The problems with mould start when one or several species become established indoors, which presents our bodies with an "abnormal" exposure.

One of our modern dilemmas in dealing with mould is borne mostly from our modern need to have standardised protocols. The difficulty lies in a lack of basic scientific information on indoor mould ecology. To date, it has been very difficult to standardise methods of assessing risk from indoor mould. The problem is the vast complexity of indoor mould ecology, which requires that virtually every situation needs to be dealt with on its own terms. This makes it very difficult to compare one situation with another. Even so, there are some patterns of mould growth, exposure and damage that allow us to make some generalisations.

The lack of clarity in our scientific knowledge about indoor mould ecology is causing serious difficulties for our medical, legal and insurance institutions. This has led to situations where a single spore of certain species can close a school or building, through to complete disregard for mould and even medical professionals declaring that mould does not cause health problems.

The Great Mould Rush of the 1990's

The "new" awareness of mould in the 1990's saw what can only be described as the unfortunate but "Great Mould Rush". To date, this has mostly occurred overseas. However, some mould issues have attempted to land on our shores. However, they have met stiff resistance from the Australian based insurance industry that has learned from their international partners. If we are lucky, there will be no Great Mould Rush in Australia. It looks like we are set-up to ease gently into the age of mould awareness with the right approach and wisdom born of other's mistakes.

Some of the unfortunate events occurring overseas lately include several high profile mould cases that ended with multi-million dollar payouts. Fortunately for us, we don't seem to have a legal system that awards exorbitant punitive damages on mould claims. Several major home insurance companies overseas have either re-worded their policies to exclude certain types of mould damage or are no longer offering home insurance in some areas. In some countries there is now a mandatory requirement to perform pre-purchase mould testing on real estate transactions.

The current situation in Australia appears to be that mould damage by enlarge is not covered as defined event in insurance policies. To date, mould remediation has only been considered by insurance companies if mould contamination is the resultant damage of an escape of water or water intrusion that was covered under the terms of the policy. Mould resulting from poor building design or rising damp is generally excluded from cover.

Insurance companies, building consultants & restoration firms have all benefited from correct mould sampling and analysis. This has being used both execute duty of care and as a tool to establishing the perimeters of remediation works by pin pointing the causes and sources of the originating moisture damage. This allows mould testing to successfully target key areas. This has minimised both the costs of remediation to Insurers and the length of time that remediation inconveniences the occupants / owners. Final clearance testing is being used by all parties as a safeguard against potential future litigation.

Dangerous Mould Myths - Stacky and Other Scary Stuff

Unfortunately, not everyone deals with mould in sensible manner. There are several areas of mis-information coming out of the Great Mould Rush overseas that are trying to establish themselves as fact. One of the myths involves a fungus called *Stachybotrys*, now nicknamed "Stacky". Several of the species of *Stachybotrys* are highly toxic and cause severe health effects from exposure. Unfortunately, this toxic aspect of "Stacky" has been used successfully in what appears to be a concerted scare campaign. Finding "Toxic Stacky" has been used as a licence to print money, and surprise-surprise, it is now found everywhere in some countries overseas.

However, this sudden increase is surprising. Normally this fungus can be difficult to capture on samples because it has sticky surface bound spores, and these do not grow well on nutrient agars. It is considered as difficult fungus to identify even by experienced mycologists. An unfortunate consequence of the rush to be "mould certified" has lead to a situation where some overseas mould inspectors believe they can identify "Stacky" just by looking at the colour of a mouldy surface. This is generally not possible. After reviewing the methods used in published scientific and magazine literature coming out of the Mould Rush, more than half of the "Stacky" identifications may be false. If a mould inspector in Australia tells you they can see "Stacky" then you have a right to be sceptical. Don't believe the hype, get it analysed using suitable methods (see below).

Other great stuff for mycological giggles coming out of the Mould Rush are danger headlines that have changed in the last two years from simply the dangers of "Mould" to "Toxic Mould" to "Black Mould" to "Black Toxic Mould" and even "Mould Monsters". A quick search of the internet will net you some of these wee beasties. Yes there is mould that can cause adverse health effects, and there is mould that can damage you house and grow to monstrous size. Similarly, there are real dangers to people's health from mould exposure in particular the very young and the Aged, allergy sufferers and those with compromised immune systems. Unfortunately, most of this recent scare-hype is built on unproven myths that need to be dispelled with scientific evidence.

The Sate of Mould Play in Australia

While we are waiting for the first sighting of Stacky in Australia, there have been a number of other species that are frequently occurring on mould jobs. Two fungi in particular that are becoming prevalent where construction timbers become wet during building are *Trichoderma viride* and *T. harzianum*. This is of great concern as these fungi affect our health and are destructive. This fungus can use wood as a nutrient source, which is not what you want on your structural timbers. Newly constructed houses are developing widespread problems from *Trichoderma* sp. This fungus is known to produce some toxic metabolites including *Gliotoxin*, *Emodin* and *Thrichodermin*. Some mould damaged houses have required a high level of personal protective equipment (PPE) for remediators to avoid the health effects from exposure. This includes full face masks with high level filtration, two layers of overalls and boot protectors and two layers of latex gloves. Even tough, salt encrusted Builders and labourers that didn't believe the dangers of exposure to mould have nearly required hospitalisation after entering mould situations without appropriate PPE. Needless to say, they are believers now.

A contributing factor to the presence of these fungi seems to be treated structural timbers that are being wrapped in plastic at the factory and sweating during storage. Some builders have reported that every piece of timber appears to be mouldy right out of the packing. Many believe that "Treated" means anti-fungal as well. Most do not understand that the chemicals used to treat the timber (AS1604-1997) are not anti-fungal, even though this is clearly stated on the product information. These timbers are being used wet and mouldy. Furthermore, structures built with this material often experiences rain damage during construction and this is not being allowed to dry out properly. Not many builders are known to carry moisture meters with them. Unfortunately "dry to touch" and "she'll be right" have become the accepted standard on-site. However, the core of the materials remains wet. Once this touch dry timber is enclosed in a building envelop, any moisture damage indoors can trigger an eruption of hidden mould growth.

Another fungal species is our favourite household mould that occurs as black spots in virtually every bathroom around Australia (if not the world). That is, the much maligned *Aspergillus niger*. Unfortunately, this fungus is being blamed for an awful lot of health symptoms in buildings and houses with mould damage. There is no doubt that this fungus can cause adverse health effects, however, there are many other fungi that are being overlooked. Some believe that once you have detected *A. niger* then you have solved your problem. In fact, this fungus is found in only a few percent of airborne samples. Its reputation as a source of fungal exposure does not appear to be justified.

New Mould Analysis Equipment - Caveat Emptor

Also coming out of the Mould Rush is a never ending array of spectacular equipment that promises to do all sorts of wonderful things to make your mould inspection and diagnosis so simple you just need to be a technician and press the right buttons. Wrong. Much of this equipment is relatively expensive and largely unproven should not be relied upon in critical situations.

One of the latest claims is that thermal imaging cameras can be used to "see" mould growing indoors. Thermal imaging has been a very useful and proven technology for detecting cold bridges in cold climates, because that's where the condensation will occur to feed mould growth. But unfortunately, this new camera system is being sold with astonishing "mould detecting" properties. Current understanding of this

technology indicates that these cameras are not sensitive enough to see the metabolic heat given off from mould activity. They may not be of much use in detecting Xerophilic (dry) mould. However, we need to keep an open mind on all new developments.

Old Mould Methods

Unfortunately, the only reliable means to identify mould species is to perform traditional mycological differentiation on nutrient agar. This requires years of training and practice to get to a point where you might start to become comfortable with identifying the thousands of the environmental mould species that exist. Some mycologists spend an entire lifetime trying to understand just one genus like *Penicillium*. A fortunate thing for Mycologists is that traditional mould analysis normally costs the same or less than other standard types of indoor air measurements.

Research at Murdoch University is currently looking into the standardisation of PCR analysis for species identification for environmental mould (a type of DNA fingerprinting). However, the number of species in the DNA data base is still limited to date and the whole process is equipment and labour intensive and thereby relatively expensive.

The standard methods for sampling mould are to use an impact sampler for viable airborne spores (e.g. Andersen N6), a spore trap for total spores (e.g. STVS trap, Murdoch University), RODAC agar plates for smooth surfaces, and swabs and adhesive tape lift-off samples on all other surfaces. Material samples can also be taken and plated onto agar plates. Similarly, vacuum cleaners can also be used to collect dust samples from carpets and other textiles.

The standard agar accepted by mycologist world wide is a 2-4% Malt Extract Agar (MAE). This medium is preferred as it supports the widest range of fungal species on one agar and it is the standard identification media. Using this standard agar is important as part of the identification process relies on the colour and speed of the colonies growing on the agar as well as spore formation. Other agars being widely used affect the appearance of colonies and include DG18 and Rose Bengal. These have poisons added to the agar to slow down fast growing fungi. It is important to note that DG18 is often misquoted as being a xerophilic agar; however, its strength is in preventing fast growing fungi such as *Rhizopus* from over-running slower growing fungi such as *Alternaria*. Xerophilic agars such as MAE+40% sucrose are the standard for detecting xerophilic (dry loving) fungi. It is also common to add an antibiotic to most agars such as *Chloramphenicol* to limit bacterial growth on the plates.

The challenge for new comers to the mould industry is to wade their way through all the equipment and methods that are available off the shelf. Many claim to be able to bypass the use of a mycologist and can identify mould species by simply "sniffing" chemical markers or by "tasting" key species. While these techniques may become useful one day, the science behind this technology is in its infancy and should not be applied to critical situations yet.

If you need to take mould samples, the most sensible solution is to use a properly trained technician or laboratory, or to get yourself trained. If you decide to undergo training, then this should include learning about indoor mould ecology as well the use

of sampling equipment and methods. This combination is critical in being able to take effective samples.

Too often there are situations where un-trained persons are taking samples using methods made-up on the spot or are taking samples from inappropriate locations. Their samples are usually completely unusable from a mycological standpoint. Unfortunately, ad-hoc sampling methods can still produce results that appear to be completely valid and meaningful. This is especially the case if samples have been analysed by a Microbiology Lab. Most of these labs when questioned have acknowledged they have limited ability with identifying mould, but still thought they were providing a quality service to their clients.

The only lab that should be used will have a qualified Mycologist on-board. They should also have a minimum 2 years experience with mould sampling and analysis and regularly participate in a recognised certification process.

Mould Remediators

We all know how to get rid of mould in our house, right? Just pour some bleach on it and it goes away, until the next time that you need to pour bleach on it again. Unfortunately, this simple chemicals approach to dealing with mould is a prevalent attitude in the local mould remediation industry. This is unfortunate, because most chemicals have been proven to be ineffective against mould in the long run. The widespread use of chemicals fails to correct the original reason why the mould grew there in the first place. It also introduces additional air pollution into the indoor air.

The only proven way to deal with mould is to find the source of the moisture feeding it, fix it, dry it out, physically remove the mould and then apply chemicals, but only in the right dilutions or they won't work. The most effective chemical solution that we have against mould so far is our favourite salad dressing - vinegar. This is claimed to be the most effective because it actually kills mould, but doesn't introduce a new chemical pollutant into the indoor air. Vinegar is even used by some European hospitals as one of their main disinfectants. A point of note is that only white fermented vinegar seems to work, as synthetic acetic acid does not appear to be effective. Diluted alcohol comes a close second, but there are a number of issues concerning its acquisition, storage, handling and OHS, PPE, duty of care and its effects on some surfaces that make it difficult to recommend.

The Australian Mould Solution

While there are a number of good teachers and courses being offered overseas, there are a number of substantial differences in building construction, legal issues, mould species, climate, insurance coverage, and standards and guidelines that create a gulf of differences between Australia and other countries.

To bust the "mould myths" and to address the problems being generated by the Great Mould Rush overseas, Mycologia Australia has developed an Australian Mould course tailored to our Australian Conditions.

The information presented in this mould course is based on hard scientific evidence and 25 combined years of experience. The trainers are both experienced adult educators and have formal qualifications in the field of environmental mycology with Ph.D.s in the area of Environmental Mycology and Mould in Indoor Air. Their experience and knowledge has been successfully trialled in research and industry at

many levels and they will be passing on their hands-on knowledge to the course participants.

Further details and registration forms for this course are available by contacting the authors and on the internet at: www.mould.net.au . This mould course is an export quality Australian Made and Owned product and is setting the standards for mould remediation in Australia.