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General Information

### CONTROLLING MOLD GROWTH WHEN CLEANING FLOODED AND/OR RAIN-WETTED HOMES

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The growth of “toxic mold fungi” within the walls, of their otherwise habitable homes is of concern to many hurricane victims whose homes were either flooded or were wetted by rainfall. First, be assured that relatively few mold species are “toxic” to humans, and the probability of these causing medical problems to building inhabitants is extremely low. *Stachybotrys*, a mold that causes toxic responses in humans, can occur on wet building components, but its spores are not air-borne and unlikely to be contacted by building inhabitants. The spores of most molds are air-borne and those of some species contain allergens that elicit allergic response in some individuals exposed to large numbers of spores. These would be similar to allergic responses to tree pollen, ragweed, etc., when these airborne units are inhaled in large numbers.

What are mold fungi?

Mold fungi are primitive organisms that obtain their food from various materials on which they grow. Molds grow on wood building components containing simple sugars and other products stored within specialized wood cells. **Molds do not cause structural damage to wood.** The reproductive units of molds are called spores, and these can be seen on the surface of materials colonized by them. These small spores are pigmented and, depending on the mold species, may be black, green, red, yellow or other colors. In small quantities, these spores are very unlikely to elicit an allergic response. When present in large numbers, as may occur in flooded or rain-wetted houses along the Gulf Coast, they can trigger respiratory allergic responses in some individuals. Other irritants, such as the dust created when wall gypsum sheetrock coverings are removed, may also cause allergic response. Susceptible individuals should take precautions, such as wearing respirators or dust masks as needed. In most instances, it is unnecessary to spend money on identification of the mold species present. The visual presence of extensive mold growth is sufficient to verify that measures to eliminate molds should be undertaken.

#### ***Why are molds growing on building components and how can their growth be controlled?***

While being primitive organisms, the factors required for the growth of molds are the same as ours:

- 1) Air – needed to respire
- 2) Temperature – favored by many mold species are similar to those that are comfortable to humans (60° - 90°)
- 3) Water – molds cannot exist without sufficient water and neither can we. For example, molds cannot grow on wood whose moisture content is less than about 20%. Building components in southern homes not subject to wetting would be expected to have a moisture content (mc) between 10-15%.
- 4) Food – molds can obtain nutrients from a variety of building components.

If the growth of mold fungi is to be prevented or controlled, one or more of these four basic factors must be altered (e.g., dry building components to below 20% mc; add mold-inhibiting fungicides to the food source).

### ***Cleaning/controlling microbes in flooded and rain wetted homes***

Understand that habitable, flooded homes on the Gulf Coast have been wet and very warm for several weeks. The flood waters likely deposited bacteria in the structures and the warm, wet conditions resulted in the widespread growth of mold fungi. Anyone with known mold allergies should not attempt to clean these structures. Those without mold allergies should make provisions for avoiding inhaling air-borne materials during cleaning activities. Lightweight moisture-resistant coveralls should be worn during cleaning operations. These clothes should be washed separately from the normal laundry. Finally, good personal hygiene should be practiced. For safety, make sure prior to all cleaning activities, that the electricity and gas have been turned off.

### ***Flooded homes***

- 1) First, remove all carpets, furniture, clothes and other items wetted by floodwaters.
- 2) Remove interior wall coverings and insulation in the wall cavities.
- 3) Wash the wall cavities and wall framing with an aqueous detergent solution using low to moderate pressure. Several people are using sodium hypochlorite (e.g., Clorox®, Purex®, etc.) solutions for such operations, but this is not recommended except when small areas are to be cleaned. While sodium hypochlorite is germicidal, its corrosivity can compromise electrical connections, etc. In addition, building materials will absorb large amounts of sodium hypochlorite. This will cause the gradual loss of chlorine gas into the living space for an extended period of time. Sodium hypochlorite is an EPA-registered pesticide, but it is not labeled for wood treatment.
- 4) Spray-treat the framing and wall cavities with a non-volatile antimicrobial that is registered by the EPA for that use. All pesticides should be applied according to label directions. Restricted use pesticides should be applied by a licensed, certified pest control technician. Borate products supplemented with a mold-control agent are recommended because borates are biocidal to bacteria and wood decay fungi as well as insects such as termites and roaches. The mold-control agent must be added to increase the biocidal activity of borates to mold fungi. In addition, borates have low mammalian toxicity, are corrosion inhibitors, colorless and odorless. One EPA-registered product that is labeled for use on wood for controlling wood-inhabiting insects and fungi, including molds, is Bora-Care with Mold-Care by Nisus Corporation ([www.nisuscorp.com](http://www.nisuscorp.com)). This product contains both borate and a mold control agent.
- 5) Place fans throughout the structure to increase the rate of drying.
- 6) When the framing is dry, the electrical connections and plumbing within the walls should be checked by licensed professionals.
- 7) Replace wall insulation and wall coverings after verifying that the moisture content of the wood framing is below 20%. Failure to make sure the moisture content is below this level will result in additional mold growth within the wall cavities. All licensed, certified pest control technicians should be familiar with the proper use of a moisture meter.

### ***Rain-wetted homes***

All of the points discussed above for flooded homes apply to homes “flooded” by rainwater, except for item 3. The wall cavities should be relatively clean when exposed and not require a detergent wash. In most instances, home wetted by rainfall have experienced roof damage. In these homes, the ceilings and insulation above them also must be removed if wet.

For more information, contact the Forest Products Laboratory at Mississippi State University at 662-325-2119.