

## Gypsum drywall is moldy when leaving the factory because of recycled content



Gypsum wallboards come with built-in mold spores from the factory because of the use of recycled cardboard backing, according to a university study.

*Keywords: drywall, wallboard, plasterboard, mold, mould, fungus, Stachybotrys, Aspergillus, Chaetomium, Neosartorya, sick building, recycled paper, recycled cardboard.*

### **Drywall is used globally**

Gypsum drywall sheets are used worldwide to cover walls and ceilings in homes and offices. It is a popular material because it is cheap to buy, fast to install and protects against fire. The problem is that these sheets quickly get moldy in case of flooding or when kept wet from small leaks, condensation or highly humid air. Moldy drywall is a health hazard as the molds send out gases, mycotoxins and spores.

Scientists have wondered why gypsum drywall gets moldy so quickly. The thought was that over time mold spores land on the sheets and then await their opportunity to multiply when they get wet. It turns out that the sheets are already seeded with mold spores at the factory.

### **The lucky insight**

Birgitte Andersen is a scientist at the Technical University of Denmark who has been looking into the drywall mold problems. She wondered why it was the same species of mold she kept seeing on samples she got from various water-damaged buildings, and why the species were different than what she saw on samples of wood, concrete and other materials.

One day as she was waiting for the bus, she noticed a pallet of recycled cardboard sitting in the rain. The cardboard was all wet and discolored. She realized the recycled cardboard was already moldy before it arrived at the factory and the mold spores might survive the production process and make it into the brown paper backing on drywall sheets.

### **Testing in the laboratory**

Together with three other scientists, Birgitte Andersen tested thirteen sheets of gypsum drywall they got from a variety of manufacturers, stores and manufacturing batches.

They disinfected the surfaces of every sample and placed them in sterile and sealed containers with some sterile water on the bottom to keep the air humid.

After 70 days all the samples were visibly moldy. The moldiest sample was a “moisture resistant” type of wallboard. They identified the various types of fungi, and found that all their samples contained mold from these families:

- *Aspergillus* (*Neosartorya*)
- *Chaetomium*
- *Stachybotrys*

Various other types of mold were found on some of the samples, such as *Penicillium* and *Cladosporium*.

### **Other research**

Russell Jerusik of the Ashland Hercules Water Technology Research Center in the United States published a paper in 2009 about mold problems in paper manufacturing. He stated:

*Re-cycled pulp is often stored in less than optimal conditions from the perspective of preventing mold infestation and is often contaminated with food materials.*

After discussing how moldy paper and cardboard loses strength and economic value, and becomes a health problem, he discusses various remedies such as fungicides and essential oils that can be added to the paper products.



*Cardboard recycling container that is overflowing so the cardboard stacked outside and inside will get wet if it rains. This picture is from the United States.*

## **Commentary**

Gypsum drywall seeded with mold spores from the factory is likely to be a global problem. Recycled cardboard is commonly used to manufacture the drywall backing in the United States and other countries.

Recycled materials have a very low value so it is not surprising that they are not stored carefully. As the picture above shows, even overflowing recycling containers can let rain get to the cardboard, and that starts breeding the mold.

This author has many times noticed that writing paper with a high content of post-consumer recycled paper often smells moldy. This type of paper is common in Europe and rare in the United States. In the United States recycled paper mostly comes from industrial uses, not consumers.

Cardboard has probably more post-consumer content, so the problem with the moldy drywall backing is likely to be similar in the United States.

The question is what to do about the problem. Convincing people to protect their recyclables better will be difficult. If the manufacturers add fungicides or essential oils to their drywall product that would make them unusable in healthy houses.

2017

### **Sources**

*Pre-contamination of new gypsum wallboard with potentially harmful fungal species*, Andersen B., Dosen I., Lewinska A. M., Nielsen, K. F., *Indoor Air*, 2016.

*Skimmel stotrives i genbrugspap på gipsplader*, Mie Stage, *Ingeniøren* (Danish Engineering Weekly), March 18, 2016.

*Fungi and paper manufacture*, Jerusik Russell J., *Fungal Biology Reviews*, 24 (2010), 68-72.