

Experiment 1

Introduction

Claims are being made around the country that certain types of drywall are having corrosive effects on copper wiring and piping in houses. I wanted to conduct a simple experiment that would indicate that this is indeed an issue.

Hypothesis

I hypothesized that “corrosive” drywall, in the presence of heat and moisture, will blacken copper while standard drywall will not.

Methods

Two samples of drywall were used in this experiment.

- A piece of Knauf board from an affected house.
- A piece of domestic board that I had in my workshop was used as a control ↓.



Two new pennies were used as my copper samples ↑.

I dipped each piece of drywall in water and then placed them each in a mason jar with a mint-condition copper penny.



I placed the jars side-by-side in the oven and heated them to 170 degrees Fahrenheit (77 Deg C) for 17 hours.



Results

The difference in the condition of the pennies was dramatic. The corrosive drywall turned the penny black while the domestic drywall did not affect the penny at all.



Effects of Gamma-Irradiation on the Ability of Corrosive Drywall to Cause Copper Corrosion: Examining the Role of Microbes

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Conclusion

This result suggests that there is a significant difference in the way corrosive drywall affects copper.

Experiment 2

Introduction

A pilot study was performed to determine if bacteria in drywall play a role in the emission of gasses that are corrosive to copper. This study looked at the effects of irradiating a sample of corrosive drywall on its ability to cause copper corrosion in a hot and moist environment as compared to a sample of non-irradiated corrosive drywall.

Hypothesis

I hypothesized that the blackened copper could be caused by living bacteria on or within the drywall. A sample was then submitted for gamma ray irradiation that was similar to what is used for food sterilization and was believed to be sufficient to kill all microbes present on or within the drywall sample. I then compared the blackening of copper clad pennies exposed to irradiated and non-irradiated drywall to determine if there was a discernable difference between the samples.

Methods

I took two more pieces of the Knauf board from the same sample as before.



One drywall sample was exposed to a sterilizing gamma dose of 25.11kGy to 28.24 kGy. For reference a similar dose of gamma radiation is used to decontaminate spices and herbs in the food preservation industry. Only 3 kGy is used to decontaminate eggs and poultry. (<http://www.foodtechservice.com/aboutfoodirr.asp>)



A paired sample of drywall that was not irradiated was used as a control.

I dipped each piece in water and then placed them each in a mason jar with a mint-condition copper penny.



I placed the jars side-by-side in the oven and heated them to 170 degrees Fahrenheit (77 Deg C) for 17 hours.



Results

There was no difference in the pennies – they both ↑ turned black.



Conclusion

These results suggest that live bacteria play no role in copper corrosion by “corrosive” drywall under the conditions used to screen for problem drywall in this experiment.

Limitations

- 1) This was only a small pilot study that should be repeated using more samples and types of drywall.
- 2) Subjecting the irradiated and untreated drywall to microbial culture could examine the effectiveness of the irradiation at killing microbes on and within the drywall.
- 3) Identifying and measuring the specific gasses emitted by the drywall before and after irradiation would verify the emission of corrosive gasses is not changed by sterilizing the drywall.