

Antimicrobial Copper and ... *Norovirus*

Name of Study: Inactivation of Norovirus on Dry Copper Alloy Surfaces

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A recent laboratory study conducted at the University of Southampton in the U.K. demonstrated that norovirus was rapidly inactivated on copper and copper-alloy surfaces as a result of antimicrobial properties in the metal.

Key findings:

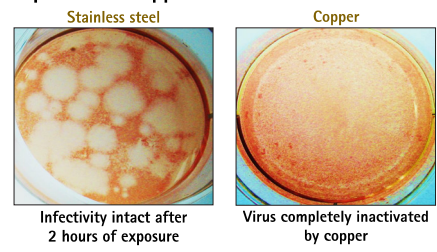
- In wet contact simulation testing, rapid inactivation of murine norovirus was observed on alloys containing more than 60% copper at room temperature but no reduction of infectivity on stainless steel was found.
- In dry touch simulation testing, all virus particles were inactivated on copper and copper nickel alloys within 5 minutes, within 10 minutes on bronze, 30 minutes on brass, and within 2 hours on nickel silver (copper nickel zinc alloys). No inactivation was observed on stainless steel.
- Increasing the viral load by 50 times did not affect inactivation times on copper alloys.

Norovirus Facts:

What is it?

- The norovirus (family Caliciviridae), the primary cause of gastroenteritis, is highly contagious and responsible for approximately **5–8 million deaths per year**.
- The norovirus infects more than **267 million** people worldwide annually, including **23 million** in the U.S. alone, resulting in up to **70,000 hospitalizations** and **800 deaths** per year.

Norovirus is unable to infect host cells after exposure to copper surfaces



How is it contracted?

- The disease is usually contracted by ingestion of contaminated food, water, person-to-person contact and touching contaminated surfaces. Even cleaning cloths used to wipe contaminated surfaces can spread the infectious virus to other surfaces.
- Symptoms include **vomiting, diarrhea** and **stomach cramping** caused by inflammation of the stomach and intestines.

Where is it prevalent?

- Norovirus is responsible for many outbreaks, often seasonal, especially in closed environments such as on **cruise ships** and in **healthcare facilities, schools, daycare centers** and **restaurants**.
- Although healthcare facilities are the most commonly reported settings for norovirus outbreaks in the U.S., **over 90% of diarrheal disease outbreaks** on cruise ships are caused by this germ.
- In **2012** alone, the Centers for Disease Control (CDC) reported over **3,000 cases** of norovirus among cruise ships.

Copper Facts:

This study was performed because metallic copper alloys have previously been shown to be effective antimicrobial surfaces against a range of bacteria, fungi, and viruses. A U.S. based study revealed that the use of copper surfaces in hospital rooms can reduce the number of healthcare-acquired infections (HAIs) by 58%. Six highly touched objects – bed rails, over-bed tables, chair arms, call button, computer accessories and IV poles – found in ICU rooms at three U.S. hospitals were retrofitted with copper touch surfaces for the study.

Brief synopsis of methodology

For this study, murine norovirus (the "mouse version" of the virus) was used as a surrogate to human norovirus to test the effect of exposure to copper surfaces versus stainless steel surfaces. The study found that the rate of inactivation is also affected by temperature: the process occurs more slowly at 39 degrees F and is faster over a 2-hour period at 98 degrees F.

To download the full study, visit <http://goo.gl/FtcUo0>

This is part of an ongoing series designed to educate the public about individual studies conducted with copper and explain its ability to inactivate viruses, and kill bacteria and fungi. To learn more about copper, visit www.antimicrobialcopper.com or www.copper.org.

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