

October 17, 2020

U.S. COPPER, INC  
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## **Efficacy Study on Copper (Cu 99'9%)**

### **Background:**

Controlling the spread of SARS-CoV-2 is a major public health challenge, and viral resistance has become one of the most important global problems in current times. The antimicrobial effect of copper has been known for centuries, and ongoing research is being conducted on the use of copper-coated hard and soft surfaces for reduction of microbial contamination.

### **Challenge:**

Surfaces can be sources of exposure to viruses and present a potential route for transmission of diseases. SARS-CoV-2 can be transferred to people and objects by coming into direct contact with them; contamination on hands can then be spread to the mouth, nose, or eyes allowing the virus to enter the body and cause the infection. Viral persistence tends to increase on porous or semi-porous surfaces and during cooler weather or environmental conditions.

### **Study Objective:**

The objective of this laboratory-controlled study is to evaluate Copper (Cu 99'9%) as a long-lasting antimicrobial product – assessing their efficacy at reducing the spread of infectious viruses from surfaces. The study will include the assessment of the effectiveness of their product as a function of time. The study may identify if Copper (Cu 99'9%) demonstrates residual (e.g., minutes) efficacy against viruses on surfaces.

### **Disclaimer:**

The summary here is intended to provide a simple representation for the results of preliminary testing; therefore, only a brief description of the purpose of the study, methods, and interim results are provided. Synergy Diagnostic Laboratory, Inc does not endorse the purchase or sale of any commercial products or services.

### **Procedure:**

Two samples of Copper (Cu 99'9%) were used to evaluate the stability of SARS-CoV-2 on its surfaces. One sample of Copper (Cu 99'9%) was used as the control and was NOT contaminated with SAR-COV-2 virus, while the second sample of Copper (Cu 99'9%) was contaminated with a contrived SARS-CoV-2 virus sample. The contrived sample of SARS-CoV-2 virus was spread on the Copper (Cu 99'9%), and visually observed while allowed to dry, taking 20 seconds. An initial dry swab was taken representing time zero (0). The

uncontaminated Copper (Cu 99'9%) sample was also tested at time zero (0) for confirmation of no cross contamination. Dry swabs were taken at the tested time points listed in the chart below. The samples were then tested utilizing the DirectDetect™ SARS-CoV-2 Direct Real-time RT-PCR kit assay which uses reverse transcription of SARS-CoV-2 RNA, DNA amplification, and fluorescence detection to determine if a surface is contaminated with SARS-CoV-2 targeting specific genomic regions of SARS-CoV-2: nucleocapsid (N) gene and open reading frame 1ab (ORF1ab) gene.

**Testing Times**

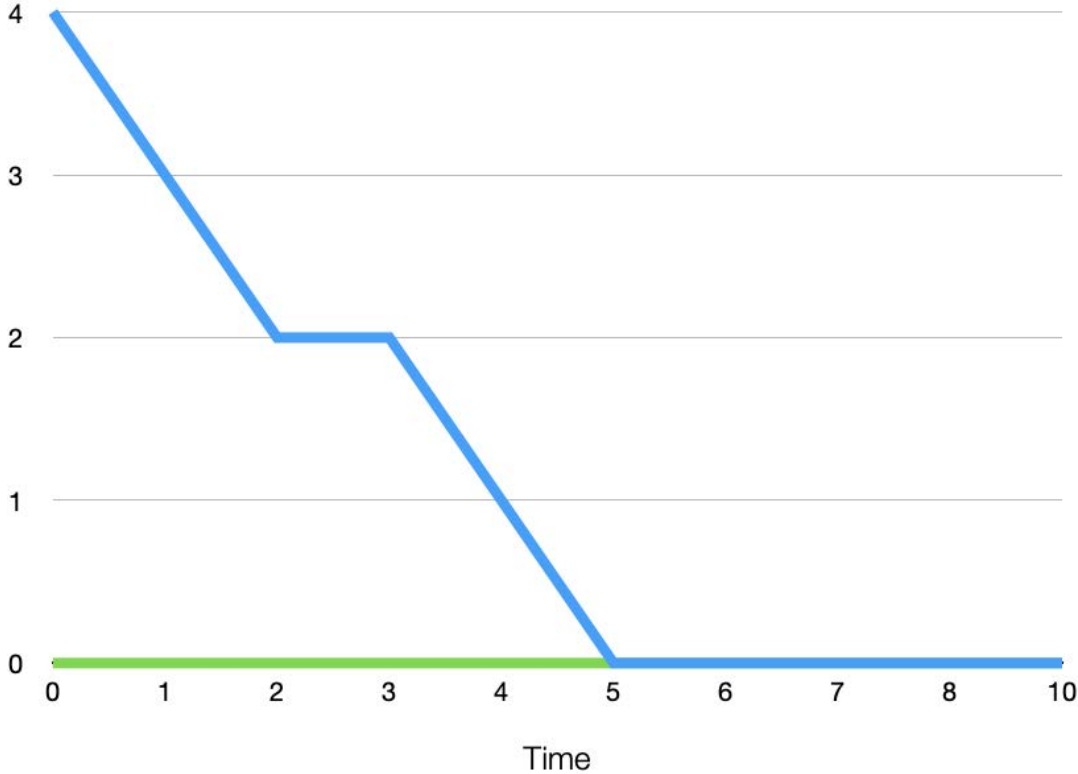
<b>Tested Time Point (Minutes)</b>	<b>Copper (Cu 99'9%) (Contaminated with SARS-COV-2)</b>	<b>Control (Uncontaminated)</b>
0	X	X
1	X	X
2	X	X
3	X	X
4	X	X
5	X	X
6	X	X
7	X	X
8	X	X
10	X	X

**Results:**

The results of the efficacy study determined the clinical relevance to incorporating copper surfaces into the built environment to reduce the microbial burden and thereby reducing the risk of spreading SARS-CoV-2 virus. The contaminated Copper (Cu 99'9%) swabs were analyzed for SARS-CoV-2 targeting two distinct genes, ORF1ab and the N gene. The swabs tested from time equal to zero (0), one (1) and two (2) minutes were positive for both genes, indicating the virus is present. Swabs tested at three (3) minutes showed amplification for only one gene, indicating the breakdown of viable viral load in comparison to the time zero (0) swab. The virus was undetectable by five (5) minutes. The control showed no virus over the ten-minute test.

**October 17, 2020 Efficacy Study Results**

— Copper (Cu 99'9%) (Contaminated with SARS-COV-2)  
— Control (UnContaminated)



Tested Time Point (Minutes)	Copper (Cu99'9%) (Contaminated with SARS-COV-2)	Control (Uncontaminated)
0	Positive	Negative
1	Positive	Negative
2	Positive	Negative
3	Positive	Negative
4	Positive	Negative
5	Negative	Negative
6	Negative	Negative
7	Negative	Negative
8	Negative	Negative
10	Negative	Negative