Antimicrobial Effect of Copper Alloys on E. coli, S. enterica, and S. aureus

Curtis, Whitney (School: Success Academy DSU)

The oligodynamic effect is the ability of metals to kill microbes, including bacteria. This effect is vital to modern methods of sterilization, as biocidal metals are commonly incorporated into “high-touch” surfaces like doorknobs and handles. To distinguish which metals have the greatest microbe-killing ability for implementation into high touch surfaces, an analysis was performed on copper and its alloys of brass and bronze. 13mm rounds of each metal were incubated atop agar plates containing Escherichia coli, Salmonella enterica and Staphylococcus aureus. A total of nine plates were incubated for each bacteria, and the inhibited areas of bacterial growth were measured. Copper corresponded to a mean inhibition area of 8.0617 mm, brass resulted in 8.04 mm, and bronze gave 9.8942 mm. An ANOVA test was performed resulting in a p-value of 0.043, which is a significant result at $p < 0.05$. A pairwise comparison revealed that the significant group was the bronze, showing that this alloy has a statistically significant advantage in the contact killing of microorganisms. These results support bronze as an effective method of implementing the oligodynamic effect to sterilize surfaces.

Awards Won: