



Antimicrobial Efficacy of Copper and Copper Alloys - Meticillin-resistant Staphylococcus Aureus -

Recent and ongoing research by Professor Bill Keevil et al at the University of Southampton has shown that copper surfaces inactivate disease-causing germs in a matter of minutes. Studies have clearly demonstrated such an antimicrobial effect on a range of microbes including meticillin-resistant *Staphylococcus aureus* (MRSA), *E. coli* O157, *Listeria monocytogenes* and other healthcare-associated infections. Some data for MRSA and EMRSA strains is presented here.

Figures 1 and 2 show the kill curves for copper and copper alloys at room and chill temperature respectively. Figure 3 shows the effect of reducing inoculum on kill times on pure copper. Figure 4 shows EDIC microscopy confirming that the non-culturable bacteria recovered from copper are not respiring.

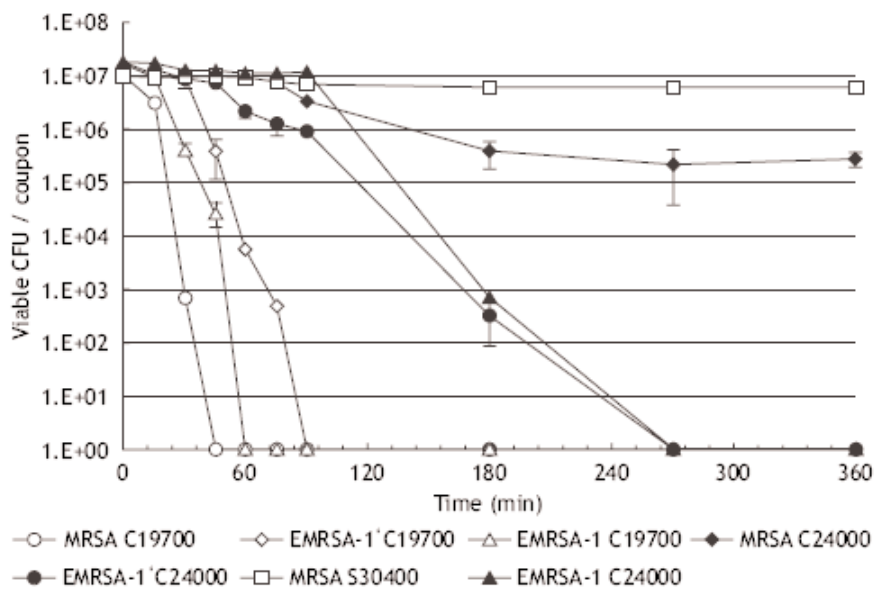


Figure 1 Effect on meticillin-resistant *Staphylococcus aureus* (NCTC 10442), epidemic MRSA-1 (EMRSA-1) and EMRSA-16 viability of a 6-h exposure to either stainless steel (S30400), copper (C19700) or brass (C24000) at 22° C. Points represent the mean (N = 3) ± standard error of the mean.

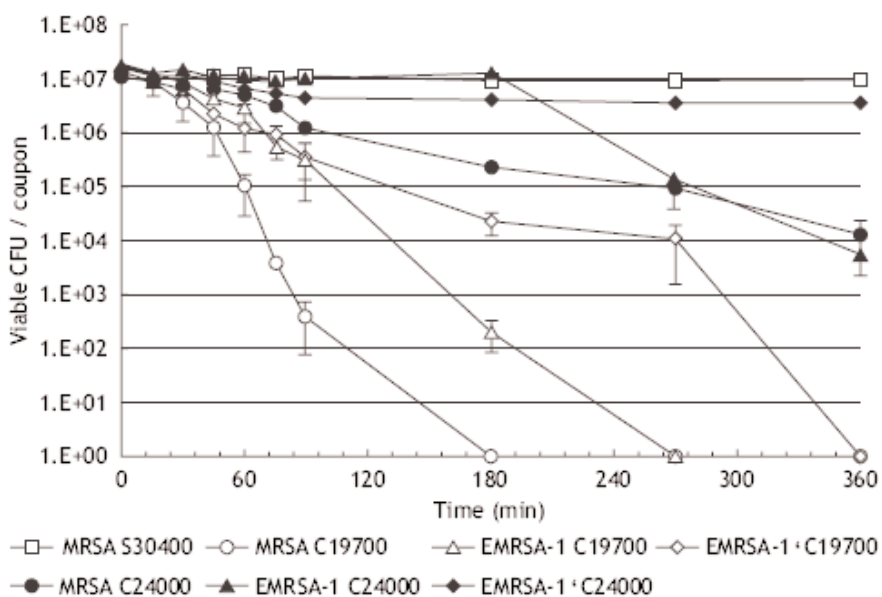


Figure 2 Effect on meticillin-resistant *Staphylococcus aureus* (MRSA), epidemic MRSA-1 (EMRSA-1) and EMRSA-16 viability of a 6-h exposure to either stainless steel (S30400), copper (C19700) or brass (C24000) at 4° C. Points represent the mean (N = 3) ± standard error of the mean.

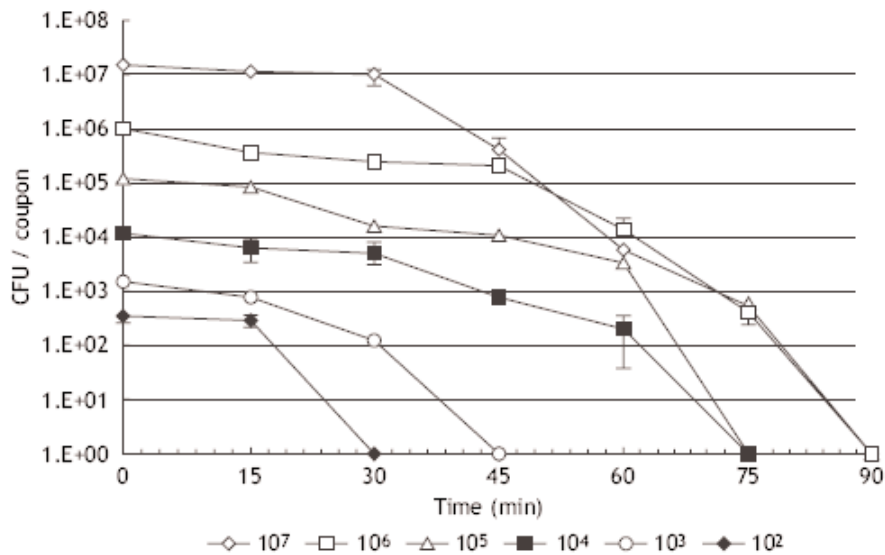


Figure 3 Effect of epidemic meticillin-resistant *Staphylococcus aureus*-16 (EMRSA-16) inoculum size on time for total kill when exposed to copper (C19700). Points represent the mean (N = 3) ± standard error of the mean.

The result of these experiments* led the research team to advise that hospitals switch materials from stainless steel to copper alloys in critical care areas where patients are at greatest risk of being infected.

Copper has been used throughout history and around the world as a hygienic material, and there is a long list of touch surfaces which could benefit from copper's antimicrobial properties today. A few low-cost and easy to implement improvements in facilities design can reduce the viability of microbes on the most frequently touched surfaces. For example, stainless steel and aluminium door handles can be replaced with brass handles.

*Reference: Potential use of copper surfaces to reduce survival of epidemic meticillin-resistant *Staphylococcus aureus* in the healthcare environment. Noyce J O, Michels H T and Keevil C W, *Journal of Hospital Infection* 62:289-97 (2006).

Antimicrobial Copper Interest Group

The Antimicrobial Copper Interest Group has been formed for designers, healthcare professionals, facilities managers, product manufacturers and material suppliers who wish to keep up with the latest developments, research and in-situ trials from the US, Japan and Europe. The prime aims of the group are information dissemination and networking. To apply to join please email your expression of interest to: bryony.samuel@copperdev.co.uk.

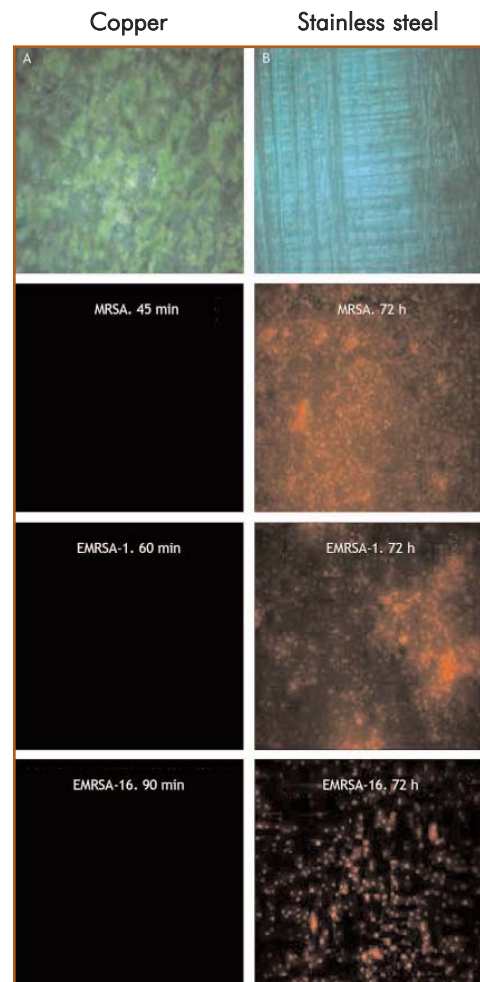


Figure 4 Episcopic differential interference contrast and epifluorescent images of copper (A) and stainless steel (B) inoculated with meticillin-resistant *Staphylococcus aureus* (MRSA), epidemic MRSA-1 (EMRSA-1) and EMRSA-16. Red points represent respiring cells. Original magnification 400.

Copper Development Association

5 Grovelands Business Centre, Boundary Way, Hemel Hempstead, HP2 7TE

Tel: 01442 275705, Fax: 01442 275716

Website: www.copperinfo.co.uk/antimicrobial

E-mail: helpline@copperdev.co.uk