Starting from scratch

Should the test include flexible or absorbent materials? Is it better wet or dry? What about disinfectants and time span? Antimicrobial hard surface testing is in dire need of standard practice. Eoin Redahan reports.

Image courtesy of US CDC/Brian Judd/James Gathany

You feel reassured when you wipe a hard surface with disinfectant, but you shouldn't. Peer into a microscope and you will see scratches. Magnify it further and you will find bacteria hiding in the scratches. When your disinfectant can't get into these nooks, the pathogens persist.

It can be disconcerting to think about. MRSA can stick around in a hospital ward for up to seven months. *Salmonella* has survived in an old, dry food factory for more than 10 years. Recent studies have questioned the efficacy of hand washing and disinfectant wipes. In the UK alone, £1bln is needed each year to tend patients with health care associated infections. Despite this, MRSA has accounted for 9,000 UK deaths since 2007. And, in case some of this journalistic scaremongering hasn't rattled you, the

next great superbug, NDM-1, is piggybacking on the skin of 100 million people in India.

Despite the aforementioned issues raised by contributors at the Antimicrobial Hard Surfaces: The Need for Standards conference, held in London on 28 February, they weren't too concerned about the development of materials to combat pathogens. Various novel coatings, implants and biocide impregnations are improving the fight against infection, and copper's antimicrobial properties have been exploited to promising effect in an array of new alloys. What is more worrying, however, is the lack of an adequate international standard to test the efficacy of these novel surfaces.

The current international standard (ISO) for antimicrobial surface testing is JISZ2801 (Japanese Standards Association, 2000). Professor C W Keevil, Chair of the Environmental Health Unit at the University of Southampton, UK, noted, '[It was] originally developed for hydrophobic tests (incorporating silver), but is widely used for other applications because it is the only standard available'.

One of the main deficiencies of the standard is that it does not recreate in-use conditions. Surfaces are incubated at 35°C in a humid environment for 24 hours. The microbial inoculum used for the test is covered with a sterile polyethylene film. Like many others present, Keevil was sceptical about the test's efficacy. 'How realistic are 35°C temperatures across Europe?' he asked. 'In what environments do you wrap your surface in a plastic film? And, when does a surface stay wet for a 24-hour period?' His team has devised an alternative test method – where the sample is incubated at 4°C and 20°C and the sample dries rapidly – to mimic in-use conditions.

Developing a pan-industry standard in Europe has been slow in recent years. 'If you could detect movement, you were doing very well,' one delegate added dryly. As with many sectors, a lack of cohesion has stymied progress. It is feared that this could see professionals in the UK and Europe fall behind their US counterparts. More than 350 antimicrobial copper-containing products now conform to the US Environmental Protection Agency's standard, After each material has demonstrated strong antimicrobial efficiencies, it attains the CU+ standard of excellence, which is important for the consumer. 'The end users want reassurance,' an audience member said. 'They have a certain expectation of a specific level of performance.'

Frustratingly, test method standardisation was posed in the UK as far back as 1998, but as yet relatively little has been accomplished. 'For the past six years, we've tried to develop a standard for a field III (field trial) European test,' one delegate noted. 'And we haven't got on very well. It needs to be developed at a British level first.'

Compiling an all-encompassing standard isn't as easy as it would appear, especially when it comes to identifying parameters. For instance, should rolled polymerised metal organic frameworks be included? What about materials with release systems or impervious materials? Should the standard be broad enough to include as many material types as possible, and include the interaction with cleaning materials?

Almost everyone agreed that the test should provide long-term analysis and realistic in-use conditions. Some delegates advocated getting a basic standard in place quickly and honing it once it is in place. 'I would like to reduce the scope, the articulation of the problem,' one audience member said. 'We don't want a standard that will take a decade to produce.' This urgency is understandable, as the last time the industry deliberated over testing standards, the maligned JISZ2801 standard filled the void.

Rob Greaves, of the British Standards Institute, offered a possible solution, 'We don't require full consensus to develop a Publicly Available Specification (PAS),' he said. 'For some of the areas where we have a standard, they tried to develop that at European level for five years. But we developed a British PAS [for these] in 12 months.'

Perhaps the PAS could provide a starting point for a new standard. But who will pay for this standard? Manufacturers? End users? Test centres? Not for the first time, a consensus was not forthcoming. But, as one delegate noted, it is in everyone's eventual interest to get moving as quickly as possible. 'This is a piece of technology that is related to the global market place. We may as well get on that bus.'

They said...

'The problem is, [the existing ISO standard] does not realistically control all the parameters' – Jean-Yves Maillard, Reader in Pharmaceutical Microbiology, Cardiff University

'Micro-organisms will adapt to a food processing environment and stay around for a long time' – John Hoolah, Head of Food Hygiene, Campden BRI

'People don't like the colour of copper, so we need to make alloys' – Delegate

'We must make sure the standard is material agnostic, antimicrobial and doesn't come off the door' – Delegate

'We lose one thirtieth of our skin mass every day. That means a whole person-worth of skin will be left in this room at the end of the day. The bacteria on the skin flakes persist if the room isn't cleaned' – Dr David Jenkins, University of Leicester NHS Trust

Standards practice

ISO — International Organization for Standardization: The world's largest developer and publisher of international standards. 163 national standard institutes are members. Each standard requires a consensus.

EN — Pan-European design codes

EPA — US Environmental Protection Agency standards

BSI — British Standards Institute: the UK's national standards body

PAS — Publicly Available Specification: a document where the development process is based on the British Standard model. Any organisation can commission a PAS, which is subject to BSI acceptance.