

A fresh approach to clean water

Microbiologists at Giessen University are using an Infinite® M200 microplate reader to look at the potential of engineered metal nanoparticles for treating water, inhibiting the growth of bacteria in drinking water at the point of use, and eradicating pharmaceuticals and other micropollutants from waste water.



Researchers in the Institute of Applied Microbiology at Giessen University, Germany, have developed a microplate-based assay for online testing of the effects of metal nanoparticles – including silver, iron and palladium – on bacteria and organic micropollutants. Michael Bunge, senior scientist in the Nanobioengineering group, explained: “It is clear that some metal nanoparticles are toxic to a variety of

microorganisms, but we don’t know how and to what extent they affect microbial growth and survival, and there are no standard methodologies to assess this accurately. We have, therefore, developed a straightforward technique that simultaneously cultivates microbes and uses the Infinite M200 microplate reader to monitor the effects of different sizes and compositions of nanoparticles on bacteria, specifically

enterobacteria and strains that exhibit antibiotic multi-resistance.”

“We began by measuring at specific time and end points, but soon discovered that we needed to look at the whole dynamic response of bacterial cultures. For example, some bacteria exhibit quite extended lag phases and didn’t even start to grow until 36-48 hours, while others have a very erratic pattern of growth. These observations may be highly significant, yet are undetectable using the more traditional microbiological end-point criteria, such as counting colony forming units or measuring inhibition zones, making continuous measurements vital.”

Michael continued: “We chose an Infinite M200 for this application because it is a monochromator-based reader, making it easy to adjust the wavelength down to a resolution of 1 nm – which is particularly important for nanoparticle suspensions with a high background signal – and I knew from previous experience that Tecan systems were reliable. The system itself is very easy to use, and it is saving us so much time on repetitive, laborious tasks. We also have the option to combine it with fluorescence techniques to assess the viability of cells in real time, or to add an injector module for automated liquid handling, should the need arise.”



The Nanobioengineering group (left to right): Karsten Theophel, Santosh K. Sandhi, Michael Bunge, Lara Neumann, Veronika Schacht, Victor Cheunuie-Ambe and Nassim Sahragard



“So far, we have applied this method to drinking water and we are working closely with companies interested in applying water filters directly to taps and other drinking water supplies in remote regions, especially in less developed areas of the world. Another potential application we would like to explore is the purification of waste water, particularly from hospitals, which contains many pharmaceuticals that are difficult to eradicate from water supplies, despite the efforts of treatment plants. We are hopeful that metal nanoparticles can be used to significantly reduce the recirculation of these and other micropollutants.”

To find out more on Tecan's monochromator-based Infinite M200 microplate reader, visit www.tecan.com/infinite200

To find out more about the Institute of Applied Microbiology, Giessen University, visit www.uni-giessen.de/cms/fbz/fbog/institute/mikrobiologie?language_sync=1



Craig Williamson, VP Service and Consumables Tecan US, Inc.

Leading the debate

Remote support is a controversial subject, for service providers as well as customers, but Tecan's US helpdesk has taken a long hard look at the benefits it brings to all parties and, in the last year, has increased the fix rate by telephone from 60 % to 71 %.

Remote support is not a simple solution; without a really skilled helpdesk and technical team it's hard to achieve. At Tecan US, we have a mix of nine skilled individuals based in North Carolina, from computer specialists to laboratory scientists from all disciplines, on call 24 hours a day, 365 days of the year. Each one has undergone an intense 18-month learning phase in preparation for any call that might come their way and, if they can't help straightaway, there will certainly be a colleague close at hand who can.

In 2011, with the help of this knowledgeable team, we decreased our field dispatches by over 1,000 service calls, getting our customers up and running much faster than would previously have been possible, and saving considerably in costs for both the customer and Tecan. Hardware problems might still need a visiting engineer, but even diagnosing an issue over the phone can save time and help in preparation. When it comes to application or software issues, we can often solve things quickly by phone without the customer even needing to wait for a visit. With mutual trust and understanding, many customers have come to recognize that giving Tecan remote access to their instruments on these occasions, even if that means through firewalls, can give them instantaneous diagnosis and, in many cases, a quick fix there and then. This is truly a win-win situation and the way forward for the Tecan service organization.

**Do you have experience of the advantages remote support can give?
Send your comments to talk@tecan.com**