

Comparison of the effectiveness of different antimicrobial surfaces technologies

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Abstract:

Introduction:

The risk of infection via microbiologically contaminated surfaces has already been demonstrated by other publications. [1] One possibility to counteract this danger besides the improvement of cleaning and disinfection procedures is coating or equipping surfaces with antimicrobially active substances. American publications showed positive effects of copper surfaces on infection rates in intensive care units in 2013. [2] In this work two different antibacterial surface technologies metalloacid (AMiSTec) and TiO₂/Ag (Health Complete) were compared regarding feasibility as well as their advantages and disadvantages. [3+4]

Material and methods:

The active components were applied to the test samples via the electrospray technique. For the AMiSTec technology the samples were coated with the appropriate varnish. The examination of the antimicrobial activity was assessed according to the JIS Z 2801. Therefore triplicates of the samples were contaminated with a given concentration of E. coli bacteria (approx. 5×10^5 /ml) and after incubation at 35°C and >90% humidity the viable germs on the surfaces were counted via cultivation on agar plates (TSA-Agar). The activity of the surfaces can be calculated by comparison with an antimicrobial inactive surface. This was done with different incubation times and different light intensities to obtain results for the reaction kinetics and the influence of the luminosity to the antimicrobial effectivity.

Results:

We could demonstrate that all of our tested samples showed a strong antimicrobial activity (>log 3 germ reduction) in the JIS experiments. The evaluation of the reaction kinetics showed a full activity of the samples already after 30 minutes incubation time. The Health Complete surfaces showed this activity also at low light intensities (approx. 300 Lux). The AMiSTec technology can be easily included in a wide range of materials (plastic, varnish, etc.). Both technologies can also be applied on the surfaces subsequently via the electrospray technique. Because of this advantage the products do not have to be designed and produced as antimicrobial active products in advance, but can be antimicrobially “retrofitted”. This allows a broader range of applications to various products and components.

Keywords: antimicrobial surface, electrospray technique, hygiene

[1] Bures S, Fishbain JT, Uyehara CF, Parker JM, Berg BW. Computer keyboards and faucet handles as reservoirs of nosocomial pathogens in the intensive care unit. *Am J Infect Control* 2000;28:465–471. [PubMed: 11114617]

[2] Salgado et al., *Infect Control Hosp Epidemiol* 2013;34(5):000-000

[3] www.amistec.at/technologie.htm

[4] www.healthcomplete.de