Application Note:
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Antimicrobial properties of Thermo Scientific Finnpipette F1 compared to traditional pipettes

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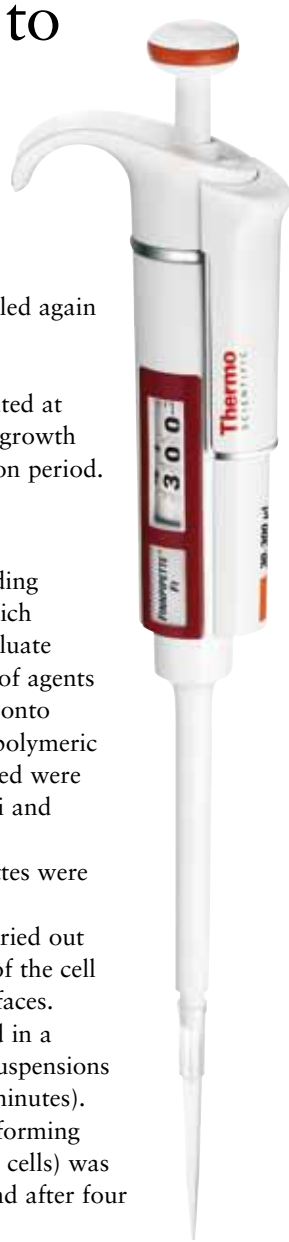

In this application note the antimicrobial properties of the Thermo Scientific Finnpipette F1 were compared to traditional pipettes without antimicrobial treatment. The experiments were performed by an independent laboratory (Institut für Biotechnische Forschung und Entwicklung Graf GmbH, Kirkel-Limbach, Germany).

Introduction

Even when a pipette user observes strict cleanliness, microbes from his or her hands may contaminate the pipette and cause deterioration of is parts. More importantly, these microbes are a potential source of sample cross-contamination. Cross-contamination can lead to false positive results in diagnostic tests or incorrect results in scientific research.

To minimize these possibilities, the handle and the dispensing button of the Finnpipette® F1 are made of an antimicrobial polymer,to protect the device from microbial growth.

In these experiments the antimicrobial properties of the Finnpipette F1 were compared to three pipettes without antimicrobial treatment.

Materials and Methods

The test pipettes were the Finnpipette F1 and traditional pipettes from three different competitors.

Two different approaches were used to determine antimicrobial properties:

Method 1

This method simulated pipette use:
Step 1: The handles of the pipettes were disinfected with 70% ethanol.
Step 2: The handles were sampled for bacteria using contact plates (Oxoid Dip Slides with TTC (red spot) medium).
Step 3: Each pipette was held bare-handed for one hour.
Step 4: The handles were then sampled for bacteria using contact plates.
Step 5: The handles were sampled again after four hours.

The contact plates were incubated at 37 °C for 24 hours. Microbial growth was checked after the incubation period.

Method 2

The pipettes were tested according to ASTM standard E 2180, which comprises a test method to evaluate the antimicrobial effectiveness of agents incorporated or bound into or onto primarily flat hydrophobic or polymeric surfaces. The test organisms used were the two bacteria Escherichi coli and Staphylococcus aureus.
Step1: The handles of the pipettes were disinfected with 70% ethanol.
Step 2: Contamination was carried out by pipetting droplets of 25 µl of the cell suspension on the handles' surfaces.
Step 3: The pipettes were stored in a horizontal position while the suspensions completely dried (approx. 60 minutes).
Step 4: The number of colony forming units (cfu, a measure for viable cells) was determined after 30 minutes and after four hours.

Results and discussion

The results of the simulation experiment (Method 1) are shown in the following pictures (Fig. 1-3). The figures show that the Finnpipette F1 had significant antimicrobial properties when compared to competitive pipettes without antimicrobial treatment. More bacteria were inactivated on the handle of the Finnpipette F1 than on the handles of the competitive pipettes.

The results of the ASTM standard testing experiment (Method 2) are illustrated in the following graph (Fig. 4). Four hours after the handles were contaminated with bacterial suspensions, the

reduction of E. coli was 99.9% for the Finnpipette F1, and 98.3 to 99% for the competitor pipettes. The reduction of S. aureus was 19% for the Finnpipette F1 after four hours, while the reduction was approximately 9% for the competitive pipettes. Staphilococci are known to be relatively resistant to drought stress and low water activities as occurred due to the experimental conditions.

These results were consistent with with those of the first experiment: the reduction of bacteria was highest with the Finnpipette F1, followed by the competitive pipette # 3.

Under dry conditions, pipette handles are not a good base for microbial growth as seen by the reduction of the number of viable microorganisms on all pipettes. This is most probably due to drought stress on the bacteria. The reduction, however, was clearly higher for the Finnpipette F1 than for the other test pipettes. The surface of the Finnpipette F1 has a smooth finish while the other pipettes have a textured surface. This may mean that also the surface texture has an impact on the reduction of microorganisms.

Conclusion

These results show that the antimicrobial material used in the handle and dispensing button of the Finnpipette F1 resulted in a significant reduction of microorganisms as compared to competitor pipettes of leading brands. Therefore, the experiments demonstrated the efficacy of the antimicrobial polymer in giving an extra protection against microbial growth.

Figure 1. Samples taken from the disinfected pipette handles (before holding the pipettes).

Figure 2. Samples taken from the pipette handles immediately after holding the pipettes with bare hands for one hour.

Figure 3. Samples taken from the pipette handles four hours after holding the pipettes with bare hands for one hour.

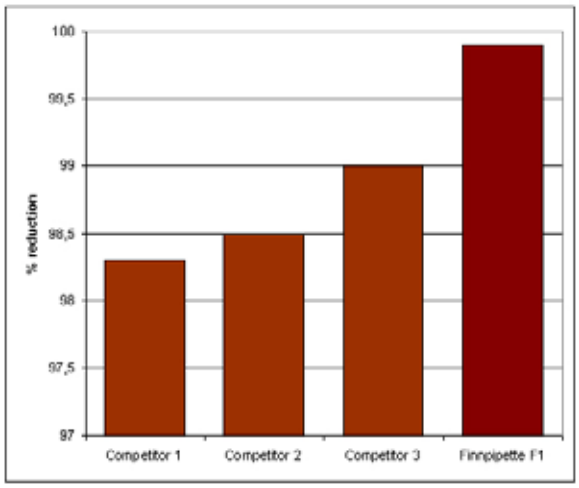

Fig.ure 4. Reduction of cfu of E. coli from different pipettes 4 h after contamination.

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