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THE DENTAL ADVISOR

3110 West Liberty
Ann Arbor, MI 48103
Toll free: 800.347.1330
E-mail: info@dentaladvisor.com
Web Site: www.dentaladvisor.com

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Cleaning Efficacy of Miele Washer/Disinfector

John A. Molinari, Ph.D., and Joelle Prose, M.B.S.
THE DENTAL ADVISOR Biomaterials Research Center
Dental Consultants, Inc., Ann Arbor, Michigan

Purpose – The purposes of this study were to investigate the efficacy of the *Miele G7881 Washer/Disinfector* with regard to:

1. Removing bioburden and contaminant microorganisms on instruments and cassettes used in a dental practice;
2. The antimicrobial effects of the washer/disinfector cycle on processed inanimate surfaces.

Materials and Methods – The *Miele G7881 Washer/Disinfector* (*Miele Professional*) was installed at Enspire Dental, Ann Arbor, Michigan. Cultures of gram-positive *Staphylococcus aureus* ATCC #29213 and gram-negative *Pseudomonas aeruginosa* ATCC #27853 were grown aerobically in tryptic soy broth at 37C for 24 hours prior to study. Suspensions of the experimental bioburden were prepared by mixing the tryptic soy broth cultures of *S. aureus* (3 ml) and *P. aeruginosa* (3 ml) into 4 mL of citrated whole human blood.

Sterile cotton swabs were used to coat instrument surfaces, cassette rails, and other cassette surfaces (Figure 1). Applied bioburden was allowed to dry for 10 minutes prior to processing the cassette in the *Miele G7881 Washer/Disinfector*. Baseline (control) specimens (n=5) were taken on multiple areas from instruments and cassettes using sterile cotton swabs moistened in tryptic soy broth prior to processing in the unit. Two contaminated cassettes with instruments were processed in the *Miele G7881 Washer/Disinfector* (Figure 2). Five samples were collected from the cassette, cassette trays, and representative instruments immediately after completion of cleaning/ disinfection cycles.

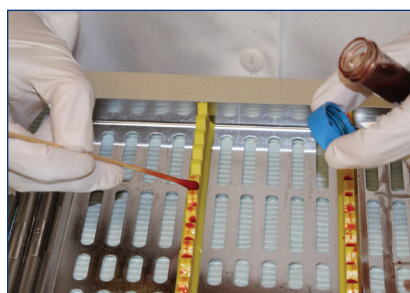


Figure 1. Applying the 24 hour tryptic soy broth cultures of *S. aureus*, *P. aeruginosa*, and heparinized blood to the cassette rails.



Figure 2. Placing cassettes with applied indicated bioburden into the *Miele G7881 Washer/Disinfector*.

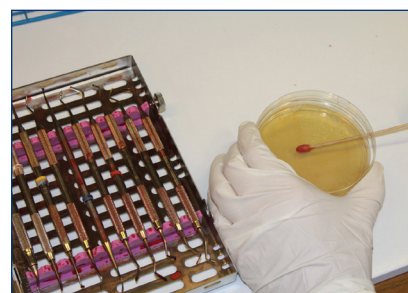


Figure 3. Culturing bacterial contaminants onto tryptic soy agar plates using sterile cotton swabs.

Collected samples were cultured in duplicate onto tryptic soy agar plates and tryptic soy agar plates containing 5% sheep blood (Figure 3). The latter medium was used to allow for culture and isolation of other possible, fastidious, environmental bacteria. All plates were incubated aerobically at 37C for 24 hours before observation. Microbial growth was assessed and colony forming unit (cfu) counts were determined where possible.

Results – Tryptic soy agar plates containing 5% sheep blood that were exposed to microbial contaminants of whole human blood, *S. aureus*, and *P. aeruginosa* prior to cleaning in the **Miele G7881 Washer/Disinfector** resulted in extensive microbial growth (Figure 4). These control results were consistent for all collected samples including instrument handles and tips, cassettes, and trays. Samples assayed with the above microbial contaminants also yielded confluent growth when cultured on tryptic soy agar plates and incubated at 37C for 24 hours.

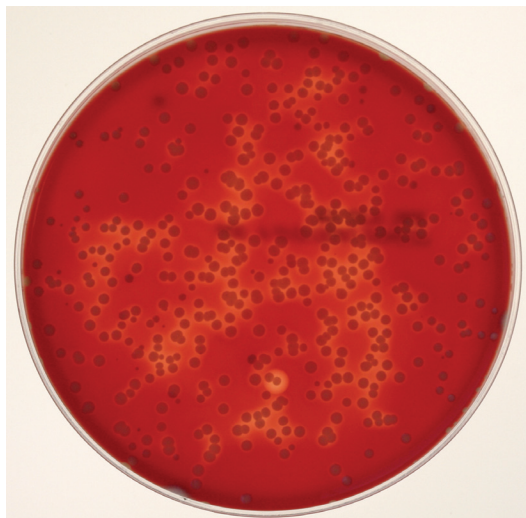


Figure 4. Microbial contaminants from an instrument handle serving as the control on tryptic soy agar containing 5% sheep blood.

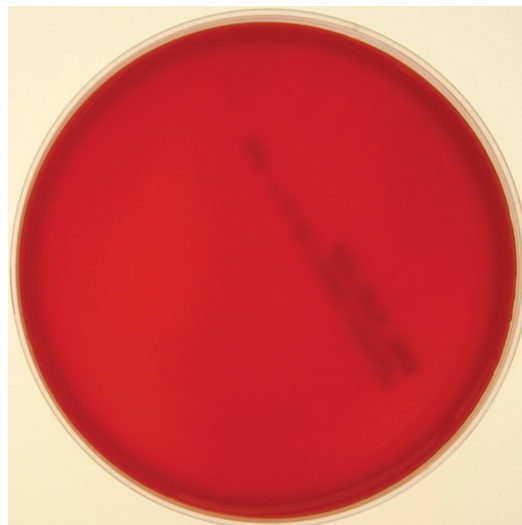


Figure 5. Microbial contaminated cassette after processing in Miele G7881 Washer/Disinfector on tryptic soy agar containing 5% sheep blood.

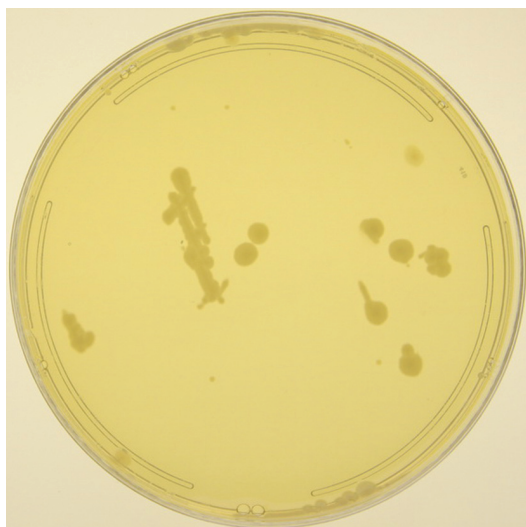


Figure 6. Experimental cassette bioburden cultured after processing in **Miele G7881 Washer/Disinfector** on tryptic soy agar.

In contrast, samples collected from instruments and cassettes processed in the **Miele G7881 Washer/Disinfector** yielded no colony growth when cultured on tryptic soy agar plates containing 5% sheep blood (Figure 5) and only occasional low levels of growth when cultured on tryptic soy agar plates (Figure 6).

Conclusions – The **Miele G7881 Washer/Disinfector** was found to be effective in cleaning cassette and instrument surfaces following the completion of a single cycle. The efficacy of the antimicrobial effects of the unit cycle also proved to be successful in removing contaminant bacterial species.