

Laboratory Report

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Your date of order:	06.07.2005	Receipt of samples/sampling:	29.07.2005
Your order no.:		Date of analysis:	19.08.2005
BMA-order no.:	AU050706-04	Date of report:	24.08.2005
BMA-sample no.:	050817-01	Report no.:	BE050706-04/1K2

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Test object

Mop pad: MicroSpeed Plus prewashed at 60°C

Analyses

Evaluation of capability of MicroSpeed Plus Mop to reduce bacteria on floor surfaces in a clean bench

1. Purpose of the study / Conclusion

It was the purpose of the present study to investigate MicroSpeed Plus Mop with regard to its cleaning effects in hospitals.

As it was not the purpose of cleaning in hospitals to remove ubiquitous environmental germs on the surface of a floor, but to reduce the number of pathogenic or optional pathogenic microorganisms two bacterial strains (*Pseudomonas aeruginosa* and *Staphylococcus aureus*) are used in the test, which are typical pathogens in hospitals.

The test strains were applicated onto the surface of a freshly disinfected PVC floor (Tarkett Granit) in a clean bench under standard laboratory conditions.

During this test the MicroSpeed Plus Mop showed a high reduction (99,95%) of both bacterial test strains.

The results of this study thus demonstrate that under the chosen conditions, sanitation results are approaching disinfection criteria.

2. Materials and Methods

Material

Test surface:	new PVC floor (Tarkett Granit, 40 x 100 cm), non structured
Mop system:	MicroSpeed Plus Mop, prewashed at 60°C, cut to a length of 25 cm
Frame:	Vileda, cut to 25 cm to fit to lab bench
Neutral cleaner:	Tana Green care Neutral-Reiniger 04631 (TANA Chemie GmbH, Mainz, Germany)
Bacteria strains:	<i>Pseudomonas aeruginosa</i> (ATCC 9027) <i>Staphylococcus aureus</i> (ATCC 6538)
Tubes	50 ml Falcon tube
Liquid agar for the pour plating method:	tryptone soya agar (45°C)
Solid agar for the spread plates method:	tryptone soya agar

Method

This test was performed in a clean bench under standard conditions.

Test surface

Before testing the floor was disinfected in the clean bench.

Application of bacteria onto the test surface

The bacterial strains *Pseudomonas aeruginosa* and *Staphylococcus aureus* were applied onto the test surface as suspension. The concentration of *Pseudomonas aeruginosa* and *Staphylococcus aureus* in suspension was $7,26 \times 10^7$ cfu/ml (cfu = colony forming unit) for each strain. 5 ml of this bacterial suspension was applied onto 2.268 cm^2 yielding in $1,6 \times 10^5$ cfu/cm².

Determination of bacteria from the surface of the floor based on EN 1174-2

Areas of $7 \times 9 \text{ cm}$ were suspended in 15 ml 0,09 % NaCl solution in a falcon tube and shaken 20 min end to end. The bacteria concentration of the suspension was analysed using the pour plating method (mixing of the suspension with hot liquid tryptone soya agar (45°C) and plating) for low concentrations and the spread plates method (plating 100 µl of the suspension on a solid tryptone soya agar plate, 2 parallel plates per dilution) for high concentrations. The agar plates were cultivated 4 days at 30°C.

Cleaning procedure with the Mop system

The 25 cm mop was moistened by spraying 75,7 ml water (which equals 100ml / commercial 50 cm MicroSpeed Plus Mop) with 1% neutral cleaner (without disinfectants) onto the mop and put on a 25 cm frame. Then the mop was wiped once across the test surface by moving it in form of an 8 at a speed of approx. 5 cm/s based on instructions of the manufacturer.

Control of disinfection:

Before application of bacteria the disinfection was controlled by suspension of 3 floor areas of $7 \times 9 \text{ cm}$ and determination of bacteria by using the pour plating method.

Samples:

After application of bacteria and drying of the floor for one hour the recovery of the test was determined by suspension of 3 floor areas of $7 \times 9 \text{ cm}$ and determination of bacteria using the spread plates method. After application of bacteria and drying of the test surface $0,39 \times 10^4$ cfu of cultivable bacteria / cm² ($\pm 0,09 \times 10^4$ cfu/cm²) were detectable.

After cleaning the bacteria concentration was determined by suspension of 15 floor areas of $7 \times 9 \text{ cm}$ using the pour plating method and 15 floor areas using the spread plates method.

3. Results

The results of the measurements and analyses exclusively refer to the examined article(s).

Capability of MicroSpeed Plus Mop to reduce bacteria on a new PVC floor under standard conditions with 2 bacteria test strains (*Pseudomonas aeruginosa* and *Staphylococcus aureus*)

Table 2: Bacteria concentrations on the floor surface before and after cleaning

Sample / Sample identification		Bacteria concentration before cleaning		Bacteria concentration after cleaning		Reduction [%]
		[CFU / cm ²]	[CFU / m ²]	[CFU / cm ²]	[CFU / m ²]	
MicroSpeed Plus Mop, prewashed 050817-01	mean	3.857	$3,857 \times 10^7$	2,5	$2,460 \times 10^4$	99,95
	standard deviation	897	$0,897 \times 10^7$	1,3	$1,313 \times 10^4$	0,02


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Annex

Single Results

The results of the measurements and analyses exclusively refer to the examined article(s).

Table 2: Capability of MicroSpeed Plus Mop to reduce bacteria on a new PVC floor under standard conditions with two bacterial test strains (*Pseudomonas aeruginosa* and *Staphylococcus aureus*). Bacteria concentrations on the floor surface before and after cleaning.

Sample / Sample identification	Sample No.	Bacteria concentration before cleaning Results obtained by the spread plates method (plating of 100 µl of the 1:10 or 1:100 dilution)			
		[CFU / cm ²]	[CFU / m ²]		
MicroSpeed Plus Mop, prewashed 050817-01/ mean standard deviation	4.7	4.345	4,345 x 10 ⁷		
	4.8	4.405	4,405 x 10 ⁷		
	4.9	2.821	2,821 x 10 ⁷		
		3.857	3,857 x 10 ⁷		
		897	0,897 x 10 ⁷		
Sample / Sample identification	Sample No.	Bacteria concentration after cleaning Results obtained by the pour plating method (mixing of the suspension with hot liquid tryptone soya agar, 1 + 1)		Reduction [%]	
		[CFU / cm ²]	[CFU / m ²]		
MicroSpeed Plus Mop, prewashed 050817-01/ mean standard deviation	4.11	n.e.	n.e.	n.e.	
	4.13	3,1	30.952	99,93	
	4.15	5,7	57.143	99,91	
	4.17	2,6	26.190	99,95	
	4.19	2,6	26.190	99,96	
	4.21	2,1	21.429	99,93	
	4.23	1,9	19.048	99,96	
	4.25	1,2	11.905	99,97	
	4.27	2,6	26.190	99,94	
	4.29	2,1	21.429	99,96	
	4.31	1,0	9.524	99,97	
	4.33	1,0	9.524	99,96	
	4.35	3,6	35.714	99,94	
	4.37	n.e	n.e.	n.e.	
	4.39	n.e	n.e.	n.e.	
			2,5	24.603	99,95
			1,3	13.133	0,02

n.e.: This sample could not be evaluated and therefore was not included into the calculation of the mean and standard deviation.