

# Antimicrobial Test Report

## Aim

Testing antimicrobial activity against *Klebsiella pneumoniae* of Schmitz **Bioactive** draping fabrics.

## Test Samples

- Schmitz draping fabrics treated with *HeiQ AGS-20 TF* (Standard formulation).

## Methods

- Testing method: ISO 20743.
- Prepare sample test pieces of ca.0.4g, repeated in triplicate
- Samples sterilized with steam treatment (steam at 100 °C for 5 minutes, drying at 70 °C for 5 hours).
- Prepare bacteria culture of ca.  $3 \times 10^5$  cells/ml
- 200 µl of bacteria culture applied to sample
- Sample incubated for 18 hours at 37 °C
- Living bacteria remaining on each sample are rinsed off and counted. Counting provides the number of so-called Colony Forming Units (cfu) which is an indicator of bacteria population.
- Calculation of antimicrobial performance metrics (From cfu counts after 18 hrs). See metric calculations below.

## Antimicrobial Performance Metrics

- Performance metrics calculated from the mean cfu counts as follows:

$$\% \text{ Reduction} = \frac{[(\text{Mean cfu})_{\text{control}} - (\text{Mean cfu})_{\text{sample}}]}{(\text{Mean cfu})_{\text{control}}} \times 100$$

$$\text{Log reduction} = \text{Log}_{10}(\text{Mean cfu})_{\text{control}} - \text{Log}_{10}(\text{Mean cfu})_{\text{sample}}$$

- Antimicrobial performance categories are defined according to the following table:

Antimicrobial performance	Log reduction	% Reduction
None	<0.5	<68.4%
Slight	0.5 to <1	68.4% to <90%
Medium	1 to <2	90% to <99%
Good	2 to <3	99% to <99.9%
Very good	≥ 3	≥ 99.9%

## Test organisms

Species	Comment	Strain
<i>Klebsiella pneumoniae</i>	Gram negative bacteria	ATCC 4352 (DSM 789)

## Results

<b><i>Klebsiella pneumoniae</i> (ATCC 4352)</b>							
#	ID	Sample	Bacteria count (cfu)		% reduction	Log reduction	Performance
			Mean	St.Dev			
-	0912	HeiQ reference polyester (0 hrs)	1.1E+05	-	-	-	-
-	0912	HeiQ reference polyester	4.3E+05	2.1E+04	-	-	-
1	BT09-0126-001	22316H Bioactive; Green Broad striped; washing 0x at 60°C	9.9E+01	0.0E+00	99.98%	3.6	Very good
2	BT09-0126-002	22316H Bioactive; Green Broad striped; washing 25x at 60°C	9.9E+01	0.0E+00	99.98%	3.6	Very good
3	BT09-0126-003	22316H Bioactive; Green Broad striped; washing 50x at 60°C	9.9E+01	0.0E+00	99.98%	3.6	Very good
4	BT09-0126-004	225H Bioactive; Blue checkered; washing 0x at 60°C	9.9E+01	0.0E+00	99.98%	3.6	Very good
5	BT09-0126-005	225H Bioactive; Blue checkered; washing 25x at 60°C	9.9E+01	0.0E+00	99.98%	3.6	Very good
6	BT09-0126-006	225H Bioactive; Blue checkered; washing 50x at 60°C	9.9E+01	5.8E-01	99.98%	3.6	Very good
7	BT09-0126-007	106H Bioactive; Orange broad striped; washing 0x at 60°C	9.9E+01	0.0E+00	99.98%	3.6	Very good
8	BT09-0126-008	106H Bioactive; Orange broad striped; washing 25x at 60°C	9.9E+01	0.0E+00	99.98%	3.6	Very good
9	BT09-0126-009	106H Bioactive; Orange broad striped; washing 50x at 60°C	9.9E+01	5.8E-01	99.98%	3.6	Very good
10	BT09-0126-010	15211H Bioactive; Red/yellow fine striped; washing 0x at 60°C	9.9E+01	0.0E+00	99.98%	3.6	Very good
11	BT09-0126-011	15211H Bioactive; Red/yellow fine striped; washing 25x at 60°C	9.9E+01	0.0E+00	99.98%	3.6	Very good
12	BT09-0126-012	15211H Bioactive; Red/yellow fine striped; washing 50x at 60°C	1.3E+02	5.8E+01	99.97%	3.5	Very good
13	BT09-0126-013	178H Bioactive; Orange; washing 0x at 60°C	9.9E+01	0.0E+00	99.98%	3.6	Very good
14	BT09-0126-014	178H Bioactive; Orange; washing 25x at 60°C	9.9E+01	0.0E+00	99.98%	3.6	Very good
15	BT09-0126-015	178H Bioactive; Orange; washing 50x at 60°C	9.9E+01	0.0E+00	99.98%	3.6	Very good
16	BT09-0126-016	110H Bioactive; White cotton; washing 0x at 60°C	9.9E+01	0.0E+00	99.98%	3.6	Very good
17	BT09-0126-017	110H Bioactive; White cotton; washing 25x at 60°C	9.9E+01	0.0E+00	99.98%	3.6	Very good
18	BT09-0126-018	110H Bioactive; White cotton; washing 50x at 60°C	9.9E+01	0.0E+00	99.98%	3.6	Very good
19	BT09-0126-019	709H Bioactive; White synthetic; washing 0x at 60°C	9.9E+01	0.0E+00	99.98%	3.6	Very good
20	BT09-0126-020	709H Bioactive; White synthetic; washing 25x at 60°C	1.4E+03	2.3E+03	99.7%	2.5	Good
21	BT09-0126-021	709H Bioactive; White synthetic; washing 50x at 60°C	6.4E+04	5.7E+04	84.9%	0.8	Slight

## Discussion

### Control materials

- Inoculated untreated polyester reference sample (0912) shows growth of bacteria after 18 hours incubation indicating the viability of the bacteria and no inherent antimicrobial effect of the reference sample.

### Sample materials

- All tested samples (with the exception of the white synthetic fabric) show **very good antimicrobial activity** against *Klebsiella pneumoniae* initially and up to 50x washes at 60°C.

- The white synthetic fabric shows **very good** initial activity against *Klebsiella pneumoniae* however the activity diminished to **good activity** after 25x washes at 60 °C and after 50x washes at 60 °C the fabric shows **slight activity**.

### Conclusions

- **All tested Bioactive draping fabrics show excellent initial antimicrobial activity against *Klebsiella pneumoniae*.**
- **All tested Bioactive draping fabrics (except white synthetic) show outstanding durability giving excellent activity beyond 50x washes at 60 °C.**
- **The white synthetic Bioactive draping fabric shows lower wash durability for unknown reasons. To achieve better wash durability it may be beneficial to employ the HeiQ AGS-20 SD component in the recipe or perform a pre-treatment on the fabric to address any residues that may be present.**

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