

Aschaffenburg, 17 September 2018

From: Bie-schu  
Authorized by: Dr. Biester**REPORT**

**Order No.:** 18571/1      **Page 1 of 3 pages**

**Client:** Chimica Pomponesco SpA  
Via delle Industrie 1  
46030 Pomponesco (Mn) / Italy

**Date of order:** 24 July 2018

**Receipt of sample material:** 25 July 2018

**Origin of sample material:** From the client

**Purpose:** Analysis of the antimicrobial efficacy according to ISO 22196

(Dr. Derra)  
Managing Director(Dr. Biester)  
Dipl.-Biologist  
Head of  
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The present report refers exclusively to the samples as laid out therein. Information and statistical data on the results can be obtained on request.

## Sample Material

For analysis, two coated chipboard samples with the following designations were in hand:

Sample 1: Sample without antibacterial additive, reference  
Sample 2: Sample with antibacterial additive

## Carrying out of the Tests

Examination period: 26 July 2018 to 13 September 2018

## Test for Antibacterial Efficacy \*

The determination was performed according to 22196:2011-08.

The test specimens were contaminated with the test organism on 4 x 4 cm of the coated surface. Immediately after inoculation the germ suspension was removed from some test pieces with Neutralizing Broth and the number of germs was determined ( $T_0$ ). The remaining test pieces were stored in a humid chamber. After 6 hours the germ suspension was removed and the germ count on these samples was determined ( $T_6$ ) as well.

The samples were cleaned with 70 % ethanol before the test was started.

Test organism: *Staphylococcus aureus* (DSM 799)  
*Escherichia coli* (DSM 1576)

Volume of germ suspension: 600 µl per sample specimen

Sample specimen size: 5 x 5 cm

Film size: 4 x 4 cm

Neutralization broth: BD Difco D/E Neutralizing Broth

Storage conditions: 36 ± 1 °C, 6 h

Nutrient medium: PC-Agar

## Calculation of antibacterial activity R:

$$R = (U_t - U_0) - (A_t - U_0) = U_t - A_t$$

R = antibacterial activity

$U_0$  = average of logarithm numbers of viable bacteria [cells/cm<sup>2</sup>] immediately after inoculation on reference test pieces

$U_t$  = average of logarithm numbers of viable bacteria [cells/cm<sup>2</sup>] after 6 hours of incubation on the reference test pieces

$A_t$  = average of logarithm numbers of viable bacteria [cells/cm<sup>2</sup>] after 6 hours of incubation on the equipped test pieces

Additionally, the logarithmic and percent reductions were calculated in comparison to the average initial numbers of bacteria on the reference material.

Result:

***Staphylococcus aureus* (DSM 799)**

	Sample 1	Sample 2
Average CFU/cm <sup>2</sup> (0 h)	1.7 x 10 <sup>4</sup>	---
Average CFU/cm <sup>2</sup> (6 h)	1.7 x 10 <sup>3</sup>	15
U <sub>0</sub> = Log CFU/cm <sup>2</sup> (0 h)	4.2	---
U <sub>t</sub> = Log CFU/cm <sup>2</sup> (6 h)	3.0	---
A <sub>t</sub> = Log CFU/cm <sup>2</sup> (6 h)	---	0.7
%-reduction (6 h)	---	99.90
log-reduction (6 h)	---	3.5
antibacterial activity R	---	2.3

CFU = colony-forming units

***Escherichia coli* (DSM 1576)**

	Sample 1	Sample 2
Average CFU/cm <sup>2</sup> (0 h)	8.4 x 10 <sup>3</sup>	---
Average CFU/cm <sup>2</sup> (6 h)	5.9 x 10 <sup>3</sup>	15
U <sub>0</sub> = Log CFU/cm <sup>2</sup> (0 h)	3.9	---
U <sub>t</sub> = Log CFU/cm <sup>2</sup> (6 h)	3.7	---
A <sub>t</sub> = Log CFU/cm <sup>2</sup> (6 h)	---	0.6
%-reduction (6 h)	---	99.85
log-reduction (6 h)	---	3.3
antibacterial activity R	---	3.1

CFU = colony-forming units

The accreditation applies to the methods marked with \* in the test report (Register no. D-PL-14160-01-01 and D-PL-14160-01-02). End of report