Work Order	3527.2
Setup-Code	200127-10290-2801-01

Test Report

JIS Z 2801:2012 (Mod)

Antimicrobial products – Test for antimicrobial activity and efficacy

Test Object:

Determination of the germ reduction rate of Liquid Guard 2,9% versus Escherichia coli DSM22312 after 0.5h, 1h, 3h and 24h

Report on Findings

Client:
Address:
Nano-Care Deutschland GmbH
Alfred-Nobel-Straße 10
66793 Saarwellingen

Work order no.: 3527.2

Test object: Determination of the germ reduction rate of Liquid Guard 2,9% versus *Escherichia coli* DSM22312 after 0.5h, 1h, 3h and 24h

Sample description: Beschichtete Folie

Date of receipt of sample: 2020-Jan-20

Type of test: JIS Z 2801:2012 Antimicrobial products – Test for antimicrobial activity and efficacy

Test Germ: *Escherichia coli* DSM22312

Test laboratory: QualityLabs BT GmbH

Address:
Neumeyerstrasse 46a
90411 Nuremberg, Germany

Setup-Code: 200127-10290-2801-01

Sample material: n.b.

No. of pages in report: 7

Report on findings to the client:
Place and date of preparation: Nuremberg, 2020-Jan-30
Recipient: Nano-Care Deutschland GmbH

Laboratory Director:

_____
Harald Gerauer, Laboratory Director
QualityLabs BT GmbH

Released:

_____
Markus Zehe, Managing Director
QualityLabs BT GmbH

Declaration on Quality Assurance

This investigation was performed and supervised according to the standard operating procedure "SOP zu JIS Z 2801:2012 (Mod)" by QualityLabs BT GmbH. The laboratory and process are continually monitored by independent, external authorities, as well as by internal audits.

Archiving

A copy of the test report, a protocol of the measurement as well as the accompanying correspondence and business records are archived by QualityLabs BT GmbH. The retention period is at least 10 years.

Test description

Anti-bacterial activity is determined in accordance with a modified version of JIS Z 2801:2012.

During the test, a thin liquid-film containing the bacteria (1.25×10^4 CFU / cm^2) is applied directly to the test sample (Standard: 5 cm x 5 cm). To avoid desiccation a foil (Standard: 4cm x 4cm, Stomacher Bags) is applied. Immediately after inoculation, the bacteria from the reference sample are separated from the sample and the enveloping foil surfaces using ultrasound and vortex devices and the number of viable germs (CFU – colony-forming units) is determined (t_0 value). A further set of reference samples and samples given anti-microbial treatment is incubated with bacteria in a liquid-film and the enveloping foil in a damp environment at 37°C. After 24 hours, the bacteria are separated from the sample surfaces using ultrasound and vortex devices and the number of viable germs is determined (t_{24} value).

Assessment of antimicrobial activity

A logarithmic germ reduction of **≥ 3 log scales** of the antimicrobial sample in comparison to the respective reference is used as assessment criterion to pass the antimicrobial test.

Germ reduktion [log scales]	Antibacterial activity
< 3	Not sufficient antimicrobial activity
≥ 3	Sufficient antimicrobial activity

References to Testconditions

Testconditions		
Sample size	25	cm^2
Foil size	16	cm^2
Volume Inoculum	200	µl
Sample cleaning	-	-

References to deviations, preincubations, special test conditions

The inoculum was used with a cell concentration of 7.000 cells/cm^2, the samples were incubated at room temperature. After an incubation period of 0.5, 1, 3 and 24 hours, the germ reduction was determined.

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Test Results

	Sample Name	Sample Code	t_0 (cells/cm^2)			t (cells/cm^2)			Reduction [%]	Log Reduction
1	Uncoated foil	102902001200041	1.4×10^4	1.8×10^4	1.6×10^4	1.1×10^5	7.3×10^4	9.4×10^4	-	**Reference**
2	Liquid Guard 2,9% 0.5 h	102902001200042				3.0×10^2	2.6×10^2	4.9×10^2	**99.62**	**2.42**
3	Liquid Guard 2,9% 1 h	102902001200042				$< 1.0 \times 10^1$	3.8×10^1	1.1×10^2	**99.95**	**3.27**
4	Liquid Guard 2,9% 3 h	102902001200042				$< 1.0 \times 10^1$	$< 1.0 \times 10^1$	$< 1.0 \times 10^1$	**> 99.99**	**> 4**
5	Liquid Guard 2,9% 24 h	102902001200042				$< 1.0 \times 10^1$	$< 1.0 \times 10^1$	$< 1.0 \times 10^1$	**> 99.99**	**> 4**

*see “Interpretation of Results”, page 6

Test strain	*Escherichia coli* DSM22312
Initial cell count inoculum / cm^2	**7.0×10^3**
Initials of the editor	JJ
Measurement ended on	Jan-30-2020

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Comments on test objects

NONE

Interpretation of the results based on the measurements

NONE

Editor: Mrs. Jovanovic ____ **Crosschecked:** Mr. Zehe____

References

JIS Z 2801:2012 Antimicrobial products – Test for antimicrobial activity and efficacy