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30.Juli 2020

Report - Antiviral Activity of textile product HEFM47.CO.01

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Tested textile product

- reference textile: Cotton (Co), untreated, 11.04.2020, lab number: C1
- antiviral textile: HEFM47.CO.01, 13.05.2020, LIVINGUARD, lab number: C2-neu

Method

- modified according to ISO 18184 (First edition 2014-09-01)
 - washing of all tested textiles with deionized water 10 times at **40°C**, drying
 - cutting pieces of approximately 20x20mm and making up a mass of 0,4g with several pieces
 - sterilization at 121°C for 15 min, drying
 - before starting the test conditioning the textiles overnight in a humid environment (incubator 37°C)
 - controls: verification of cytotoxic effect and cell sensitivity to virus/inactivation of antiviral activity

- test: inoculation of 0,4g textile with 1ml (or 2ml) virus suspension (at least 10^7 TCID₅₀/ml)
- test virus: SARS-CoV-2 München (SARS-CoV-2 M)
- washing out using 19 ml (or 18 ml) cell culture medium (MEM Eagle EBSS + 10% fetal calf serum + 1% non-essential amino acids, +1 % penicillin (10.000 U/ml) / streptomycin (10 mg/ml)) after specific time points
- titration of washing solution in 96-well plate and titer calculation with method of Spearman and Karber in TCID/ml
 - comparison of titer from untreated textile (reference) and treated textile for the specific time points

Results

Code ITU	C1	C2-neu	C1	C2-neu	C1	C2-neu	C1	C2-neu	C1	C2-neu	C1	C2-neu
sequential nr.	1	1	2	2	3	3	4	4	5*	5*	6*	6*
textile after 30 min in log(10) TCID ₅₀ /ml	7,6	6,35	7,6	6,6	7,35	6,35	7,35	6,475	7,35	7,1	7,475	6,975
Antiviral Activity after 30min in log(10)		1,25		1		1		0,875		0,25		0,5
Reduction after 30min in %		94,38		90,00		90,00		86,66		43,77		68,38
textile after 1h in log(10) TCID ₅₀ /ml	7,1	5,975	7,1	6,1	7,35	5,475	7,35	5,85	-	-	-	-
Antiviral Activity after 1h in log(10)		1,125		1		1,875		1,5	-	-	-	-
reduction after 1h in %		92,50		90,00		98,67		96,84	-	-	-	-
textile after 2h in log(10) TCID ₅₀ /ml	7,1	5,225	7,1	5,225	6,6	5,35	6,975	5,35	7,725	6,475	7,35	5,6
Antiviral Activity after 2h in log(10)		1,875		1,875		1,25		1,625		1,25		1,75
reduction after 2h in %		98,67		98,67		94,38		97,63		94,38		98,22
textile after 6h in log(10) TCID ₅₀ /ml	6,975	3,85	6,85	4,475	6,475	4,1	6,725	4,35	6,85	4,1	7,1	3,975
Antiviral Activity after 6h in log(10)		3,125		2,375		2,375		2,375		2,75		3,125
reduction after 6h in %		99,93		99,58		99,58		99,58		99,82		99,93
textile after 12h in log(10) TCID ₅₀ /ml	6,475	< 3,1	6,225	3,35	6,475	3,35	5,975	3,1	-	-	-	-
Antiviral Activity after 12h in log(10)		>3,375		2,875		3,125		2,875	-	-	-	-
reduction after 12h in %		>99,9		99,87		99,93		99,87	-	-	-	-

*inoculation with 2ml virus suspension instead of 1ml

Conclusion

The treated textile sample "C2-neu" can efficiently inactivate SARS-CoV-2. The results show a reduction of infectious SARS-CoV-2 within 6 hours from 2.3 to 3.1 log-ranges in comparison to the untreated textile. This means a reduction rate up to 99.9% after 6 hours. As a result of the inoculation of 0.4 g textile with 1 ml virus suspension the whole textile was moistened. This allows the textile sample having the largest disinfectant effect, we assume. Therefore, especially the handling with moist masks seems to be safer in comparison to the untreated textile.

Berlin, 30.07.2020



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