



BIOTECH TESTING SERVICES

TEST REPORT

LAB NO.: 2103896/ 1 - 8

DATE: 07/01/2022

NAME OF CUSTOMER : DELIUS GmbH & Co. KG
ADDRESS : Goldstraße 16 - 18 | 33602 Bielefeld | Germany
REFERENCE : Letter No. Nil dated December 22, 2021
Kind attention Angelika Schmidt-Koch
DATE OF RECEIPT : 28/12/2021
DATE OF INITIATION : 28/12/2021
DATE OF COMPLETION : 07/01/2022
SAMPLE DESCRIPTION : Sample labeled as-

Sr. No.	Description
1.	Divan printed Delicare
2.	Dimout Delicare
3.	Mono Delicare
4.	Pure Delicare
5.	Shiranu Delicare
6.	Scott Delicare
7.	Linda Delicare
8.	Maris Delicare
Untreated lab control	



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Page 1 of 7



BIOTECH TESTING SERVICES

Test Method:

ISO 18184: 2019; Determination of antiviral activity of textile products

Scope:

This International Standard specifies testing methods for the determination of the antiviral activity of the textile products. The textile products include woven and knitted fabrics, fibres, yarns, braids using Enveloped virus, an influenza virus, which is an infective virus in humans that causes respiratory tract infection

Determination of Infectious titre:

TCID50 method

Virus strains and host cells:

Test Virus: Influenza A virus (H3N2): A/Hong Kong/8/68: ATCC VR-1679

Host Cell: MDCK cell ATCC CCL-34; Passage No.: Cells from PN 19

Experimental Conditions:

Test Fabric : 0.4 grams

Control Fabric : Untreated Fabric

Test procedure : Triplicates

Virus inoculum volume : 0.2 ml

Viral titre : 1.80×10^7 PFU/ ml

Contact time : 2 hours

Wash out Medium : SCDLP

TCID50 method : 96 Well plate

Medium of Cell culture : Eagle's minimal essential medium (EMEM), supplemented with inactivated FBS & antibiotics

Incubation : 37° C in CO₂ incubator/ 7 days

Verification of cytotoxicity by cell sensitivity to virus and the inactivation of antiviral activity:

1. Sterile Control and Test fabric were added with 20 ml wash out solution, SCDLP medium. These were agitated by vortexing for 5 seconds, 5 times. The washing out solution was inoculated with virus suspension and incubated at 25° C for 30 minutes.
2. Infective titre of this solution was determined by TCID50 Method.
3. Log of TCID50/ ml of Control fabric - Log of TCID50/ ml of Test Fabric ≤ 0.5 .

Observations:

Log of TCID50/ ml of Control fabric	Log of TCID50/ ml of Test Fabric	Log of TCID50/ ml of Control fabric - Log of TCID50/ ml of Test Fabric	Acceptable Criteria
3.70	3.45	0.25	≤ 0.5 "

*Method modified wrt contact time

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2103896/1-8
Page 2 of 7

Test Procedure:

1. Test Fabrics and Control Fabrics were inoculated with 0.2 ml of virus suspension in triplicate sets. One triplicate set of Control fabric was terminated immediately after adding virus suspension. Remaining sets were incubated at 37°C for 2 hours in CO₂ incubator.
2. After the contact duration, test and Control fabrics were terminated using wash out solution. Virus titre of wash out solution was determinate using TCID₅₀ Method.

Results:

Test Virus: Influenza A Virus (H3N2): A/Hong Kong/8/68: ATCC VR-1679

1: Test Sample: Divan printed Delicare

Virus	Replicates	Log of Infectivity titre value Log (Va) (Immediately after Inoculation of Control)	Log of Infectivity titre value Log (Vb) (After 2 hours of contact with Control)	Log of Infectivity titre value Log (Vc) (After 2 hours of contact with Test Specimen)
Influenza virus suspension: (1.65 × 10 ⁸ PFU / ml)	Set I	5.82	5.80	4.10
	Set II	5.86	5.85	4.05
	Set III	5.94	5.92	4.02
lgTCID ₅₀ / Average		5.87	5.86	4.06
Reduction value M = Log (Va – Vb)		0.01		
Log of Antiviral Efficacy Value Mv		1.80		
Percentage Antiviral Efficacy Value Mv		98.41		

Test Virus: Influenza A Virus (H3N2): A/Hong Kong/8/68: ATCC VR-1679

2: Test Sample: Dimout Delicare

Virus	Replicates	Log of Infectivity titre value Log (Va) (Immediately after Inoculation of Control)	Log of Infectivity titre value Log (Vb) (After 2 hours of contact with Control)	Log of Infectivity titre value Log (Vc) (After 2 hours of contact with Test Specimen)
Influenza virus suspension: (1.65 × 10 ⁸ PFU / ml)	Set I	5.82	5.80	3.02
	Set II	5.86	5.85	2.98
	Set III	5.94	5.92	3.00
lgTCID ₅₀ / Average		5.87	5.86	3.00
Reduction value M = Log (Va – Vb)		0.01		
Log of Antiviral Efficacy Value Mv		2.86		
Percentage Antiviral Efficacy Value Mv		99.86		



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Test Virus: Influenza A Virus (H3N2): A/Hong Kong/8/68: ATCC VR-1679

3: Test Sample: Mono Delicare

Virus	Replicates	Log of Infectivity titre value Log (Va) (Immediately after Inoculation of Control)	Log of Infectivity titre value Log (Vb) (After 2 hours of contact with Control)	Log of Infectivity titre value Log (Vc) (After 2 hours of contact with Test Specimen)
Influenza virus suspension: (1.65×10^8 PFU / ml)	Set I	5.82	5.80	3.52
	Set II	5.86	5.85	3.45
	Set III	5.94	5.92	3.35
lgTCID ₅₀ / Average		5.87	5.86	3.44
Reduction value M = Log (Va – Vb)		0.01		
Log of Antiviral Efficacy Value Mv		2.42		
Percentage Antiviral Efficacy Value Mv		99.61		

Test Virus: Influenza A Virus (H3N2): A/Hong Kong/8/68: ATCC VR-1679

4: Test Sample: Pure Delicare

Virus	Replicates	Log of Infectivity titre value Log (Va) (Immediately after Inoculation of Control)	Log of Infectivity titre value Log (Vb) (After 2 hours of contact with Control)	Log of Infectivity titre value Log (Vc) (After 2 hours of contact with Test Specimen)
Influenza virus suspension: (1.65×10^8 PFU / ml)	Set I	5.82	5.80	3.40
	Set II	5.86	5.85	3.35
	Set III	5.94	5.92	3.26
lgTCID ₅₀ / Average		5.87	5.86	3.34
Reduction value M = Log (Va – Vb)		0.01		
Log of Antiviral Efficacy Value Mv		2.52		
Percentage Antiviral Efficacy Value Mv		99.69		

2103896/1-8
Page 4 of 7

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Test Virus: Influenza A Virus (H3N2): A/Hong Kong/8/68: ATCC VR-1679

5: Test Sample: Shiranu Delicare

Virus	Replicates	Log of Infectivity titre value Log (Va) (Immediately after Inoculation of Control)	Log of Infectivity titre value Log (Vb) (After 2 hours of contact with Control)	Log of Infectivity titre value Log (Vc) (After 2 hours of contact with Test Specimen)
Influenza virus suspension: (1.65×10^8 PFU / ml)	Set I	5.82	5.80	4.10
	Set II	5.86	5.85	4.18
	Set III	5.94	5.92	4.20
IgTCID ₅₀ / Average		5.87	5.86	4.16
Reduction value M = Log (Va – Vb)		0.01		
Log of Antiviral Efficacy Value Mv		1.70		
Percentage Antiviral Efficacy Value Mv		98.00		

Test Virus: Influenza A Virus (H3N2): A/Hong Kong/8/68: ATCC VR-1679

6: Test Sample: Scott Delicare

Virus	Replicates	Log of Infectivity titre value Log (Va) (Immediately after Inoculation of Control)	Log of Infectivity titre value Log (Vb) (After 2 hours of contact with Control)	Log of Infectivity titre value Log (Vc) (After 2 hours of contact with Test Specimen)
Influenza virus suspension: (1.65×10^8 PFU / ml)	Set I	5.82	5.80	3.42
	Set II	5.86	5.85	3.40
	Set III	5.94	5.92	3.38
IgTCID ₅₀ / Average		5.87	5.86	3.40
Reduction value M = Log (Va – Vb)		0.01		
Log of Antiviral Efficacy Value Mv		2.46		
Percentage Antiviral Efficacy Value Mv		99.65		



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Test Virus: Influenza A Virus (H3N2): A/Hong Kong/8/68: ATCC VR-1679

7: Test Sample: Linda Delicare

Virus	Replicates	Log of Infectivity titre value Log (Va) (Immediately after Inoculation of Control)	Log of Infectivity titre value Log (Vb) (After 2 hours of contact with Control)	Log of Infectivity titre value Log (Vc) (After 2 hours of contact with Test Specimen)
Influenza virus suspension: (1.65×10^8 PFU / ml)	Set I	5.82	5.80	4.15
	Set II	5.86	5.85	4.02
	Set III	5.94	5.92	4.00
IgTCID ₅₀ / Average		5.87	5.86	4.06
Reduction value M = Log (Va – Vb)		0.01		
Log of Antiviral Efficacy Value Mv		1.80		
Percentage Antiviral Efficacy Value Mv		98.41		

2103896/1-8
Page 6 of 7

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Test Virus: Influenza A Virus (H3N2): A/Hong Kong/8/68: ATCC VR-1679

8: Test Sample: Maris Delicare

Virus	Replicates	Log of Infectivity titre value Log (Va) (Immediately after Inoculation of Control)	Log of Infectivity titre value Log (Vb) (After 2 hours of contact with Control)	Log of Infectivity titre value Log (Vc) (After 2 hours of contact with Test Specimen)
Influenza virus suspension: (1.65×10^8 PFU / ml)	Set I	5.82	5.80	2.90
	Set II	5.86	5.85	2.82
	Set III	5.94	5.92	2.85
lgTCID ₅₀ / Average		5.87	5.86	2.86
Reduction value $M = \text{Log} (V_a - V_b)$		0.01		
Log of Antiviral Efficacy Value M_v		3.00		
Percentage Antiviral Efficacy Value M_v		99.90		

Antiviral activity $M_v = \text{Log} V_a - \text{Log} V_c$

Where:

M_v = antiviral activity value

Log (Va) = Average of Infectivity titre value immediate after inoculation of Control fabric

Log (Vb) = Average of Infectivity titre value after contact time of Control fabric

Log (Vc) = Average of Infectivity titre value after contact time of Test fabric

Antiviral performance standard:

Item	Antiviral efficacy value M_v	Standard
Tested Textile Sample	$3,0 > M_v \geq 2,0$	Good effect
	$M_v \geq 3,0$	Excellent effect



For BIOTECH TESTING SERVICES

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Quality Manager
(Authorized Signatory)

2103896/1-8
Page 7 of 7

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