Clarice Weis Arns (PhD, Professor)
Laboratório de virologia
Instituto de Biologia/Universidade Estadual de campinas-UNICAMP
CEP:13083-862 Campinas- SP- Brasil
FONE: (19) 3521-6258 Email: arns@unicamp.br

Cidade Universitária, 21 de novembro de 2020

Fitesa Naotecidos S/A
Rua Paul Zivi, 80 - Distrito Industrial
Gravataí, RS, Brazil 94045-430
Tel: +55 51 3489 7000
CNPJ: 93211084/0002-74
Raphael Machado Cezar
Quality, Fitesa
raphael.cezar@fitesa.com

VIRUCIDAL TEST REPORT

1. **Samples**:

   Sample 1 - Fitesa Shield S Phobic OE 20 gsm - Batch 579025
   Sample 2 - Fitesa Shield SMS Phobic OE 40 gsm - Batch 581312

2. **Virus tested:** Coronavirus strain MHV-3 genus Betacoronavirus (same family and genus as SARS-CoV-1, SARS-CoV-2/COVID19 and MERS).

Virus	**Cell line**
Coronavirus MHV-3	L929 NCTC clone 929 [L cell, L-929, derivative of Strain L] (ATCC® CCL-1™)

3. **Experimental procedure:**

   a) The tests were performed in laboratory NB-2 (Biosafety Level 2) following the Recommendations of ANVISA Art. 1 and Art. 3 of IN 04/13 and IN 12/16 and methodologies described in the standards (ISO 18184/ 2019-06-25: "Textiles — Determination of antiviral activity of textile products" and the Robert Koch Institute - RKI) and following a Good Laboratory Practices (GLP).

   - Dulbecco minimal essential medium (DMEM) containing 2% to 10% fetal bovine serum was used as culture medium for virus and cell line.

   b) The titration of the Coronavirus (MHV-3) was carried out according to the $TCID_{50}$ (Tissue Culture Infective Dose) method. Sequential dilutions in base 10 were placed in quadruplicate volumes/well in a 96-well sterile microplate. Cell line L 929 was added at a concentration of $2x10^5$ cells/mL per well. After 48 hours the Cytopathic Effect (CPE) of the viral infection is verified and compared with cell and virus control.

Clarice Weis Arns (PhD, Professor)
Laboratório de virologia
Instituto de Biologia/Universidade Estadual de campinas-UNICAMP
CEP:13083-862 Campinas- SP- Brasil
FONE: (19) 3521-6258 Email: arns@unicamp.br

Cidade Universitária, 21 de novembro de 2020

c) The samples were treated following the ISO 18184/2019-06-25 methodology.

In summary: The samples "**Fitesa Shield S Phobic OE 20 gsm and Fitesa Shield SMS Phobic OE 40 gsm**" were sterilized by autoclaving, cut to 5 cm^2, added viruses and left to act for different contact times at room temperature. DMEM medium was added and shaken with Vortex mixer to extract the virus from the samples. The suspension was used in the virucidal/antiviral test.

d) For each sample suspension (different contact times 15 and 30 minutes and 2 hours): Sterile 96-well microplates with 100 µL of sample suspension with virus were inoculated with 100µL of DMEM homogenized, titrated/diluted, and added to the L929 cell monolayer. Then they were incubated at 37ºC with 5% CO_2 for 48 hours.

e) After 48 hours of incubation the microplates were observed by inverted microscope in search of the characteristic Cytopathic Effect of the virus and titers were calculated based on the Reed-Muench method (1938).

Results are expressed as a percentage of viral inactivation (Table 1) compared to untreated viral control (virus titer).

Summary/Control:

- Negative: cell control (2x10^5 cell/mL) in DMEM without virus and without sample test;
- Virus control: Virus titration (10^1 to 10^{12}) and cell line (2x10^5 cell/mL) in DMEM;
- Positive test: presence of virus, sample test and cell line (2x10^5 cell/mL) in DMEM.

* **Table 1** - Results are expressed as a percentage of viral inactivation compared to the untreated viral control.

Log Reduction	Reduction Factor	Percent reduction/virus inactivation
1	10	90%
2	100	99%
3	1000	99.9%
4	10,000	99.99%
5	100,000	99.999%
6	1,000.000	99.9999%

https://microchemlab.com/information/log-and-percent-reductions-microbiology-and-antimicrobial-testing

Clarice Weis Arns (PhD, Professor)
Laboratório de virologia
Instituto de Biologia/Universidade Estadual de campinas-UNICAMP
CEP:13083-862 Campinas- SP- Brasil
FONE: (19) 3521-6258 Email: arns@unicamp.br

Cidade Universitária, 21 de novembro de 2020

4. Results:

Table 2 - Coronavirus (strain MHV-3) antiviral activity results with "**Fitesa Shield S Phobic OE 20 gsm and Fitesa Shield SMS Phobic OE 40 gsm**".

Sample Test	Contact time	Antiviral activity results (Table 1) * against Coronavírus (MHV-3)
Sample 1 - Fitesa Shield S Phobic OE 20 gsm	15 minutes	99%
	30 minutes	99.9%
	2 hours	99.9%
Sample 2 - Fitesa Shield SMS Phobic OE 40 gsm	15 minutes	99.9%
	30 minutes	99.9%
	2 hours	99.9%

5. Conclusion:

- The samples "**Fitesa Shield S Phobic OE 20 gsm and Fitesa Shield SMS Phobic OE 40 gsm"** showed 99% and 99.9% viral inactivation, and therefore, were effective for the inhibition of viral particles of the Coronavirus group and in the combat against COVID-19.

Prof. Dr. Clarice Weis-Arns (ID Lattes: 8635038112182716)
(Responsible for the Report)

Clarice Weis Arns (PhD, Professor)
Laboratório de virologia
Instituto de Biologia/Universidade Estadual de campinas-UNICAMP
CEP:13083-862 Campinas- SP- Brasil
FONE: (19) 3521-6258 Email: arns@unicamp.br

Cidade Universitária, 21 de novembro de 2020

Bibliografia Consultada:

ANVISA - Ministério da Saúde/Agência Nacional de Vigilância Sanitária
INSTRUÇÃO NORMATIVA Nº 4, DE 2 DE JULHO DE 2013
http://bvsms.saude.gov.br/bvs/saudelegis/anvisa/2013/int0004_02_07_2013.html

ANVISA- INSTRUÇÃO NORMATIVA Nº 12, DE 11 DE OUTUBRO DE 2016 – ANVISA.
https://alimentusconsultoria.com.br/instrucao-normativa-no-12-2016-anvisa/
https://alimentusconsultoria.com.br/instrucao-normativa-in-no-50-de-3-de-dezembro-de-2019-anvisa/

ISO 18184/ 2019-06-25: "Textiles — Determination of antiviral activity of textile products"

BS EN 16777:2018: *Chemical disinfectants and antiseptics. Quantitative non-porous surface test without mechanical action for the evaluation of virucidal activity of chemical disinfectants used in the medical area*

DIN EN 14476:2015. Chemical disinfectants and antiseptics. Virucidal quantitative suspension test for chemical disinfectants and antiseptics used in human medicine. Test method and requirements [phase 2, step 1]. Brussels 2015, CEN-Comité Européen de Normalisation.

Britta Becker, Lars Henningsen, Dajana Paulmann, Birte Bischoff, Daniel Todt , Eike Steinmann, Joerg Steinmann, Florian H. H. Brill and Jochen Steinmann
Evaluation of the virucidal efficacy of disinfectant wipes with a test method simulating practical conditions
Antimicrobial Resistance and Infection Control (2019) 8:121
https://doi.org/10.1186/s13756-019-0569-4

G. Kampf D., Todt, S. Pfaender , E. Steinmann
Persistence of coronaviruses on inanimate surfaces and their inactivation with biocidal agents
Journal of Hospital Infection 104 (2020) 246e251
https://doi.org/10.1016/j.jhin.2020.01.022 0195-6701

JEFF MILLER and ROLF ULRICH
On the analysis of psychometric functions: The Spearman–Kärber method
Perception & Psychophysics 2001, 63 (8), 1399-1420

Rabenau HF, Schwebke I, Blumel J, Eggers M, Glebe D, Rapp I, Sauerbrei A, Steinmann E, Steinmann J, Willkommen H, Wutzler P.
Guideline of the German Association for the Control of Virus Diseases (DVV) e.V. and the **Robert Koch-Institute (RKI)** for testing chemical disinfectants for effectiveness against viruses in human medicine. Version of 1st December, 2014.
Bundesgesundheitsblatt Gesundheitsforschung Gesundheitsschutz. 2015;58: 493–504

Reed LJ, Muench H.
A simple method of estimating fifty per cent endpoints. Am J Hyg. 1938; 27:493–497.