



- Las afirmaciones utilizadas en este documento sobre HeiQ Viroblock NPJ03 son proporcionadas por HeiQ basadas en pruebas realizadas en su propio tejido.
- Las declaraciones sobre virus y antivirales podrían ser consideradas como declaraciones de salud, las cuales son usualmente reguladas bajo la regulación de dispositivos medicos - pero cada país es diferente. Por favor, consulte directamente a HeiQ si necesita cualquier ayuda.
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- Fuente: 20200316 HeiQ Pure_Viroblock_email



HEIQ[®] **VIROBLOCK**



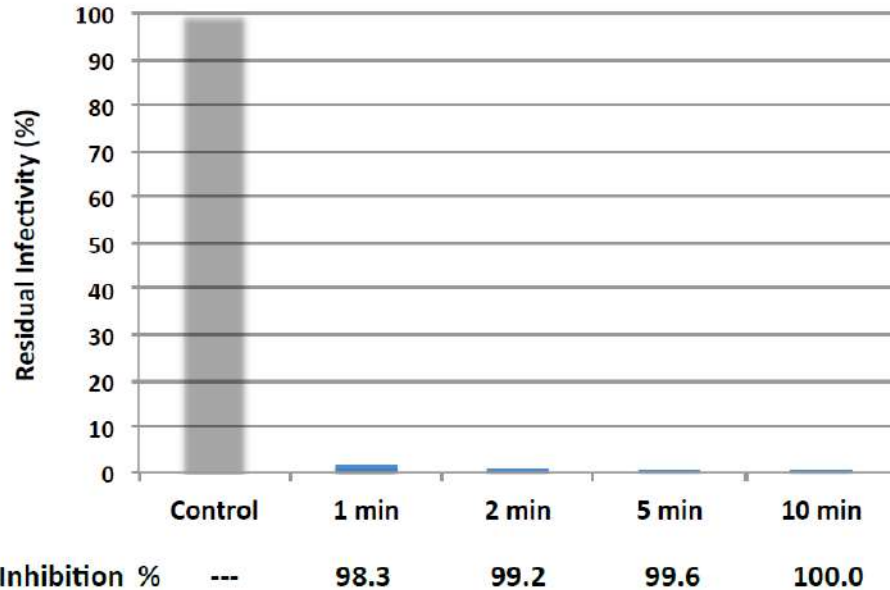
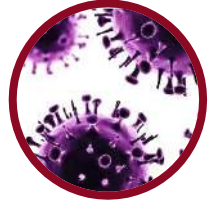
Vesicle & silver technologies

Highly efficient antiviral and antibacterial effect



Sendai virus time series

- Non-woven fabric treated with HeiQ Viroblock NPJ03
- Residual virus infectivity tested according to a modified ISO 20743 method (Sendai virus)

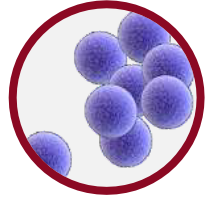


- **Rapid anti-viral effect demonstrated within 2 to 5 minutes**



Staphylococcus aureus time series

- Polyester fabric treated with HeiQ Viroblock NPJ03
- Time series effectiveness based on modified ISO 20743 test method



Kill rate for *Staphylococcus aureus* over time

sample # 326-1-1	contact time [min]	0	15	20	30	60
cfu control		4.35×10^5				5.17×10^5
cfu sample			6.63×10^4	2.23×10^3	6.93×10^2	$\leq 9.9 \times 10^1$
log reduction			0.8	2.3	2.8	3.6
% reduction			84.74%	99.49%	99.84%	99.98%

The theoretical limit of detection is 100 CFU

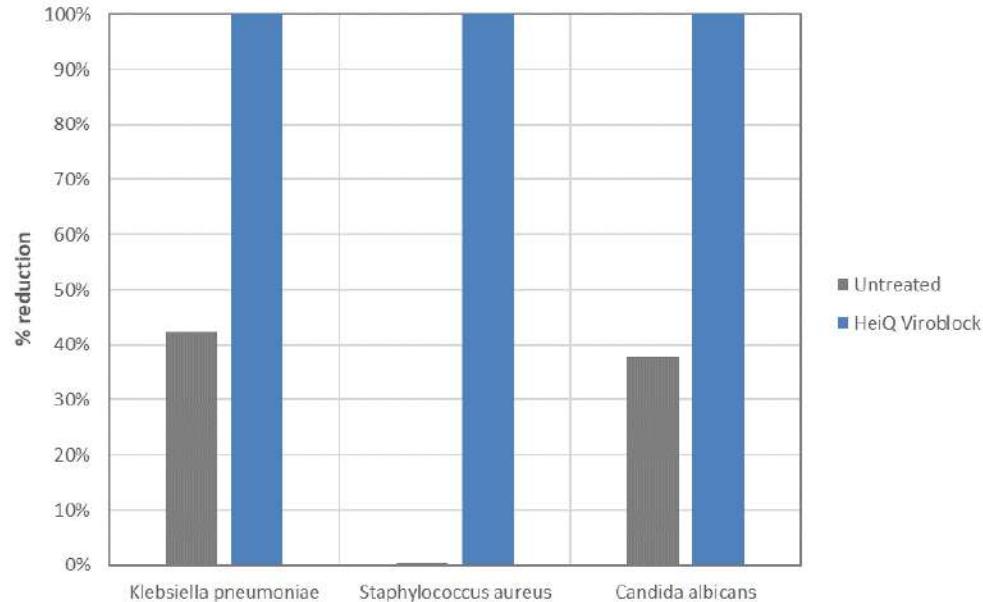
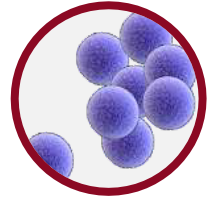
The time series study showed **>99% effect** against ***Staphylococcus aureus*** within 20 min

- **Rapid anti-bacterial effect demonstrated within 20 to 30 minutes**



Antimicrobial effect on bacteria and yeast

- Non-woven fabric treated with HeiQ Viroblock NPJ03
- Antimicrobial activity tested according to a ISO 20743



- **Broad spectrum activity against gram negative and gram positive bacteria (and yeast)**

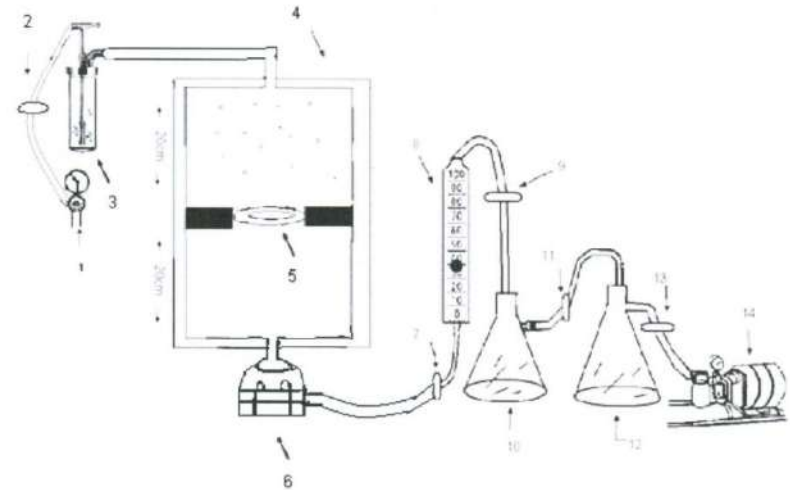


HeiQ Viroblock aerosol challenge testing

Aerosol challenge test (antiviral effect)

Method

- Test mask mounted and sealed within a test chamber
- A nebulizer delivers an aerosol of the target virus inoculum to the upstream side of the mask
- A vacuum draws air through the mask
- A collection dish placed below the mask downstream collects aerosol droplets that pass through the mask sample
- The reduction in infectivity with and without mask is calculated as an indicator of effectiveness



Key

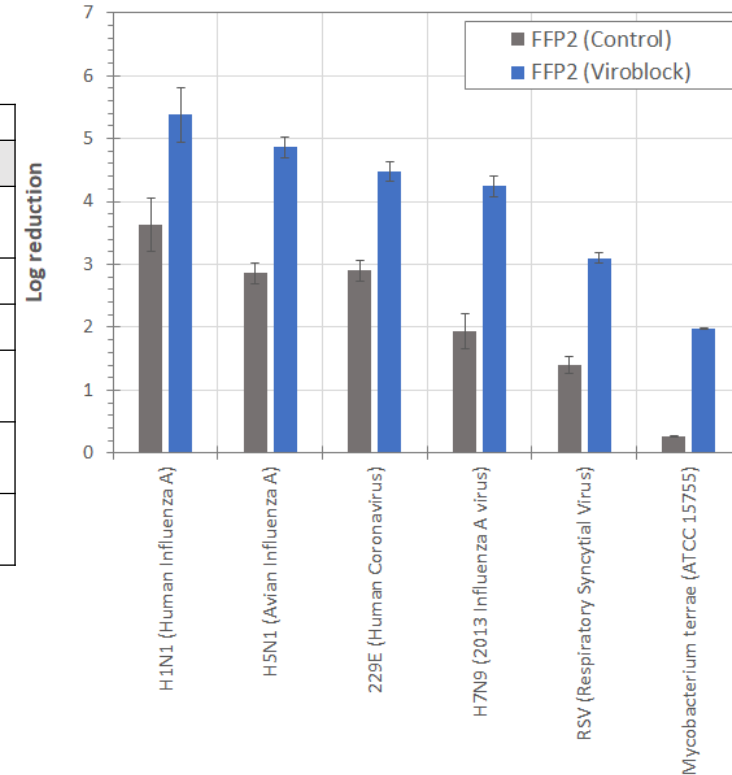
- | | | |
|-----------------------------|--------------------------------|-----------------|
| 1. High pressure air source | 7. Filter #2 | 13. Filter #5 |
| 2. Filter #1 | 8. Calibrated Flowmeter, L/min | 14. Vacuum pump |
| 3. Nebulizer | 9. Filter #3 | |
| 4. Mask chamber | 10. 4L Vacuum flask #1 | |
| 5. Test material location | 11. Filter #4 | |
| 6. Anderson Impactor | 12. 4L Vacuum flask #2 | |



Aerosol challenge test (antiviral effect)

- FFP2 face masks (untreated control vs HeiQ Viroblock treated)

Study ID	Agent	Log reduction		% reduction	
		Control	Viroblock	Control	Viroblock
798-110	H1N1 (Human Influenza A)	3.63	5.38	99.9766%	99.9996%
798-111	H5N1 (Avian Influenza A)	2.86	4.86	99.862%	99.999%
798-112	229E (Human Coronavirus)	2.90	4.48	99.874%	99.997%
798-114	H7N9 (2013 Influenza A virus)	1.93	4.24	98.825%	99.994%
798-115	RSV (Respiratory Syncytial Virus)	1.40	3.10	96.02%	99.92%
798-116	Mycobacterium terrae (ATCC 15755)	0.26	1.98	45.05%	98.95%

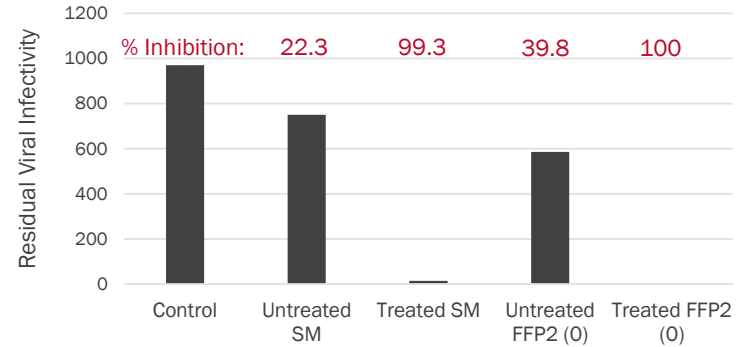


- HeiQ Viroblock NPJ03 (Viroblock) treated FFP2 mask shows **dramatically (>10 times) improved reduction** in virus infectivity
- Effective against key virus types: H1N1, H5N1, H7N9, Coronavirus, and RSV

Antiviral efficacy test (ISO 18184)

Determination of antiviral activity of textile products

- ISO 18184¹⁾ measures the property to give the morphological change or structural damage to the surface protein of virus
- A reference cloth used to verify the stability of the test virus on a textile fabric
- Infectivity titre of virus is measured with the number of infectious viral particles present per unit volume in a cell lysate or in a solution



96 wells microplate for TCID50 method

Please consult your local testing laboratories to carry out ISO18184 tests if needed

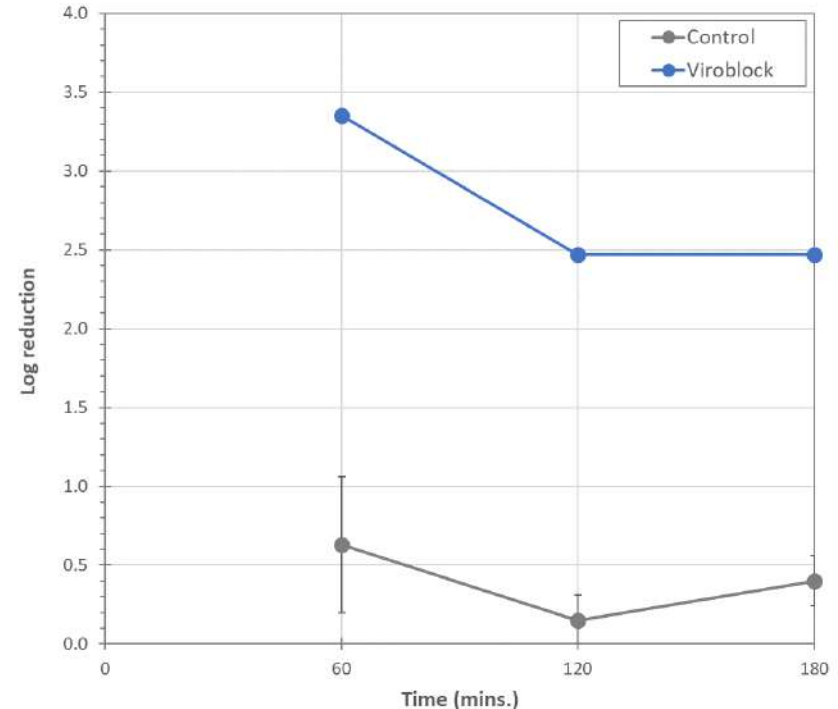


Misting study results

- Cotton fabric (Untreated control vs HeiQ Viroblock treated)
- Exposure to Human influenza A (H1N1)

Study	Agent	Time (mins)	Control	Viroblock
798-119	H1N1 (Human Influenza A)	60	0.63	3.35
		120	0.15	2.47
		180	0.40	2.47

- HeiQ Viroblock treated fabric shows **dramatically improved reduction (>100 times)** in virus infectivity over a 3 hour period





FFP2 control facemask vs FFP2 treated HeiQ Viroblock



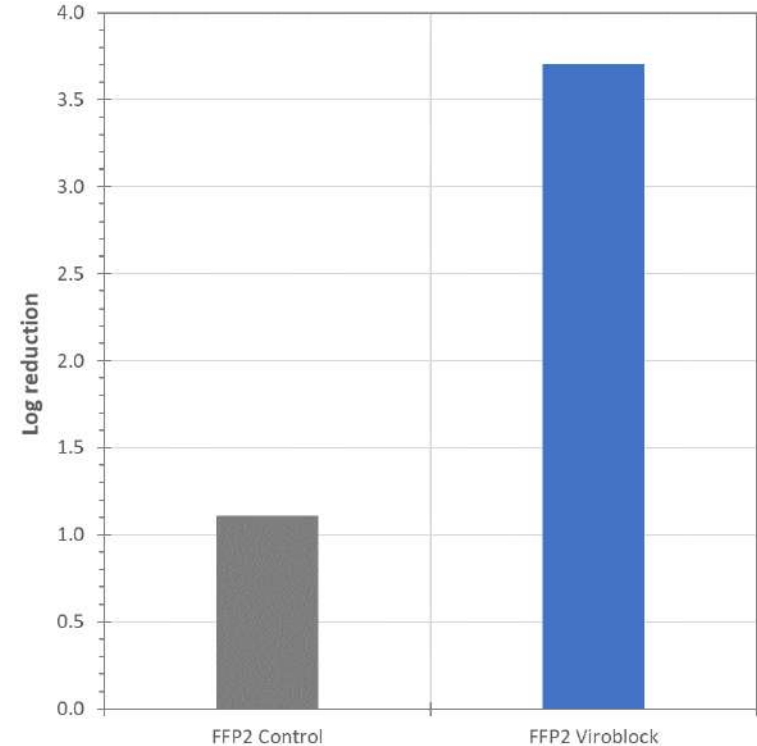


Misting study results

- FFP2 face masks (untreated control vs HeiQ Viroblock treated)

Study	Agent	FFP2 Control	FFP2 HeiQ Viroblock
798-126	H1N1 (Human Influenza A)	1.11	3.71

- HeiQ Viroblock treated FFP2 mask shows **dramatically (>100 times) improved reduction** in virus infectivity (mist contact)





Face mask performance comparison

- FFP3 masks have a higher resistance to breathing than FFP2 masks leading to higher metabolic cost. Higher resistance can lead to greater fatigue and exertion for prolonged periods of mask wearing. ^{1, 2)}
- FFP2 mask material treated with HeiQ Viroblock showed similar virus reduction to FFP3 mask material** ³⁾
- Masks treated with HeiQ Viroblock provide significantly **greater protection against surface contamination** of the mask material ⁴⁾

Mask type	Metabolic cost (W/m2) ¹	Max breathing resistance (Pa) ²	Log reduction (H1N1 human influenza)			
			Aerosol protection ³		Surface protection ⁴	
			Control	HeiQ Viroblock	Control	HeiQ Viroblock
FFP2	20	70		5.22	1.11	3.71
FFP3	40	100	5.11			

[1] Roberge, R.J., Kim, J.H. and Coca, A., 2012. Protective facemask impact on human thermoregulation: an overview. Annals of occupational hygiene, 56(1), pp.102-112.

[2] Senić, Ž., Ilić, M., Radojković, A., Rajić, D. And Karkalić, R., Efficiency of Respiratory Protection Devices Against Bird Flu Virus. 4th International Conference on Defensive Technologies, OTEH 2011, 2011 Oct 6-7th.

[3] Viroblock, Aerosol study 798-121

[4] Viroblock, Misting study 798-126



Droplet breakthrough

- A cough can release around 100,000 droplets into the air ¹⁾
- A scenario of a mask exposed to all 100,000 droplets yields different resulting numbers of viable virus droplets passing through:

Mask	Log reduction [2]	% reduction	Viable droplets passing through mask
FFP2 control	3.63	99.9766%	>23
FFP2 & HeiQ Viroblock	5.38	99.9996%	<1



- **HeiQ Viroblock treatment enhances the level of virus protection for masks by >10 times**

1) Gerone, P.J., Couch, R.B., Keefer, G.V., Douglas, R.G., Derrenbacher, E.B. and Knight, V., 1966. Assessment of experimental and natural viral aerosols. Bacteriological reviews, 30(3), p.576.

[2) Viroblock, Aerosol study 798-110