Agion Antimicrobial Efficacy Against Coronavirus is Tested and Published

The technology is deployed in the EU, Canada and United States in FDA cleared N95 respirator

February 10, 2020

The novel coronavirus (nCoV) outbreak in China has prompted several inquiries to Sciessent regarding the ability of Agion Antimicrobial to inactivate viruses. This white paper summarizes some university and government research previously completed on the antiviral properties of Agion.

Initial Research

The first half of the 2000's was marked by viral outbreaks that included H5N1 avian influenza, norovirus on cruise ships and the SARS coronavirus. Sciessent (formerly Agion Technologies) engaged with university researchers, industry partners and government organizations to investigate the ability of Agion to inactivate viruses. At the time the Chinese Center for Disease Control was looking for approaches to control the coronavirus and evaluated the Agion powder for efficacy. Around the same time Sciessent began working with Prof. Charles Gerba at the University of Arizona and to evaluate antiviral properties of Agion.

A Note on Terminology

Viruses are not living organisms; they must enter a living cell to multiply. Therefore, antiviral agents are said to "inactivate" viruses, not "kill" them.

Test Results

Chinese CDC (2003)

- Complete inactivation of SARS coronavirus in 2 hours
- *VERO E6 cell substrate, using virus CPE method*

University of Arizona (2004)

- 90% reduction of human coronavirus 229E in 1 hour
- 99% reduction of human coronavirus 229E in 2 hours
- 99.999% reduction of human coronavirus 229E in 24 hours
- *TCID50 technique, monitoring MRC-5 cell monolayers for cytopathic effects*

Chinese Academy of Agricultural Sciences (2006)

- 99% reduction of H5N1 avian influenza in 10 minutes
- *Klein-Defors suspension eradication test*

Published Research

A portion of the above results were published by Professor Gerba and his team in the peer-reviewed scientific journal *Food and Environmental Virology*:

> **Assessment of the Antiviral Properties of Zeolites Containing Metal Ions**,
> Food Environ Virol (2009) 1:37–41
>
> Abstract
>
> The antiviral properties of zeolite (sodium aluminosilicate) powders amended with metal ions were assessed using human coronavirus 229E, feline infectious peritonitis virus (FIPV), and feline calicivirus F-9. Zeolites containing silver and silver/copper caused significant reductions of coronavirus 229E after 1 h in suspension. The silver/copper combination yielded a >5.13-log10 reduction within 24 h. It was also the most effective (>3.18-log10) against FIPV after 4 h. Other formulations were ineffective against FIPV. On plastic coupons with incorporated silver/copper-zeolites, >1.7-log10 and >3.8-log10 reductions were achieved for coronavirus 229E and feline calicivirus within 24 h, respectively. Silver/copper zeolite reduced titers of all viruses tested, suggesting that it may be effective against related pathogens of interest [i.e., SARS coronavirus, other coronaviruses, human norovirus (calicivirus)]. Of note, it was effective against both enveloped and nonenveloped viruses. Metal-zeolites could therefore possibly be used in applications to reduce virus contamination of fomites and thus the spread of viral diseases.
>
> *Note: Springer Nature is making Coronavirus research free, including the above article.*

Agion in Polyester Fiber

During this time Sciessent worked with Foss Manufacturing (now Foss Performance Materials) to develop a polyester fiber with Agion embedded into the fiber itself. The fiber, named Fosshield, was incorporated into N95 respirator media as an approach to limit contamination of the respirator by the wearer or those around them. Further antiviral efficacy testing was performed on the respirator media construction.

N95 Respirator Media Test Results

- 99.98% reduction of coronavirus in 4 hours*
- 99.6% reduction of adenovirus in 1 hour*
- 99.999% reduction of haemophilus influenzae in 1 hour*
- 99.8% reduction of feline calicivirus (norovirus surrogate) in 4 hours*

**Results based on testing of samples containing Agion Antimicrobial*

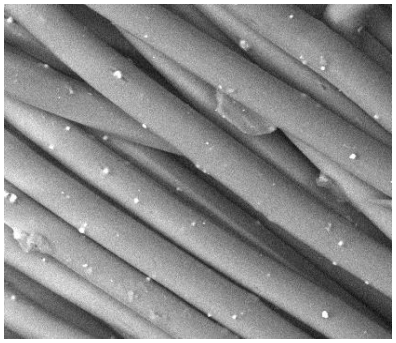
Once proven, the media was manufactured by Nexera Medical into an N95 respirator, which underwent extensive testing and was submitted to the FDA in 2009. The Nexera Spectrashield surgical respirator was cleared by NIOSH and received a 510(k) from the Food and Drug Administration in 2011 and has since been cleared in Canada and the European Union.

Approved claims for the European Union:

http://www.nexeramed.com/nfiles/news_110711_1.php

Approved claims for Canada:

http://www.nexeramed.com/cfiles/regulatory.php?region=CA

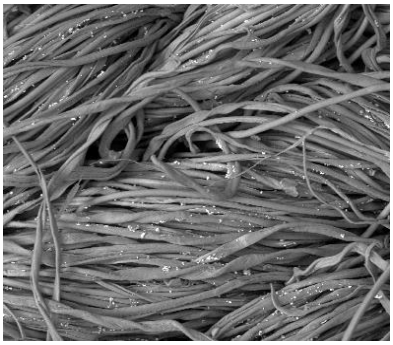


Application Options

Agion is a versatile material that can be mixed into coatings, compounded into plastics, and applied to textiles using several processes:

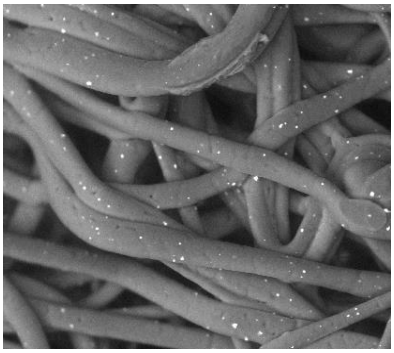
Topical – Fastest and most versatile

- Pad/Dry/Cure
- Exhaust
- Dip/Extract
- Yarn Package



Embedded

- Filament or staple fiber spinning
- Melt blown nonwoven
- Spunbond nonwoven



Contacts

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The Agion® Antimicrobial is presently registered by the United States Environmental Protection Agency as a preservative and bacteriostatic agent for use in treated articles under 40 CFR 152.25a. The information presented herein is not intended to support or endorse public health claims for treated articles. The Agion Antimicrobial is also used in medical devices under the Food and Drug Administration in the US; those medical device claims are based on safety and efficacy testing and are limited to those approved by FDA. In the EU, the Agion Antimicrobial is used in medical devices under the Medical Device Directive: those medical device claims are based on safety and efficacy testing and are limited to those approved by the designated Competent Authorities and/or Notified Bodies