

## **The inhibitory effect of nanoe™, technology with benefits of hydroxyl radicals on 4 novel coronavirus (SARS-CoV-2) variants has been verified**

**Osaka, Japan** – Panasonic Corporation has verified the inhibitory effect of nanoe™ technology with benefits of hydroxyl radicals on four novel coronavirus variants, namely Alpha, Beta, Gamma, and Delta, in collaboration with the Japan Textile Products Quality and Technology Center (QTEC) \*<sup>1</sup>.

nanoe™ the original ionizer to generate “nano-sized atomized water particles” is developed by Panasonic. It is an electrostatic atomization technology, that collects invisible moisture in the air and applies high voltage to it to produce “hydroxyl radicals” contained in water. The decisive factor is the existence of hydroxyl radicals inside nanoe™. Hydroxyl radicals are characterized by being strongly oxidative and highly reactive.

Panasonic has been conducting research on this technology over the past 20 years since 1997, and has verified its effectiveness in a variety of areas, including inhibiting pathogenic microorganism (bacteria, fungi, and viruses) and allergens, breaking down PM 2.5 components that have adverse effects on the human body \*<sup>2</sup>.

In July 2020, Panasonic verified the inhibitory effect of nanoe™ on novel coronavirus (SARS-CoV-2)\*<sup>3</sup>. Prior to this announcement, in 2012, Panasonic conducted a virus clearance test with a third-party organization and confirmed the effectiveness on each of the 4 categories in terms of biological characteristics. Based on this result, Panasonic announced that nanoe™ technology could be expected to have an inhibitory effect on new viruses\*<sup>4</sup>. In light of these facts, nanoe™ can be expected to have an effect on novel coronavirus variants. The company conducted a verification again in view of the current status of the spread of viral infection.

During the latest verification test, the virus titers of novel coronavirus (SARS-CoV-2) and its four variants (Alpha, Beta, Gamma, and Delta) were compared in a 45-liter test space with and without exposure to nanoe™. As a result, the test confirmed an inhibitory effect of more than 99% on all five types of viruses after two hours of exposure. Note that the verification results are based on the test in a closed test environment and not in a space actually in use.

Panasonic will continue to pursue the potential of the nanoe™ technology and verify its various effects in order to contribute to society.

■ For reference :

Testing of inhibitory effect of nanoe™ on four novel coronavirus variants.

■ Overview

A comparative verification was conducted in a 45L test space containing the four novel coronavirus variants with and without exposure to nanoe™.

■ Results

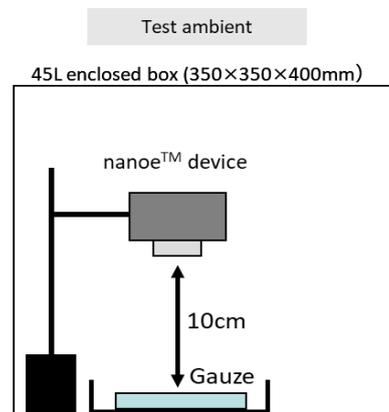
Over 99% of four novel coronavirus variants activity was inhibited within 2 hours.

Note: This verification was designed to generate basic research data on the effects of nanoe™ on the novel coronavirus in laboratory conditions different from those found in living spaces. It was not designed to evaluate product performance.

■ Methodology and data

Organization : Japan Textile Products Quality and Technology Center  
 Period : September 2021  
 Subjects : Novel coronavirus (SARS-CoV-2) and its four variants (Alpha, Beta, Gamma, and Delta)  
 Device : nanoe™ device

Method:



- nanoe™ device is installed at 10cm from the floor in the 45L test space.
- A piece of gauze saturated with four novel coronavirus variants solution was placed in a petri dish and exposed to nanoe™ for a predetermined time.
- The virus infectious titer was measured and used to calculate the inhibition rate.

■ Results data

Test subject		Time	Inhibition rate*
Novel coronavirus (SARS-CoV-2)		2 hours	99.7%
Novel coronavirus variants	Alpha	2 hours	99.7%
	Beta	2 hours	99.8%
	Gamma	2 hours	99.8%
	Delta	2 hours	99.8%

\* Calculated by Panasonic

■ Opinion from Professor Masafumi Mukamoto of Osaka Prefecture University about the results of verification:

The novel coronavirus binds to host cells through a spike protein that exposes outward, enters the cells, and then propagates. Some antibodies, such as neutralizing antibodies produced by vaccination or infection, bind to the spike protein thereby preventing the virus from binding to host cells, hence the propagation of virus and pathogenesis are inhibited. Viruses, on the other hand, make incorrect copies of viral genes as they multiply in cells. This is called mutation. In particular, a virus with mutation in amino acid of spike protein, as a variant, increases its binding capacity to cells and makes it difficult for it to bind to neutralizing antibodies, causing a resurgence of COVID-19.

Although the antiviral effect of the hydroxyl radicals contained in water is not completely understood, but it is not a highly specific reaction (the property that an antibody reacts only with a specific antigen) like an antibody. In fact, based on the results of this verification, there was no difference in the inhibition rate of hydroxyl radicals contained in water among the novel coronavirus variants. Therefore, it is considered that viral mutations caused by some amino acid substitutions do not affect the inactivation effect.

Accordingly, it is expected that the "Hydroxyl radicals contained in water" technology will produce the same experimental results when tested under the same experimental conditions as this time for mutants that are expected to appear in the future.

\*1: The Japan Textile Quality Technology Center (QTEC) was established in 1993, which is a testing and evaluation institute for antibacterial and antiviral testing to meet the needs of society. It is an organization with the technology to meet the various test methods defined by JIS, ISO, AATCC, ASTM, GB, KC, standards of inspection organizations, standards of companies such as department stores and mass merchandisers, standards of government agencies, QTEC standards, etc.

\*2: Main releases on verification cases

- May 12, 2009: Positive effects of charged water particles on viruses, bacteria, and agricultural chemicals have been verified.
- October 20, 2009: The new influenza virus inhibition effect of charged water particles has been verified.
- February 20, 2012: Suppression effect of charged water particles on pet-related allergens, bacteria, fungi, and viruses have been verified.
- January 16, 2014: Nano-sized electrostatic atomized water particles effectively breaks down PM2.5 components and inhibits growth of fungi attached to Yellow Sand.

\*3 Verified jointly with Osaka Prefecture University

\*4: January 26, 2012: Virus suppression effect of charged water particles has been verified by the virus clearance test. Co-verified with Charles River Biopharmaceutical Services GmbH, a German testing organization.

\*5: nanoe™ X Generator Mark 1 generates 4.8 trillion hydroxyl radicals per second, a 10-fold volume compared with that of nanoe™.

## **About Panasonic**

Panasonic Corporation is a global leader developing innovative technologies and solutions for wide-ranging applications in the consumer electronics, housing, automotive, and B2B sectors. The company, which celebrated its 100<sup>th</sup> anniversary in 2018, operates 522 subsidiaries and 69 associated companies worldwide and reported consolidated net sales of 6,698.8 billion yen for the year ended March 31, 2021. Committed to pursuing new value through collaborative innovation, the company uses its technologies to create a better life and a better world for customers. Learn more about Panasonic: <https://www.panasonic.com/global>

## **About Panasonic Malaysia Sdn Bhd**

Panasonic Malaysia Sdn Bhd is a sales, service and marketing company for the Panasonic brand of electrical and electronic products ranging from audio visuals, home appliances, air conditioners, indoor air quality, solar business, digital & video cameras, professional broadcasting equipment, system solutions, telecommunications, health & beauty care, batteries and lightings. All Panasonic products are available through our authorised dealers nationwide. For more information on Panasonic brand and products, visit our website at [www.panasonic.com.my](http://www.panasonic.com.my) or call our Customer Care Centre at 03-7953 7600.

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