



## **PURPOSE AND OVERVIEW**

To evaluate the anti-viral and anti-bacterial performance of anti-viral film.

## **METHOD**

### **Antiviral test**

The evaluation of antiviral performance was carried out with reference to ISO 18184.

Virus used for evaluation: Influenza virus (H3N2) A/Kitakyusyu/159/93

Feline calicivirus (F9 strain)

- 1) Anti-viral film was cut into 5 x 5 cm pieces.
  - 2) 100 µL of the virus suspension was dripped onto the sample film and covered with a 4x4 cm cover film.
  - 3) At 25°C, influenza was incubated for 1, 3, or 5 minutes, and feline calicivirus was incubated for 5, 10, or 15 minutes.
  - 4) The surface of the specimen was washed with medium containing surfactant.
  - 5) The virus titer (virus count) in the above washing solution was measured by plaque test.
- The effect of the monovalent copper compounds on the concentration was examined.

### **Antibacterial test**

The evaluation of antiviral performance was carried out with reference to JIS Z 2801.

Bacteria used in the evaluation: E. coli

Staphylococcus aureus

- 1) Anti-viral film was cut into 5 x 5 cm pieces.
- 2) 100 µL of the bacillus was dripped onto the sample film and covered with a 4x4 cm cover film.
- 3) At 35°C, E. coli was incubated for 1, 3, and 5 minutes, and Staphylococcus aureus was incubated for 5, 10, and 15 minutes.
- 4) The surface of the specimen was washed with medium containing surfactant.
- 5) The number of live bacteria in the above washout solution was measured by the blending culture method.



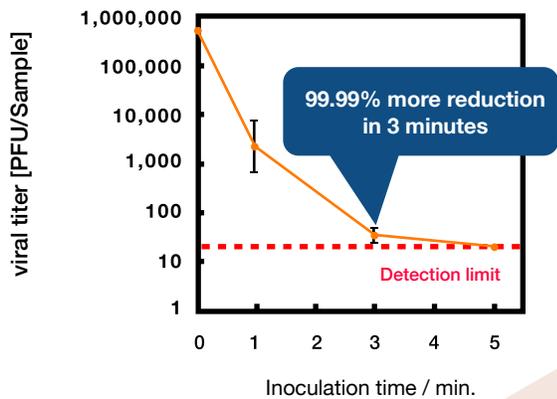
# RESULT

## Antiviral test

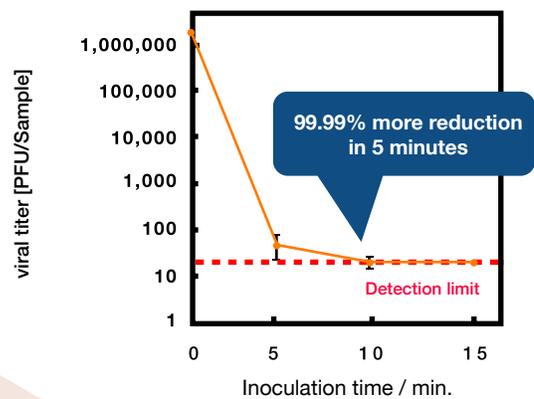
The antiviral film reduced influenza virus (H3N2) by more than 99.99% in 3 min (Fig. 1).

Against feline calicivirus, it was reduced by more than 99.99% in 5 min (Fig. 2).

The viral titers per contact time and the rate of decrease from the initial values obtained for each antiviral test are shown in Table 1.



**Fig. 1 Test for influenza virus**



**Fig. 2 Test for feline calicivirus**

Table 1 Viral titers and initial reduction from contact time for each antiviral test

Inoculation time	Influenza virus		Inoculation time	Feline calicivirus	
	Viral infectivity titer log(CFU/sample)	Reduction rate		Viral infectivity titer log(CFU/sample)	Reduction rate
0 min.	5.65	-	0 min.	5.47	-
1 min.	3.32 +/- 0.41	99.36%	5 min.	1.66 +/- 0.26	99.997%
3 min.	1.50 +/- 0.14	>99.99%	10 min.	1.30 +/- 0.00	>99.99%
5 min.	1.30 +/- 0.33	>99.99%	15 min.	1.30 +/- 0.00	>99.99%

## Antibacterial test

The antiviral film reduced E. coli by more than 99.99% in 5 minutes (Fig. 3). In addition, for Staphylococcus aureus, it was reduced by more than 99.99% in 15 minutes (Fig. 4). The number of live bacteria per contact time and the rate of decrease from the initial value obtained in each antimicrobial test are shown in Table 2.

# RESULT

## Antiviral test

The antiviral film reduced influenza virus (H3N2) by more than 99.99% in 3 min (Fig. 1).

Against feline calicivirus, it was reduced by more than 99.99% in 5 min (Fig. 2).

The viral titers per contact time and the rate of decrease from the initial values obtained for each antiviral test are shown in Table 1.

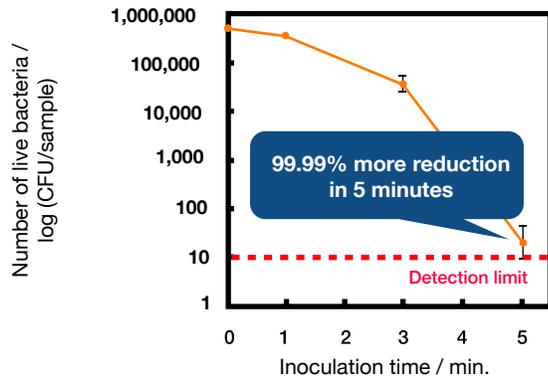


Fig. 3 Test for E. coli

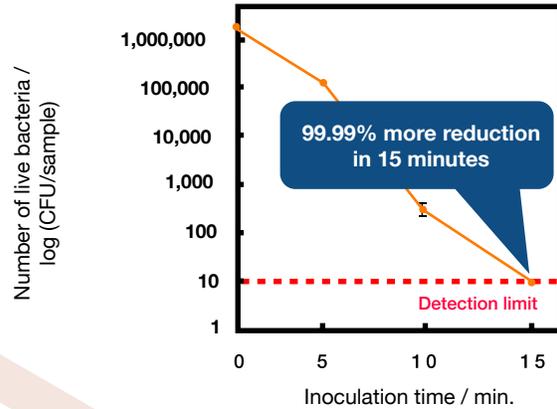


Fig. 4 Test for Staphylococcus aureus

Table 2 Number of live bacteria per contact time of each antimicrobial test and rate of decrease from the beginning

Inoculation time	E. coli		Inoculation time	Staphylococcus aureus	
	Number of live bacteria log(CFU/sample)	Reduction rate		Number of live bacteria log(CFU/sample)	Reduction rate
0 min.	5.65	-	0 min.	5.47	-
1 min.	5.51 +/- 0.04	28.44%	5 min.	5.05 +/- 0.05	61.49%
3 min.	4.22 +/- 0.13	96.22%	10 min.	2.56 +/- 0.25	99.86%
5 min.	1.24 +/- 0.33	>99.99%	15 min.	1.00 +/- 0.00	>99.99%