

Viral Inactivation Test Results

I. Testing liquid

Hakuzo Environment Wipes Double Block solution

II. Test laboratory

ATS Labs 《GLP(Good Laboratory Practice)》

III. Test

1) Sample viruses

Virus	Virogenic or ATCC # ^{*1}	Host System; Cytopathic Effect
Hepatitis B virus	Hepadna virus Inc. (DHBV)	Primary Duck Hepaocytes No Cytopathic Effects
Bovine viral diarrhea virus ^{**2} (Hepatitis C virus Alternate virus)	Bovine Viral Diarrhea Virus	MDBK cells
AIDS virus (HIV-1)	HTLV-III _{RF} ; NCI	MT2 cells; lytic cytopathic effect
S A R S Virus	Vero E6 coronavirus	Vero E6 cells
Influenza A Hong Kong type	ATCC 68-H3N2	MDBK cells; lytic cytopathic effect
R S Virus (respiratory syncytial virus)	ATCC VR-26	
Adenovirus type IV	ATCC VR-4 strain RI-67	H.Ep.#2 cells Cytopathic Effects
Rubella virus	Strain M-33	RK 13 cells; cytopathic effect
Herpesvirus (Herpes Simplex Type1)	HSV-1; ATCC VR-733	VERO cells; lytic cytopathic effect
Herpesvirus (Herpes Simplex Type2)	HSV-2; MS Strain	VERO cells; lytic cytopathic effect
Human coronavirus	VR-740 Strain 229E	MRC-5 Host
Rotavirus	Strain WA	MA 104 Cells
Vaccinia virus (Vaccinia Virus)	Strain IHD	VERO cells; lytic cytopathic effect

Avian influenza (H5N1)	Strain H5N1-PR8/CDC-RG CDC#2006719965	Rhesus Monkey Kidney cells (RMK)
Avian infectious bronchitis virus	ATCC VR-22	
Newcastle disease virus	ATCC VR-108 Strain B-1 Hitchner or Blacksburg	Chicken Embryo fibrorblast cells
Tripoli polyomavirus	Lab isolate	
Canine distemper virus	ATCC VR-256	
Rabies virus	ATCC VR-138	
Feline leukemia virus	ATCC VR-717 Strain FL-237	
Cat picornavirus	ATCC VR-649	
Pig infectious gastroenteritis virus	ATCC VR-763	
Swine herpes virus type I	ATCC VR-135	
Bovine herpes virus type I	ATCC VR-793	

※1 ⇒ American Type Culture Collection

※2 ⇒ A replacement virus for hepatitis C virus, which is similar to hepatitis C virus in terms of Structure and characteristics.

2) Test method that follows EPA guidelines

Virus was inoculated onto the cell growth medium in a petri dish and allowed to dry for 30 to 60 minutes. 2mL test solution was added to the petri dish, allowed to contact for 10 minutes, and 2mL neutralizing agent was added to deactivate the efficacy of the test solution. The diluted mixture of the test virus and test solutions are inoculated into cells for cultivation. Inoculated petri dish was cultured 5-7 days under the conditions of $37 \pm 2^{\circ}\text{C}$ and 5% CO_2 . A control test without addition of the test solution was carried out in the same manner for comparison purposes.

3) Result calculation method

The assessment of the efficacy of the disinfectant dilution is carried out by calculating the reduction factor. The reduction factor is the difference between the infectivity titre (\log_{10} TCID₅₀/ml) of the virus control (obtained without exposure to the disinfectant) and the infectivity titre obtained after exposure to the disinfectant.

4) E P A evaluation standard

A sufficient disinfectant-caused titre reduction can be assumed if the calculated reduction factor derived from 6 replicates (2 independent tests carried out with 3 carriers each) exhibits a 4 \log_{10} reduction for the determined concentration-time relation.

IV. Results

Virus	Infectivity reduction of logarithm	Reduction rate
Hepatitis B virus	4.8	99.99842%
Bovine viral diarrhea virus* ² (Hepatitis C virus Alternate virus)	5.5	99.999684%
AIDS virus (HIV-1)	>3.0	99.9% and above
SARS Virus	3.5	99.9684%
Influenza A Hong Kong type	>8.0	99.999999% and above
RS Virus (respiratory syncytial virus)	4.0	99.99%
Adenovirus type IV	5.5	99.999684%
Rubella virus	>5.0	99.999% and above
Herpesvirus (Herpes Simplex Type1)	>7.5	99.9999684% and above
Herpesvirus (Herpes Simplex Type2)	>6.5	99.9999684% and above
Human coronavirus	>4.0	99.99%以上
Rotavirus	>6.25	99.9999438% and above
Vaccinia virus (Vaccinia Virus)	>7.0	99.99999% and above
Avian influenza (H5N1)	>4.95	99.99888% and above
Avian infectious bronchitis virus	6.0	99.9999%
Newcastle disease virus	>4.0	99.99% and above
Tripoli polyomavirus	>6.0	99.9999% and above
Canine distemper virus	3.5	99.9684%
Rabies virus	4.5	99.99684%
Feline leukemia virus	>4.5	99.99684% and above
Cat picornavirus	5.0	99.999%
Pig infectious gastroenteritis virus	3.5	99.9684%
Swine herpes virus type I	5.5	99.999684%
Bovine herpes virus type I	8.0	99.999999%

