

Order No. : 16-an-PNS-5A

Date of issuance : Apr.26.2022

Test Report

To: Panasonic Corporation

TITLE

Deactivation effect of the Washing machine,
NA-S106FR1 series,
in regards to mite allergen



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Signed off by the test director



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1 Test materials and method

1.1.1 Test pieces

Cotton Towels (fabric specimen)

1.1.2 Test liquids

Purified antigens derived from mite (*Dermatophagoides pteronyssinus*) body (Dpb), by Biostir, Inc.

1.1.3 Product tested (Washing machine of front loading type)

NA-V85FC1, by Panasonic

* Products with the same specifications

NA-S056FR1, NA-S106FR1, NA-S106FC1, NA-S956FR1, NA-S96FR1, NA-S96FC1, NA-V105FR1, NA-V10FR1, NA-V105FC1, NA-V10FC1, NA-V95FR1, NA-V90FR1, NA-V95FC1, NA-V90FC1

1.2 Test method

1.2.1 Preparation of the fabric specimen carrying the allergens

Purified antigens derived from mite (*Dermatophagoides pteronyssinus*) bodies (Dpb, hereinafter) are suspended in the 0.1% BSA-added purified water to form a suspension at 0.5 mg/ml (1500 ng/ml as Der p1). The suspension is then centrifuged at 2000 rpm for 10 min. The supernatant is prepared as the test liquid.

10 ml of test liquid is evenly applied to the fabric specimens (20 cm × 20 cm), under room temperature conditions it is left to stand still for 24 hours to dry out then allergens are applied to it.

6 fabrics of allergen-attached cloth were prepared.

1.2.2 Investigation of the deactivation effect by Washing machine in regards to the allergen

The allergen fabric specimens prepared in 1.2.1 were sent to the Panasonic Corporation and washed by Washing machine, NA-V85FC1.

The washing followed the 3 conditions bellow with 2 specimens respectively.

- (1) No operation
- (2) Natural drying (for the same time period as that (3))
- (3) Allergy 60 °C program (washing + natural drying)

After washing under each condition was completed, the allergen fabric specimens were sent back to Biostir, Inc.

The allergen fabric specimens were put into zip-up bags along with 50 ml of PBS containing 0.5% BSA, 0.05% sodium azide, and 0.05% Tween 20. The zip-up bags were kneaded by hand for 10 min. And kept under 4 °C for 24 hours for extraction.

Each extract was measured via the ELISA method to measure the Der p1 concentration.

1.3. Method and equipment used for measuring

The measuring was conducted via the sandwich ELISA method.

- Equipment : MULTISKAN FC (Thermo)
- Measuring wavelength : 450 nm

The measuring was conducted via a series of 3 dilutions with $n=2$ (2 wells) for each sample.

The sample dilution was conducted with 0.1% BSA-PBS.

2 Signed off by the test director

Test client : Panasonic Corporation
Living Appliances and Solutions Company
Laundry Systems And Vacuum Cleaner Business Division

Title : Deactivation effect of Washing machine,
NA-S106FR1 series,
in regards to mite allergen

Test no. 16-an-PNS-5A

Test director :

Date *Apr. 26. 2022*

Signature

Hisashi Takahashi

Development Division, Biostir, Inc.

3. Test result

3.1.1 Details of the processing of the allergen fabric specimen

- (1) No operation
- (2) Natural drying (for the same time period as that of (3))

The allergen fabric specimens are left being with clothespins under 23 ± 2 °C (420 min).

- (3) Allergy 60 °C program (washing + natural drying)

The allergen fabric specimens (2 pieces) of each allergen are washed at an Allergy 60 °C program by Washing machine, NA-V85FC1, and naturally dried with clothespins under 23 ± 2 °C (240 min).

Test result is as bellow.

Test Date: Apr.13.2022

Test pieces: Fabric specimen carrying mite (*Dermatophagoides pteronyssinus*) (IEC towel test fabric
20 cm × 20 cm), 2 pieces

Water: 50 ppm, start temperature 20 °C

Detergent: Nothing

Displayed program time: 1;58

Test results:

Time	Power consumption	Water consumption
1hr. 56min. 45sec.	639.35 Wh	41.0 L

Fabric specimen drying time: 240 min

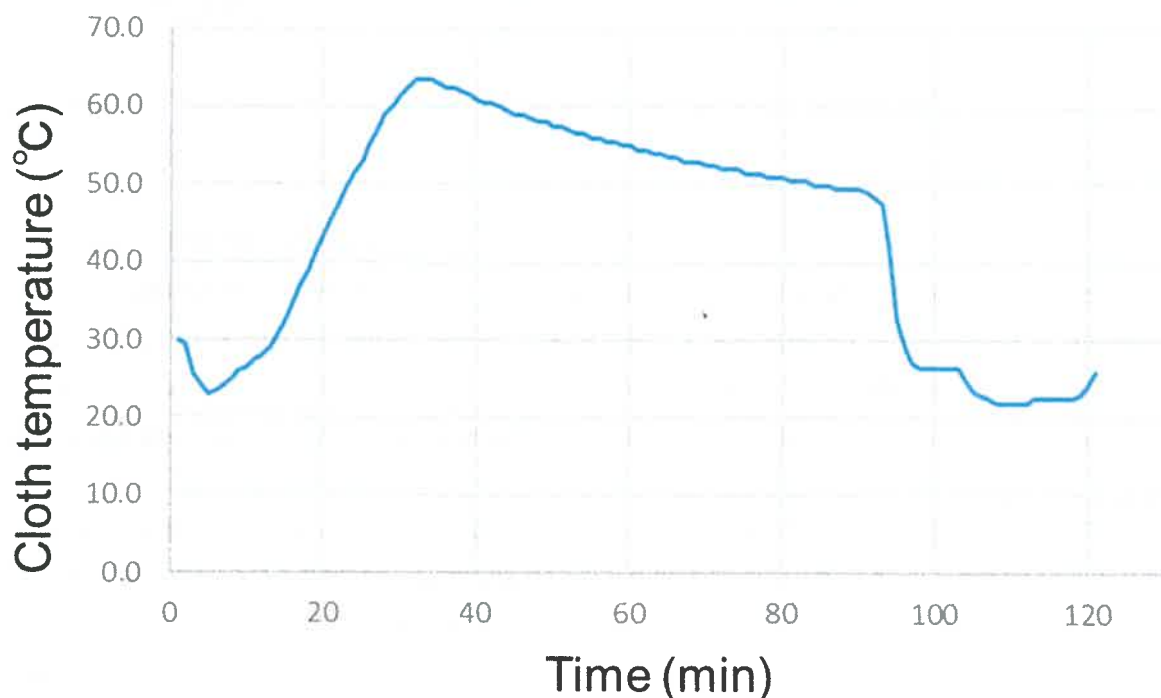


Figure Clothing temperature dependence on elapsed time

3.2 Detection result

The fabric specimen of Dpb was washed under the 3 conditions. Then, the Der p1 concentration in the extract after the washing was measured via the ELISA method. Table 1 show the measurement result.

Table 1 Residual Der p1 volume after operation under each condition (16-an-PNSWM-5A)

Washing conditions	After washing	After washing
	Extract Der p1 concentration (ng/ml) (Measurements, n=2)	Extract Der p1 mean concentration (ng/ml)
No operation-1,2	150	146
	143	
Natural drying-1,2	140	138
	136	
Allergy 60°C program-1,2	N.D.	<0.375
	N.D.	

a) N.D.: Below detectable levels (<0.375 ng/ml)

The Der p1 concentration which extracted the Dpb adhered fabric under (1) no operation was 146 ng/ml.

In relation to the 138 ng/ml which was the Der p1 concentration after the (2) natural drying for the NA-V85FC1 processing time, it was less than the detection limit (< 0.375 ng/ml).

Fig. 1 show the calibration curves of the ELISA measurements. Table 2 show the measurement data.

4. Comments

None.

5. Coverage of identical models

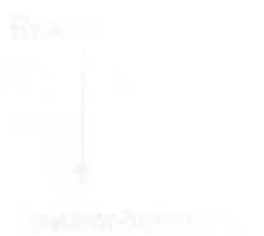
The test results which are printed in this test report are valid for the NA-V85FC1, in addition, they are also valid for the NA-S056FR1, NA-S106FR1, NA-S106FC1, NA-S956FR1, NA-S96FR1, NA-S96FC1, NA-V105FR1, NA-V10FR1, NA-V105FC1, NA-V10FC1, NA-V95FR1, NA-V90FR1, NA-V95FC1, NA-V90FC1 which are identical in functional points such as washing, rinsing, draining, and water capacities, etc.

The difference between NA-V105FR1, NA-V10FR1, NA-V105FC1, NA-V10FC1, NA-V95FR1, NA-V90FR1, NA-V95FC1, NA-V90FC1 and the tested product does not affect the recorded results, since just the operation panels and optional functions, whereas the construction and software program are identical.

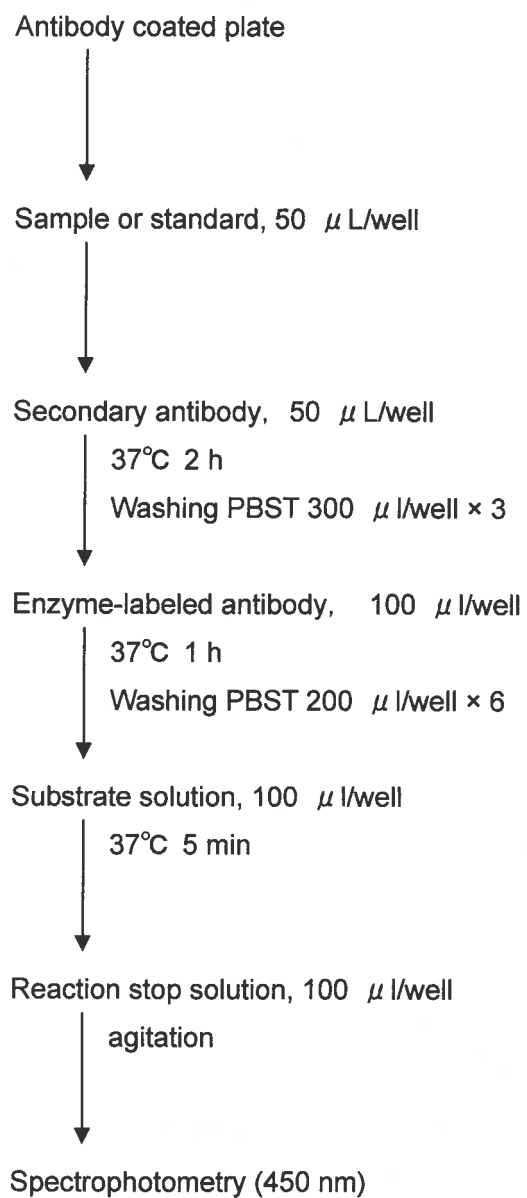
The difference between NA-S056FR1, NA-S106FR1, NA-S106FC1, NA-S956FR1, NA-S96FR1, NA-S96FC1 and the tested product is that the washer and dryer added the drying function to the tested

frame. Since its construction as a washing machine and its software program are identical, the recorded results are not affected.

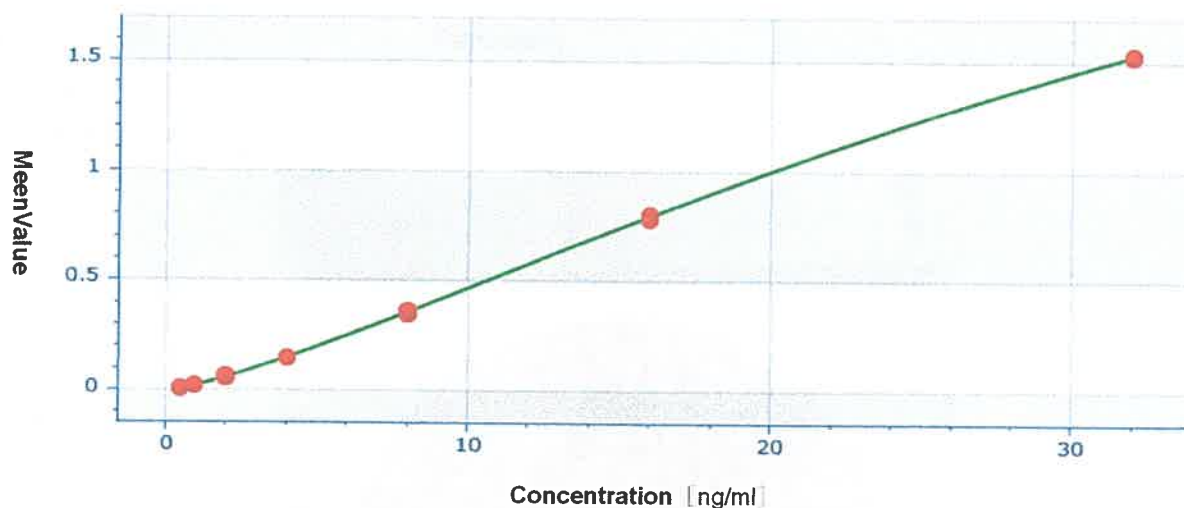
Period



Attachment 1

Der p1 measurement test protocol (Nichinichi pharmaceutical Co., Ltd.)

Appendix 1



$$y = 3.85653 + \left(\frac{0.000624679 - 3.85653}{1 + (x/43.5862)^{1.34231}} \right)$$

$$R^2: 1$$

Fig. 1. Der p1 calibration curve (16-an-PNS-5A)

Table 2 Der p 1 volume measurements(16-an-PNSWM-5A)

Sample	Dil. Ratio	Values	Result	MeanResult	Std.Dev.	CV%
No operation-1	1	1.906	≥ Maximun	NaN	NaN	NaN
		1.874	≥ Maximun	(Non-numeric)	(Non-numeric)	(Non-numeric)
	10	0.7444	15.01	14.96	0.06186	0.4134
		0.7397	14.92			
No operation-2	1	2.082	≥ Maximun	NaN	NaN	NaN
		1.975	≥ Maximun	(Non-numeric)	(Non-numeric)	(Non-numeric)
	10	0.7128	14.42	14.33	0.132	0.9214
		0.7027	14.23			
Natural drying-1	1	1.871	≥ Maximun	NaN	NaN	NaN
		1.915	≥ Maximun	(Non-numeric)	(Non-numeric)	(Non-numeric)
	10	0.6906	14.01	13.96	0.07291	0.5224
		0.685	13.91			
Natural drying-2	1	1.895	≥ Maximun	NaN	NaN	NaN
		1.853	≥ Maximun	(Non-numeric)	(Non-numeric)	(Non-numeric)
	10	0.6676	13.59	13.6	0.02336	0.1717
		0.6694	13.62			
Allergy 60°C program-1	1	0.002	< Minimum	NaN	NaN	NaN
		0.0072	< Minimum	(Non-numeric)	(Non-numeric)	(Non-numeric)
Allergy 60°C program-2	1	0.0055	< Minimum	NaN	NaN	NaN
		0.0054	< Minimum	(Non-numeric)	(Non-numeric)	(Non-numeric)

Test Item

Description : Washing machine
Trademark : Panasonic
Model and/or type reference : V85FC1
Photo appliance :



Order : 16-an-PNS-5B

Date of issuance : Apr.26.2022

Test Report

To: Panasonic Corporation

TITLE

Deactivation effect of the Washing machine,
NA-S106FR1 series,
in regards to cedar pollen allergen



Annex Shin-Osaka 4A, 2-9-1 Miyahara, Yodogawa-ku

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Signed off by the test director



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1 Test materials and method

1.1.1 Test pieces

Cotton Towels (fabric specimen)

1.1.2 Test liquids

Purified antigen derived from Japanese cedar pollen (Cpe), by Biostir, Inc.

1.1.3 Product tested (Washing machine of front loading type)

NA-V85FC1, by Panasonic

* Products with the same specifications

NA-S056FR1, NA-S106FR1, NA-S106FC1, NA-S956FR1, NA-S96FR1, NA-S96FC1, NA-V105FR1, NA-V10FR1, NA-V105FC1, NA-V10FC1, NA-V95FR1, NA-V90FR1, NA-V95FC1, NA-V90FC1

1.2 Test method

1.2.1 Preparation of the fabric specimen carrying the allergens

Purified antigens derived from Japanese cedar pollen are suspended in the 0.1% BSA-added purified water to form a suspension at 0.23 mg/ml (1500 ng/ml as Cry j1, cpe Lot. cpeJ). The suspension is then centrifuged at 2000 rpm for 10 min. The supernatant is prepared as the test liquid.

10 ml of test liquid is evenly applied to the fabric specimens (20 cm × 20 cm), under room temperature conditions it is left to stand still for 24 hours to dry out then allergens are applied to it.

6 fabrics of allergen-attached cloth were prepared.

1.2.2 Investigation of the deactivation effect by Washing machine in regards to the allergen

The allergen fabric specimens prepared in 1.2.1 were sent to the Panasonic Corporation and washed by Washing machine, NA-V85FC1.

The washing followed the 3 conditions bellow with 2 specimens respectively.

- (1) No operation
- (2) Natural drying (for the same time period as that (3))
- (3) Allergy 60 °C program (washing + natural drying)

After washing under each condition was completed, the allergen fabric specimens were sent back to Biostir, Inc.

The allergen fabric specimens were put into zip-up bags along with 50 ml of PBS containing 0.5% BSA, 0.05% sodium azide, and 0.05% Tween 20. The zip-up bags were kneaded by hand for 10 min. And kept under 4 °C for 24 hours for extraction.

Each extract was measured via the ELISA method to measure the Cry j1 concentration.

1.3. Method and equipment used for measuring

The measuring was conducted via the sandwich ELISA method.

- Equipment : MULTISKAN FC (Thermo)
- Measuring wavelength : 405 nm

The measuring was conducted via a series of 3 dilutions with $n=2$ (2 wells) for each sample.

The sample dilution was conducted with 0.1% BSA-PBS.

2 Signed off by the test director

Test client : Panasonic Corporation

Living Appliances and Solutions Company

Laundry Systems And Vacuum Cleaner Business Division

Title: Deactivation effect of the Washing machine,
NA-S106FR1 series,
in regards to cedar pollen allergen

Test no. 16-an-PNS-5B

Test director :

Date *Apr. 26. 2022*

Signature

Hisashi Takahashi

Development Division, Biostir, Inc.

3. Test result

3.1.1 Details of the processing of the allergen fabric specimen

- (1) No operation
- (2) Natural drying (for the same time period as that of (3))

The allergen fabric specimens are left being with clothespins under 23 ± 2 °C (420 min).

- (3) Allergy 60 °C program (washing + natural drying)

The allergen fabric specimens (2 pieces) of each allergen are washed at an Allergy 60 °C program by Washing machine, NA-V85FC1, and naturally dried with clothespins under 23 ± 2 °C (240 min). Test result is as bellow.

Test Date: Apr.14.2022

Test pieces: Fabric specimen carrying Japanese cedar pollen (IEC towel test fabric 20 cm × 20 cm), 2 pieces

Water: 50 ppm, start temperature 20 °C

Detergent: Nothing

Displayed program time: 1;58

Test results:

Time	Power consumption	Water consumption
1hr. 55min. 41sec	664.27 Wh	42.0 L

Fabric specimen drying time: 240 min

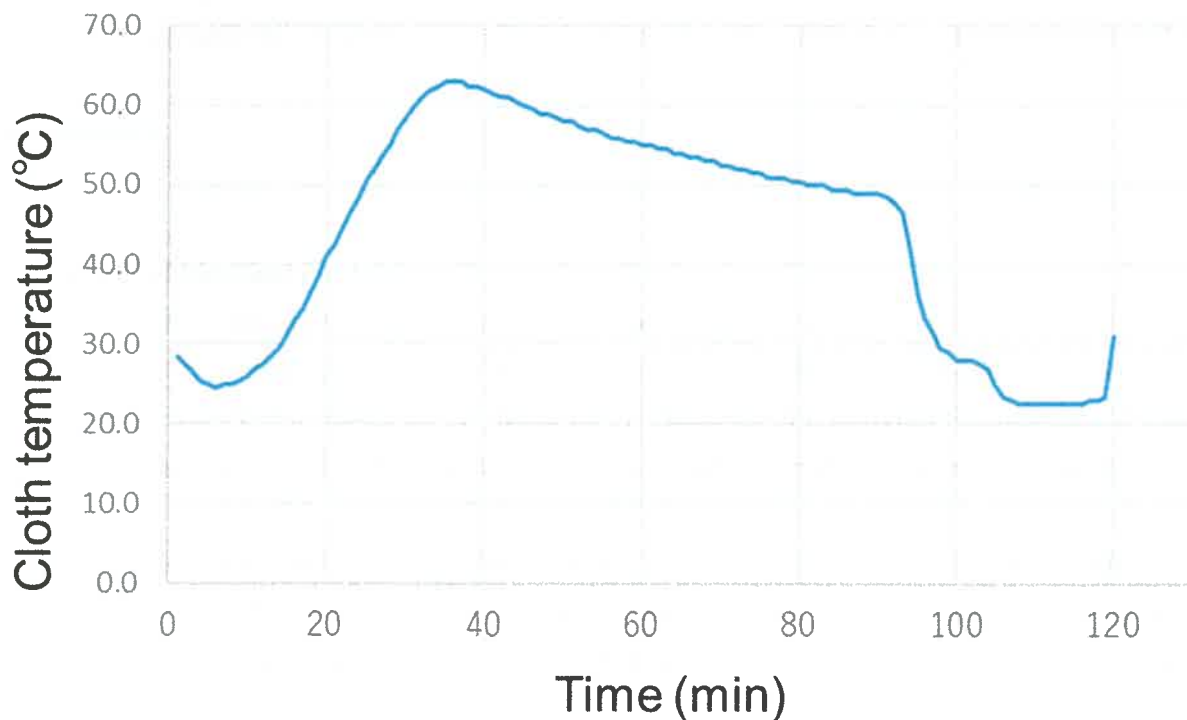


Figure Clothing temperature dependence on elapsed time

3.2 Detection result

The fabric specimen of Cpe was washed under the 3 conditions. Then, the Cry j1 concentration in the extract after the washing was measured via the ELISA method. Table 1 show the measurement result.

Table 1 Residual Cry j 1 volume after operation under each condition (16-an-PNSWM-5B)

Washing conditions	After washing Extract Cry j 1 concentration (ng/ml) (Measurements, n=2)	After washing Extract Cry j 1 mean concentration (ng/ml)
No operation-1,2	221	211
	202	
Natural drying-1,2	151	155
	159	
Allergy 60°C program-1,2	N.D.	<0.567
	N.D.	

a) N.D.: Below detectable levels (<0.567 ng/ml)

The Cry j1 concentration which extracted the Cpe adhered fabric under (1) no operation was 211 ng/ml.

In relation to the 155 ng/ml which was the Cry j1 concentration after the (2) natural drying for the NA-V85FC1 processing time, it was less than the detection limit (< 0.567 ng/ml).

Fig. 1 show the calibration curves of the ELISA measurements. Table 2 show the measurement data.

4. Comments

None.

5. Coverage of identical models

The test results which are printed in this test report are valid for the NA-V85FC1, in addition, they are also valid for the NA-S056FR1, NA-S106FR1, NA-S106FC1, NA-S956FR1, NA-S96FR1, NA-S96FC1, NA-V105FR1, NA-V10FR1, NA-V105FC1, NA-V10FC1, NA-V95FR1, NA-V90FR1, NA-V95FC1, NA-V90FC1 which are identical in functional points such as washing, rinsing, draining, and water capacities, etc.

The difference between NA-V105FR1, NA-V10FR1, NA-V105FC1, NA-V10FC1, NA-V95FR1, NA-V90FR1, NA-V95FC1, NA-V90FC1 and the tested product does not affect the recorded results, since just the operation panels and optional functions, whereas the construction and software program are identical.

The difference between NA-S056FR1, NA-S106FR1, NA-S106FC1, NA-S956FR1, NA-S96FR1, NA-S96FC1 and the tested product is that the washer and dryer added the drying function to the tested

frame. Since its construction as a washing machine and its software program are identical, the recorded results are not affected.

Period

Cry j1 measurement test protocol

Anti-cry j1 mouse IgG monoclonal antibody (anti-Cry j1 mAb013, 10 µg/ml), 50 µl/well

↓
4°C o.n.

Blocking by PBS containing 0.1% BSA, 200 µl/well

↓
37°C 1 h
washing PBS 200 µl × 3

Sample or standard, 50 µl/well

↓
37°C 1 h
washing PBST 200 µl × 3

Enzyme-labeled antibody (Peroxidase conjugated anti-Cry j1 mAb 053, thousandfold-diluted), 50 µl/well

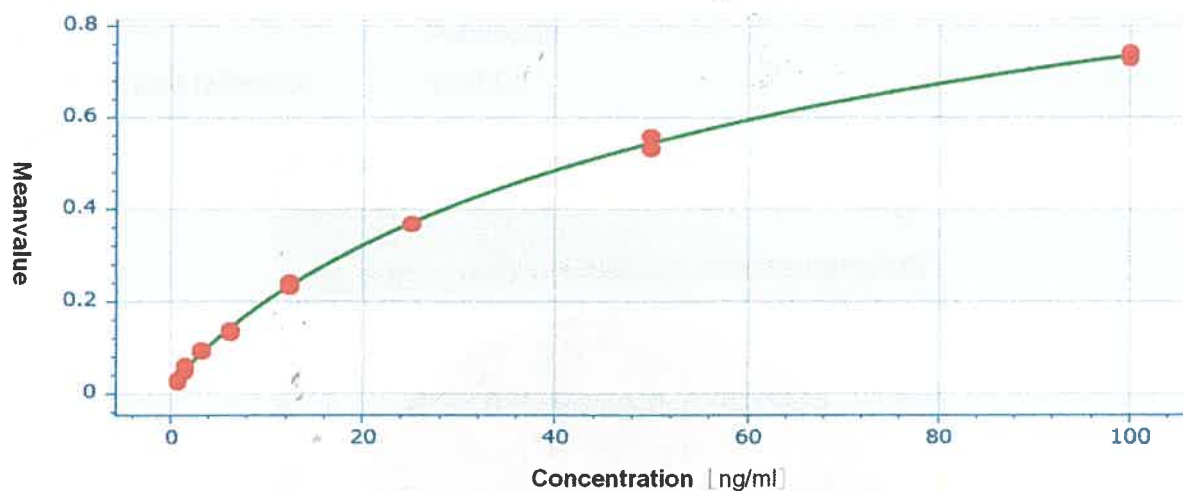
↓
37°C 1 h
washing PBST 200 µl × 3

ABTS, 50 µl/well

↓
30 min at 25 °C

Spectrophotometry (405 nm)

Appendix 1



$$y = 1.27818 + ((0.00949546 - 1.27818) / (1 + (x/71.6958)^{0.87391}))$$

$$R^2:1$$

Fig. 1. Cry j1 calibration curve (16-an-PNS-5B)

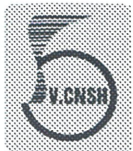
Table 2 Cry j1 volume measurements(16-an-PNSWM-5B)

Sample	Dil. Ratio	Values	Result	MeanResult	Std.Dev.	CV%
No operation-1	1	0.8754 0.8735	≥ Maximun ≥ Maximun	NaN (Non-numeric)	NaN (Non-numeric)	NaN (Non-numeric)
	10	0.3403 0.3476	21.76 22.51	22.13	0.5308	2.398
No operation-2	1	0.8134 0.8302	≥ Maximun ≥ Maximun	NaN (Non-numeric)	NaN (Non-numeric)	NaN (Non-numeric)
	10	0.3195 0.3288	19.7 20.61	20.15	0.6408	3.18
Natural drying-1	1	0.7701 0.7907	≥ Maximun ≥ Maximun	NaN (Non-numeric)	NaN (Non-numeric)	NaN (Non-numeric)
	10	0.2773 0.2587	15.86 14.3	15.08	1.102	7.308
Natural drying-2	1	0.7782 0.791	≥ Maximun ≥ Maximun	NaN (Non-numeric)	NaN (Non-numeric)	NaN (Non-numeric)
	10	0.2806 0.2758	16.15 15.73	15.94	0.2923	1.834
Allergy 60°C program-1	1	-0.0193 -0.0257	< Minimum < Minimum	NaN (Non-numeric)	NaN (Non-numeric)	NaN (Non-numeric)
Allergy 60°C program-2	1	-0.053 -0.0401	< Minimum < Minimum	NaN (Non-numeric)	NaN (Non-numeric)	NaN (Non-numeric)

Test Item

Description : Washing machine
 Trademark : Panasonic
 Model and/or type reference : V85FC1
 Photo appliance :





IBT

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No: 050522/VCCM

May 20, 2022

Test Report

Client: Branch of Panasonic Appliances Vietnam Co., Ltd. in Hung Yen

Address: Plot G2, Thang Long Industrial Park II, Lieu Xa Commune, Yen My District, Hung Yen Province, Vietnam

Test sample:

Panasonic washing machine model NA-V10FR1, made in Vietnam washing load of 10kg for StainMaster+ (Allergy 60°C course)

Test cloth: cotton knit (10cm x 10cm) and cotton knit 10kg/machine

Test items:

Test bacterial elimination efficiency for functions StainMaster+ (Allergy 60°C) of Front load washing machine NA-V10FR1 series (Made in Vietnam) with 2 types of bacteria *Escherichia coli* and *Staphylococcus aureus*.

Test method:

Protocol of Panasonic Appliances Vietnam Co., Ltd. Fabric sample washed in Operating condition of function StainMaster+ (Allergy 60°C).

Sample retention time: No

Test place: Branch of Panasonic Appliances Vietnam Co., Ltd. in Hung Yen.

Plot G2, Thang Long Industrial Park II, Lieu Xa Commune, Yen My District, Hung Yen Province, Vietnam

Test agency: Center for Culture Collection and Genetic Resource Conservation of Microorganisms, Institute of Biotechnology

Test date: 06/04/2022 – 20/05/2022

Test procedure:

The test organism (*Escherichia coli* and *Staphylococcus aureus*) were cultured in nutrient medium liquid at 37° for 24 hours (in shaking speed 150 rpm) to give a concentration of 10⁷ to 10⁸ CFU/ml.

A pieces of the test cotton cloth was sterilized in an autoclave at 121oC, 1 atm for 15 minutes and 3 ml of the cell suspensiom was dropped onto it.

The sterilization of washing machine and water supply route by sodium hypochlorite liquid: (1) Pour chlorine bleach 300ml into about 70L water in supply bucket. Then



supply water into wash tub up to a maximum lever by water supply route and start bacteria elimination; (2) Rinsing washing machine by water again (similar as (1)); (3) Add sodium thiosulfate into 70L water (about 0,002%) to neutralize residual chlorine, rinse the water supply route and wash tub similar as (1) so that residual chlorine concentration in water of wash tub ≤ 0.1 ppm.

The Dummy Laundry was placed in the wash tub of the sample. Three test pieces were fastened to the Dummy Laundry with safety pin at three points where the client was specified. Washing in 2 modes of Bacteria Elimination course: (1) StainMaster in the mode of Allergy 60°C; (2) Daily wash (without heater, rinse speed as Stainmaster). The water supplied used in the washing process was neutralized residual chlorine by sodium thiosulfate. After washing, the test pieces were taken out, each piece of cloth was washed in 100 ml of distilled water. The obtained counts were converted into the total viable cell count of three test pieces.

Test results:

Test organism	With StainMaster+ (Allergy 60°C)		Without StainMaster+ (Allergy 60°C)		With Stain Master+ (Allergy 60°C)	Without Stain Master+ (Allergy 60°C)	Degree of reduction
	Viable cell count (CFU/ml)		Viable cell count (CFU/ml)				
	Before operation	After operation	Before operation	After operation			
	A	B	C	D			
<i>Escherichia coli</i> ATCC29922	1.85×10^8	<10	1.85×10^8	8.14×10^6	7.27	1.36	5.91
<i>Staphylococcus aureus</i> ATCC25923	7.76×10^8	<10	7.76×10^8	6.71×10^6	7.89	2.06	5.83
The antibacterial effect is achieved if the degree of reduction (G) ≥ 2					<i>Escherichia coli</i> elimination ratio		99.9999
					<i>Staphylococcus aureus</i> elimination ratio		99.9999

Note:

- The results only apply to tested sample
- Name of sample and Name of client written according to client 's request



Center for Culture Collection and Genetic Resource Conservation of Microorganisms

Vice Director. Le Thi Minh Thanh

Tester

Trinh Thi Thu Ha