



# Food Safety

Foodborne Pathogens  
Food Allergens  
Mycotoxins

Pesticide Residue Analysis

Food Components and Additives

Genetic Testing

# Food Safety

## Foodborne pathogens are an important issue for food manufacturers.

### Example of foodborne pathogen management among food manufacturers.

1. Decreasing the risk of food poisoning by combining tests for viable bacteria counts and the detection of food poisoning bacteria.
2. Rapidity and simplicity are key features for microbial tests adopted for the voluntary hygiene management of food processing factories.

## Food allergy is an important issue for food manufacturers.

### Example of food allergen management among food manufacturers.

1. Allergen advisory labeling: for allergenic ingredients, for possibility of cross contamination, etc.
2. Control of contamination: avoid contamination during processing.

\*Cross contamination may occur during transport and storage of ingredients, manufacturing and processing, and packing of products.

## Mycotoxins is an important issue for food manufacturers.

### Example of Mycotoxins management among food manufacturers.

1. Mycotoxins are heat stable and thermal treatment during processing and preparation of foods cannot inactivate them. Appropriate risk management is required in each step of food supply chain (production and storage of field crops, processing, distribution, and consumption).
2. Aflatoxins are most toxic of all known mycotoxins and have carcinogenic effect on animals. Various regulatory bodies (Codex, EC, US FDA, MHLW of Japan etc.) have set their regulatory limit for aflatoxins.

## NH Foods Ltd. Research and Development Center

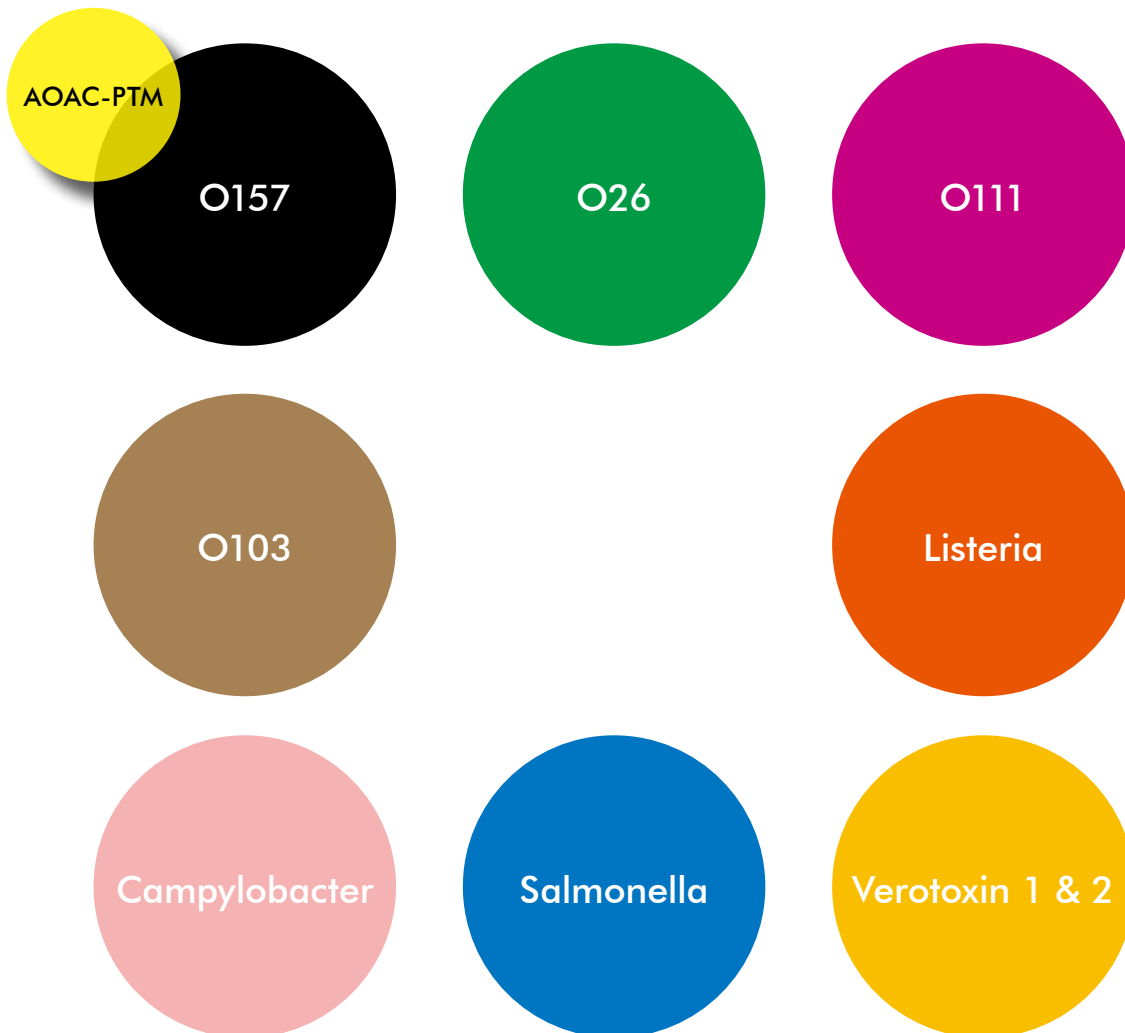
### Research to Ensure Food Safety and Security

One of the missions of the NH Foods Ltd. R&D center is to ensure food safety. The R&D center has innovated food safety testing techniques based on immunotechnologies. Leveraging its food allergen test kit, it offers a variety of food test kits, including test kits for foodborne pathogens. Their performance has earned strong public recognition. They include a food allergen detection kit that complies with the guidelines of the Consumer Affairs Agency of Japan. Other examples are mycotoxin detection kit that complies with a notice from Ministry of Health, Labour and Welfare of Japan, and verotoxin test kit that is listed in another notice.

# Foodborne pathogen test kits

by Immuno detection

## “NH Immunochromato”



The ‘NH Immunochromato’ is a line of testing kits for easy detection of food poisoning bacteria and toxins in food products. These are used to increase the level of safety in factory produced food items and production lines.

‘**NH Immunochromato O157**’ has been certified as a Performance Tested Method<sup>SM</sup> (PTM) by the AOAC Research Institute.

NH Immunochromato includes 8 kits designed for 7 food poisoning bacteria or verotoxin; *E. coli* O157, *E. coli* O26, *E. coli* O111, *E. coli* O103, verotoxin (VT1/2), *Listeria*, *Campylobacter* and *Salmonella*.

**O26, O111,** and **O103:** The only commercially available immunochromatographic assay kits  
**Verotoxin 1 & 2:** Listed in the notice from the Ministry of Health, Labour and Welfare of Japan

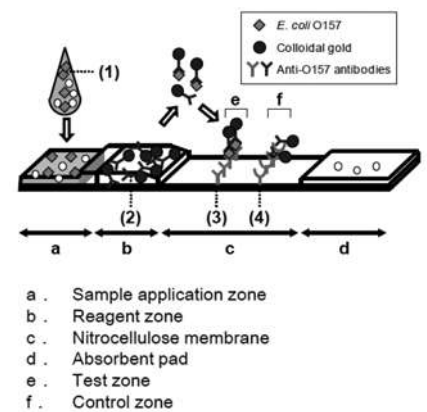
# Foodborne pathogen test kits

## NH Immunochromato

- Simple and rapid immunochromatographic assays
- One-step assay: Apply enriched samples to test strips
- Results in just 15 minutes
- O26, O111, and O103: The only commercially available Immunochromatographic assay kits in the world
- Used widely in Japan.

### Principle of assay

1. When a sample solution is applied to the sample application zone of the test strip, it is wicked through reagent zone.
2. Target pathogen/toxin (1) in the sample binds to the colloidal gold-labeled antibody (2) in the reagent zone.
3. The pathogen-antibody complex flows through the nitrocellulose membrane which contains a zone of antibody specific to target pathogen/toxin.
4. The immune complex is captured and concentrated in the zone (test zone) (3), eventually forms a reddish purple line.
5. The membrane also contains a control zone where the gold-labeled antibody is captured.
6. The control line forms in the control zone (4) regardless of the presence of target pathogen/toxin in the sample solution. The control line ensures the test is working correctly.



### Kit contents

- A : Test strip            2 tests ×10 packs  
B : Instruction manual            1  
C : Plastic bag with zipper            1



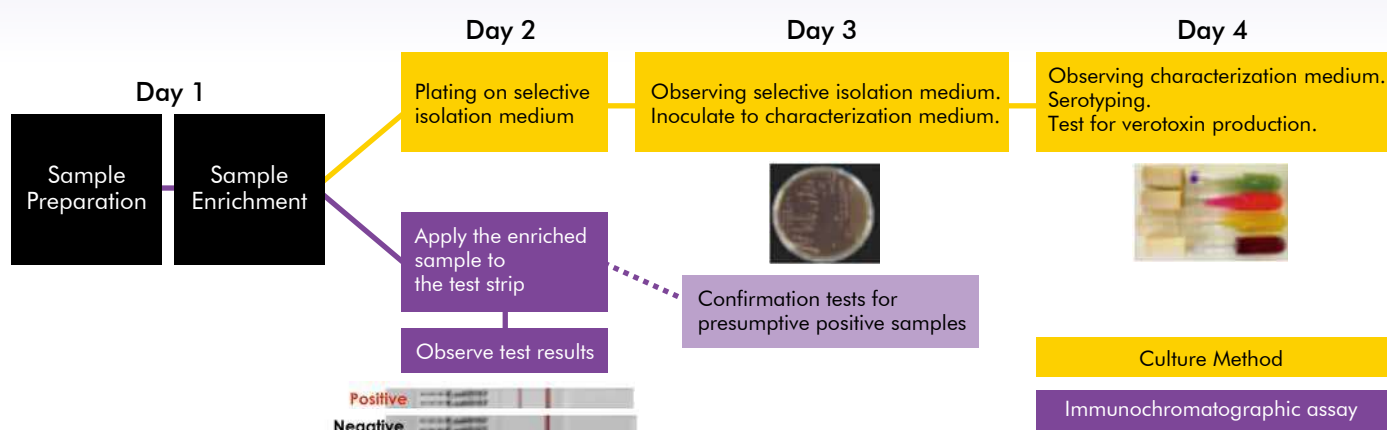
### Additionally required materials and instruments

1. Enrichment broth
2. Stomacher and stomacher bags (preferably with a filter)
3. Autoclave
4. Incubator
5. Balance (capable of weighing 25 g)
6. Disposable plastic transfer pipettes and/or appropriate micro pipettes and disposable tips
7. Timer
8. Disposable polypropylene tubes for sterilization of samples (optional)

### Storage and expiration date

- 1) Storage: Store at 2–8°C under protection from the light. Avoid freezing.
- 2) Expiration date: 12 months from the date of manufacture.

## Comparing operational procedure with culture method (Detection of *E.coli* O157)



## Test procedures (Detection of *E.coli* O157)

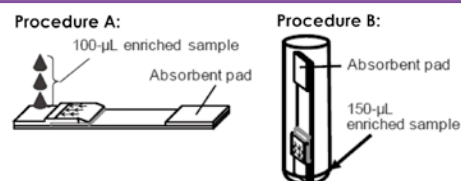
### Step 1: Sample enrichment

Add enrichment broth to weighed food sample and homogenize. Incubate the homogenized sample at 42°C for 18-24 hours.

### Step 2: Application to test strip

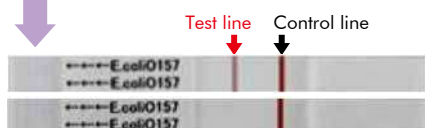
**Procedure A:**  
Place a test strip on flat surface and apply 100 µL of the enriched sample to the sample application zone.

**Procedure B:**  
Transfer 150 µL of the enriched sample into a test tube. Put a test strip in the test tube immersing the sample application zone in the sample.



### Step 3: Observation of the test results

Read the test result after 15 minutes.



**Positive results:** Reddish purple lines appear in the test zone and the control zone in 15 minutes after application of sample solutions.

**Negative results:** A reddish purple line appears in the control zone.

\*Invalid results: No reddish purple line appears in the control zone.

## NH Immunochromato

Product	Analytes	Storage	Package Size	Wako Cat. No.
NH Immunochromato O157	<i>E. coli</i> O157	2-10°C	20 tests	304-31361
NH Immunochromato O26	<i>E. coli</i> O26	2-10°C	20 tests	304-34421
NH Immunochromato O111	<i>E. coli</i> O111	2-10°C	20 tests	301-34431
NH Immunochromato O103	<i>E. coli</i> O103	2-10°C	20 tests	382-03971
NH Immunochromato VT1/2	Verotoxin 1 and verotoxin 2	2-10°C	20 tests	302-93321
NH Immunochromato Salmonella	<i>Salmonella Enteritidis</i>	2-10°C	20 tests	303-31691
NH Immunochromato Listeria	<i>Listeria</i> species	2-10°C	20 tests	300-31581
NH Immunochromato Campylobacter	<i>Campylobacter jejuni</i> and <i>C. coli</i>	2-10°C	20 tests	301-83141

## Related Products

Product	Storage	Package Size	Wako Cat. No.
Polymyxin B Sulfate	2-10°C	1 g	167-11691
		5 g	163-11693

# Magnetic beads for Immunomagnetic Separation of Foodborne Pathogens

## NH Beads



- These kits are designed to separate the target organism rapidly.
- Small volume (25 tests) ensures minimal wastage during use.
- Target organism at 10<sup>2</sup> CFU/mL in solution can be separated.



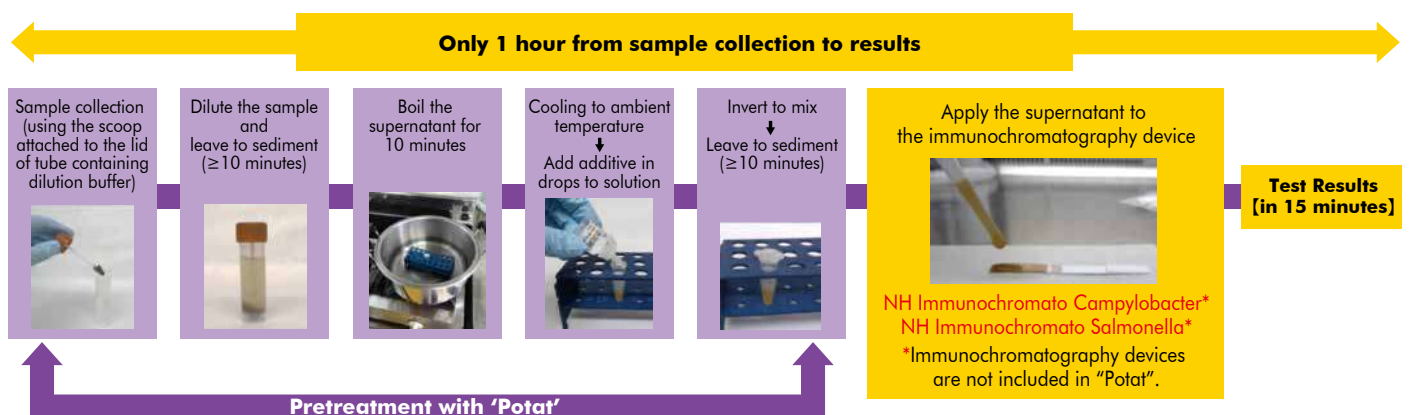
### NH Beads

Product	Storage	Package Size	Wako Cat. No.
NH Beads O157	2-10°C	20 tests	300-85671
NH Beads O26	2-10°C	20 tests	307-85681
NH Beads O111	2-10°C	20 tests	304-85691

## Fecal pretreatment reagent kit for Immunochromato

### "POTAT"

- This kit inhibits non-specific reactions caused by poultry feces-derived materials, minimizing the number of false positives.
- Tests can be conducted directly on fecal sample. Enrichment is not required.
- This kit enables on-site testing in farms and poultry meat processing facilities.
- The protocol is easy to perform. No special equipment is required.
- Only 1 hour from sample collection to results.



### POTAT

Product	Storage	Package Size	Wako Cat. No.
"POTAT" Fecal pretreatment reagent kit for Immunochromato	2-10°C	20 tests	387-05481

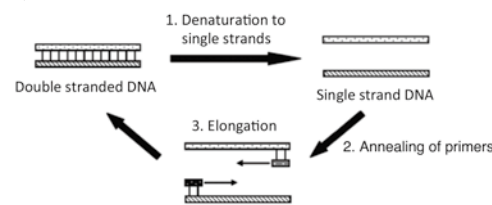
# Foodborne pathogen test kits by PCR and DNA chromatography

## GeneLine

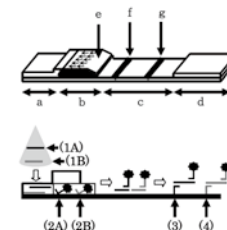
- These test kits are reagents for laboratory use, combining the PCR (polymerase chain reaction) and nucleic acid chromatography.
- Results can be obtained faster than with the culture method.
- Sensitivity comparable to the culture method.
- Post-PCR operations are simple (no need for agarose electrophoresis).
- Nucleic acid chromatography enables visual detection of target genes.

### Principle of assay

#### 1) Polymerase Chain Reaction



#### 2) Nucleic Acid Chromatography



### Kit contents (GeneLine *Listeria monocytogenes*)

#### Amplification reagent (Frozen reagent)

- A: PCR master mixture 0.5 mL×2
- D: Instruction manual 1

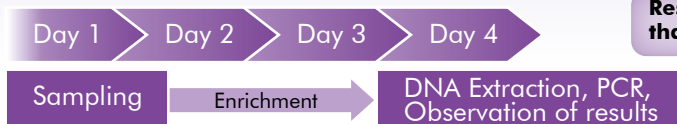
#### Test strips (Refrigerated reagent)

- B: Test strips 4 tests×12 packs
- C: Development buffer 1.4 mL×2
- D: Instruction manual 1
- E: Plastic bag with zipper 1



### Comparing with the Culture Method -Testing Durations for *Listeria monocytogenes* detection

#### GeneLine

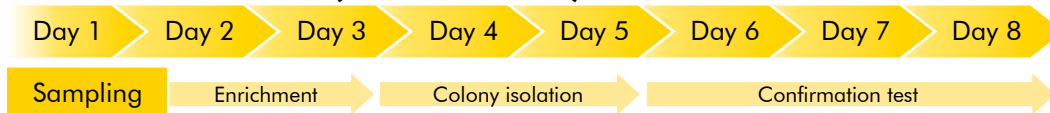


Results can be obtained faster than with the culture method



Positive results  
Negative results

#### Conventional Method (Culture Method)



### GeneLine

Product	Storage	Package Size	Wako Cat. No.
GeneLine Verotoxin test strip	2-10°C	48 tests	386-02391
GeneLine Verotoxin primer mix	-20°C	48 tests	389-02381
GeneLine <i>Listeria monocytogenes</i> test strip	2-10°C	48 tests	307-99591
GeneLine <i>Listeria monocytogenes</i> amplification reagent	-20°C	48 tests	300-99581

### Heat-resistant mutant DNA polymerase

Product	Storage	Package Size	Wako Cat. No.
Hot-Start Gene Taq NT	-20°C	50 units	315-07521
		250 units	311-07523
		250 units×4	319-07524

# Microbe test media, culture substrates and testing kits

## Microbe test media and culture substrates

### ■ Kabicidin

This product, created by the Takeda Pharmaceutical Company Institute for Fermentation (Patent number 247306), is an antibiotic extracted from the bacterial culture medium of *Streptomyces gougerotti*, which selectively inhibits the propagation of fungi such as mold and yeast while bacterial reproduction remains unaffected.

### ■ Anti Fungus Culture Medium "DAIGO"

This product consists of the anti-mold antibiotic Kabicidin (Patent number 247306), and is a powder medium that selectively inhibits the propagation of fungi only, such as mold or yeast. Thus, this product can be effectively utilized in industries that use mold and yeast.

Product Name	Storage	Manufacturer	Pkg. Size	Wako Cat.No.
Kabicidin (antibiotic for mycomycetes)	2-10°C	Nihon Pharmaceutical Co. Ltd.	100 mg × 5A	397-00161
Anti Fungus Culture Medium "DAIGO"	2-10°C	Nihon Pharmaceutical Co. Ltd.	50 g	390-00151

### For general bacteria testing

Product Name	Storage	Purpose	Pkg. Size	Wako Cat.No.
Soybean-Casein Digest Broth "DAIGO"	RT	General microbial counts, enrichment sterility testing	500 g	393-00185
Soybean-Casein Digest Agar "DAIGO"	RT	General microbial counts, isolation	500 g	396-00175

### For enterobacteria testing

Product Name	Storage	Purpose	Pkg. Size	Wako Cat.No.
MacConkey agar DAIGO for JP general test	RT	Isolation of intestinal bacteria	300 g	390-01751
Triple Sugar-Iron Agar DAIGO, for JP General Test	2-10°C	Identification of intestinal bacteria	300 g	390-01131
EEM Broth "DAIGO"	RT	<i>Salmonella</i> preculture	300 g	390-00391
Hajna Tetrathionate Broth Base "DAIGO"	RT	<i>Salmonella</i> and <i>Arizona</i> enrichment	300 g	390-00411
Brilliant Green Agar DAIGO, for JP General Test	RT	<i>Salmonella</i> isolation	300 g	399-01101
DHL Agar "DAIGO" [Desoxycholate-Hydrogensulfide-Lactose Agar]	RT	<i>Salmonella</i> and <i>shigella</i> isolation	300 g	395-00461
XLD Agar "DAIGO"	RT	<i>Salmonella</i> and <i>shigella</i> isolation	300 g	397-00421

### For *E. coli* (coliform) testing

Product Name	Storage	Purpose	Pkg. Size	Wako Cat.No.
Lactose Broth DAIGO	RT	Coliform grouping, microbial counts, enrichment identification	300 g	397-00301
EMB Agar, "DAIGO", for JP General Test	RT	Coliform group isolation	300 g	395-01061
Desoxycholate Agar "DAIGO"	RT	Coliform group isolation	300 g	395-00341
Brilliant Green-Lactose-Bile Broth "DAIGO"	RT	Coliform testing of food products	300 g	398-00451
EC Medium "DAIGO"	RT	<i>E. coli</i> testing of food products	300 g	392-00471

### Count of viable bacteria in food items

Product Name	Storage	Purpose	Pkg. Size	Wako Cat.No.
Standard Methods Agar "DAIGO"	RT	Microbial counts of food items	300 g	393-00381

### For Staphylococcus testing

Product Name	Storage	Purpose	Pkg. Size	Wako Cat.No.
Mannitol salt agar DAIGO for JP General Test	RT	Isolating <i>S. aureus</i>	300 g	396-01851
Vogel-Johnson Agar "DAIGO", for JP General Test	2-10°C	Isolating <i>S. aureus</i>	300 g	395-01181
Baird Parker Agar "DAIGO", for JP General Test	2-10°C	Isolating <i>S. aureus</i>	300 g	392-01191

### For *Pseudomonas aeruginosa* testing

Product Name	Storage	Purpose	Pkg. Size	Wako Cat.No.
Cetrimide agar DAIGO for JP General Test	RT	Isolating <i>Pseudomonas aeruginosa</i>	300 g	399-01721

### For fungus testing

Product Name	Storage	Purpose	Pkg. Size	Wako Cat.No.
Glucose Peptone Agar DAIGO, for JP General Test	2-10°C	Fungus microbial counts, isolation and strain preservation	300 g	394-01031

### For sterility testing

Product Name	Storage	Purpose	Pkg. Size	Wako Cat.No.
Fluid Thioglycollate Medium "Daigo" for JP General Test	RT	Sterility testing	300 g	393-01621
Alternative Thioglycollate Medium "Daigo" for JP General Test	RT	Sterility testing	300 g	390-01631

### Related Products

Product Name	Storage	Purpose	Pkg. Size	Wako Cat.No.
Potassium Tellurite Solution 1% "DAIGO"	RT	For adding to Vogel-Johnson Agar and Baird-Parker agar basal media	2 mL × 50A	398-00331

## HIPOLYPEPTON Series

In Hipolypepton Series from Nihon Pharmaceutical, 'Hipolypepton' made from casein and 'Hipolypepton S', 'Hipolypepton N' and 'Hipolypepton NS' made from soybeans are currently available. This series is a dried, purified powder, created from raw materials that have undergone enzymatic degradation. The casein sodium, the basic ingredient of 'Hipolypepton' (the casein-made peptone), that is used is exclusively from New Zealand, a country without incidence of BSE outbreaks.

Product Name	Storage	Manufacturer	Pkg. Size	Wako Cat.No.
HIPOLYPEPTON	RT	Nihon Pharmaceutical Co.Ltd.	500 g	392-02115
HIPOLYPEPTON S	RT	Nihon Pharmaceutical Co.Ltd.	500 g	394-02175
HIPOLYPEPTON N	RT	Nihon Pharmaceutical Co.Ltd.	300 g	397-02121
HIPOLYPEPTON NS	RT	Nihon Pharmaceutical Co.Ltd.	300 g	393-02101

### Related Products

Product Name	Storage	Manufacturer	Pkg. Size	Wako Cat.No.
DRIED YEAST EXTRACT SH	RT	Nihon Pharmaceutical Co.Ltd.	250 g	394-02131
DRIED YEAST EXTRACT D-3H	RT	Nihon Pharmaceutical Co.Ltd.	250 g	398-02151
HICASAMINO ACIDS "DAIGO"	RT	Nihon Pharmaceutical Co.Ltd.	500 g	393-02145

## Cereulide Standard Solution (50 µg/mL Methanol Solution)

Cereulide is emetic toxin produced by *Bacillus cereus*. Cereulide is stable toxin under heat, acid/alkali, digestive enzyme. It has been widely researched and analyzed as a causative toxin that induces food poisoning.

Product Name	Storage	Grade	Pkg. Size	Wako Cat.No.
Cereulide Standard Solution (50µg/mL Methanol Solution)	-20°C	for Food Analysis	500 µL 500 µL × 5A	031-23451 037-23453

### Related Products

Product Name	Storage	Grade	Pkg. Size	Wako Cat.No.
Ciguatoxin CTX 3C	-20°C	for Biochemistry	100 ng	030-21581
Maitotoxin	-20°C	for Biochemistry	10 µg	134-17161



# Food Allergen Screening Test Kit "FASTKIT"

## FASTKIT ELISA Ver. III



These ELISA kits are a food allergen screening test kits which can detect allergens in foods. This product series complies with the guideline in CAA\* Notice No. 36 dated March 26, 2014, "Test methods for food products containing allergic substances". These kits are capable of precise quantitative detection of allergen in various samples such as raw materials and processed foods.

\* Consumer Affairs Agency, Government of Japan.

## FASTKIT Slim



In the management of food allergens, the prevention of unintended incorporation (contamination) is vital in the manufacture and preparation processes of food products. In particular, the cleaning and cleansing of machinery and equipment used in the manufacture and food preparation process are essential. The swab test using FASTKIT Slim is effective in ensuring that the cleaning and cleansing are completed adequately.

# FASTKIT

# Test Kits for Food Allergens

## FASTKIT ELISA and Slim

Two types of test kits to fit for your purposes

For  
**quantitative**  
analysis

**FASTKIT ELISA Ver.III**



- ▶ High sensitive quantification.
- ▶ Applicable for processed foods.
- ▶ Used widely in Japan.

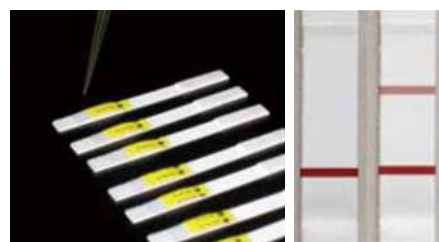


For  
**qualitative**  
analysis

**FASTKIT Slim**



- ▶ Screen samples for food allergen in 15 minutes.
- ▶ Reliable detection with simple handling.
- ▶ Clear interpretation of the results.



# FASTKIT ELISA Ver. III or FASTKIT Slim

	FASTKIT ELISA Ver.III	FASTKIT Slim
<b>Advantages</b>	<ul style="list-style-type: none"> <li>• Notice compliance</li> <li>• Precise determination of the allergen content</li> <li>• High detection sensitivity for allergens in processed foods</li> </ul>	<ul style="list-style-type: none"> <li>• Results can be obtained on-site</li> <li>• No special equipment is necessary</li> <li>• Simple handling</li> </ul>
<b>Disadvantages</b>	<ul style="list-style-type: none"> <li>• Overnight extraction (next day results)</li> <li>• A microplate reader is required</li> </ul>	<ul style="list-style-type: none"> <li>• Quantification is not possible (qualitative test)</li> </ul>
<b>Recommended Uses</b>	<p><b>In a testing laboratory</b></p> <ul style="list-style-type: none"> <li>• To know the allergens contents in new products</li> <li>• To issue reports on allergen contents</li> <li>• To test finished products and ingredients</li> </ul>	<p><b>On a manufacturing plant or cooking site</b></p> <ul style="list-style-type: none"> <li>• To monitor the contamination during production or cooking process</li> <li>• To obtain the results rapidly</li> </ul>



**FASTKIT ELISA Ver.III**



**FASTKIT Slim**



**FASTKIT ELISA Ver.III**



## “Visualization” of residual allergen using FASTKIT Slim

### Swabbing tests: check for cleanliness after washing

1. Raw eggs in bowls were beaten with chopsticks.
2. The bowls and chopsticks were washed using sponges with water or detergent
3. Swabbing tests were performed after each wash.

	Before wash	After washing with water	After washing with detergent
<b>Bowls</b>	+	+	±
<b>Chopstick</b>	+	+	+
<b>Sponges</b>	Not tested	+	-

- ☑ Washing with water was inadequate to wash egg proteins off.
- ☑ Egg proteins were detected in the sponges used in washing with water.
  - ➔ Suggests a contamination risk from the equipment used for cleaning
- ☑ Egg proteins remained on the surfaces even after washing with detergent.
- ☑ Egg proteins possibly remained in non-slip slits on the tips of chopsticks, because small grooves are hard to be washed.



**FASTKIT Slim**



# Test Kits for Food Allergens

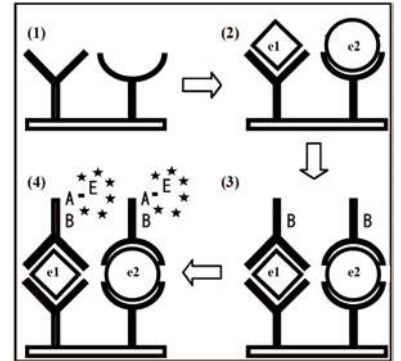
## FASTKIT ELISA Ver.III

- High sensitive quantification.
- Applicable for ingredients of processed foods.
- Used widely in Japan.
- Complies with the guideline in the notice from the Consumer Affairs Agency of Japan.

### Principle of assay

- (1) Antibodies binding to multiple proteins of allergen are immobilized on the surface of wells.
- (2) Multiple proteins of allergen (e1, e2...) in the sample solution binds to the antibodies.
- (3) The biotin-labeled antibodies bind to the already bound protein, forming "sandwich complexes".
- (4) The streptavidin-peroxidase conjugate binds to "sandwich complexes" through the biotin-streptavidin interaction.

Addition of the substrate solution (TMB) enables colorimetric analysis.



### Objective/performance

- Intended for qualitative detection of allergen proteins in food products (or solution)
- Quantitative limit: 0.78 to 50 ng/mL (standard protein)

### Kit contents

- A : Microplate coated with antibodies (with lid)
- B : Standard solution (50 ng/mL)
- C : Dilution buffer
- D : Biotin-labeled antibody
- E : Streptavidin-peroxidase conjugate
- F : Substrate solution (TMB)
- G : Stop solution (0.5 N H<sub>2</sub>SO<sub>4</sub>)
- H : Wash buffer concentrate (10 times concentrated)
- I : Extraction buffer concentrate 1 (20 × concentrated)
- J : Extraction buffer concentrate 2 (20 × concentrated)
- K : Extraction buffer concentrate 3 (20 × concentrated)



### Additionally required materials and instruments

#### [Preparation of standards and buffers]

- ▶ Measuring cylinders, beakers, micropipettes, and disposable tips.

#### [Preparation of sample solution]

- ▶ Utensils to homogenize sample (grinder, mixer mill, etc.), balance, 50-mL plastic centrifuge tubes (with cap), shaking machine, centrifuge machine (recommended: capable of 3,000×g or higher at room temperature), filter paper, and funnel.

#### [Assay and data analysis]

- ▶ Micropipette, disposable tips, test tubes or micro tubes, blotting paper (paper towel), micro-plate reader (capable of reading at 450 and 600 - 650 nm), and analytical software (capable of 4-parameter analysis)

Note) Prevent contamination through experimental instruments: use disposable lab supplies, use of instruments which are not used for other purposes is recommended. In case the instruments used for other purposes are to be used in detection of allergen, wash proteins off their surfaces by washing with an alkaline detergent before use.

### Storage and expiration date

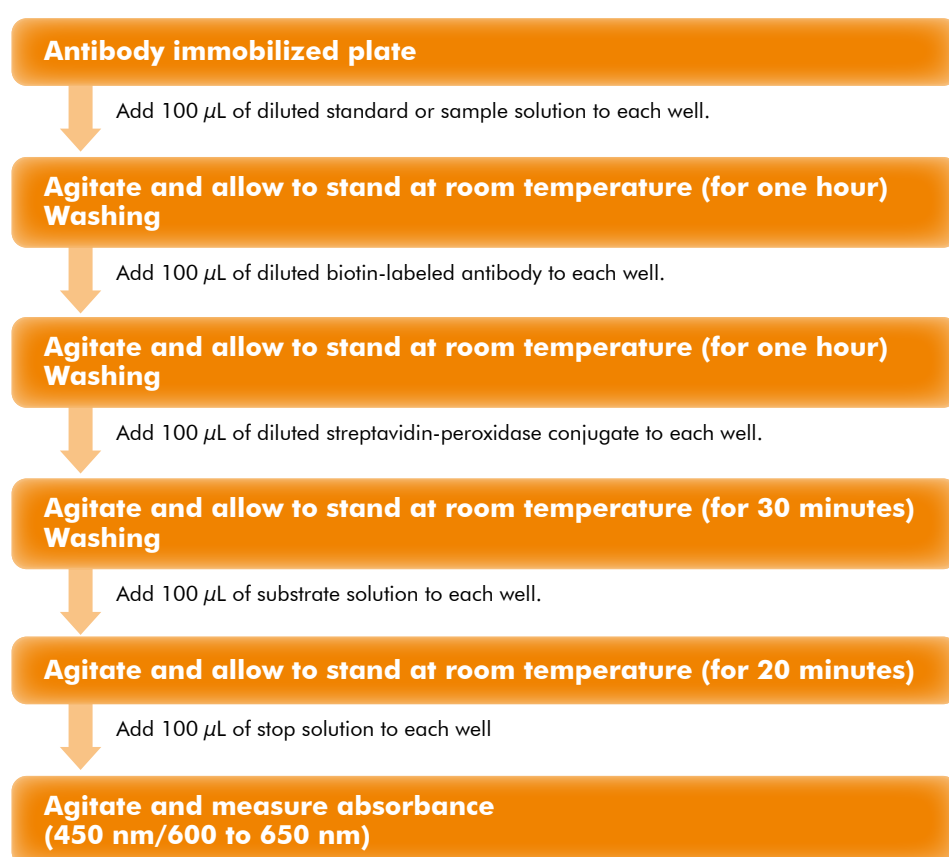
- 1) Storage: Store at refrigerated temperature (2 to 8°C) under protection from the light. Avoid freezing.
- 2) Expiration date: 6 months from the date of manufacture.

## Test procedures

### Extraction (Food product)



### ELISA assay



### FASTKIT ELISA Ver.III

Product	Storage	Package Size	Wako Cat. No.
FASTKIT ELISA Ver.III Egg	2-10°C	1 Kit	301-97811
FASTKIT ELISA Ver.III Milk	2-10°C	1 Kit	308-97821
FASTKIT ELISA Ver.III Wheat	2-10°C	1 Kit	305-97831
FASTKIT ELISA Ver.III Buckwheat	2-10°C	1 Kit	302-97841
FASTKIT ELISA Ver.III Peanut	2-10°C	1 Kit	309-97851
FASTKIT ELISA Ver.III Soy bean	2-10°C	1 Kit	387-06221
FASTKIT ELISA Ver.III Sesami	2-10°C	1 Kit	389-04581

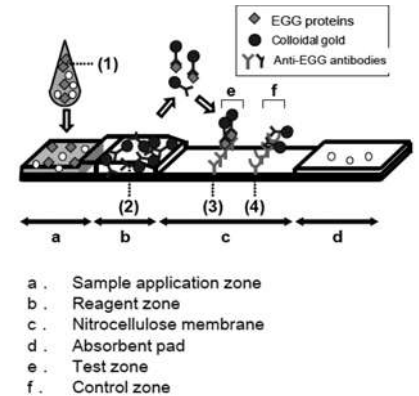
# Test Kits for Food Allergens

## FASTKIT Slim

- Screen samples for food allergen in 15 minutes.
- Reliable detection with simple handling.
- Clear interpretation of the results.
- Used widely in Japan.

### Principle of assay

1. When a sample solution is applied to the sample application zone of the test strip, it is wicked through reagent zone.
2. Proteins of target allergen (1) in the sample binds to the colloidal gold-labeled antibody (2) in the reagent zone.
3. The allergen-antibody complex flows through the nitrocellulose membrane which contains a zone of antibody specific to target allergen.
4. The immune complex is captured and concentrated in the zone (test zone) (3), eventually forms a reddish purple line.
5. The membrane also contains a control zone where the gold-labeled antibody is captured.
6. The control line forms in the control zone (4) regardless of the presence of allergen proteins in the sample solution. The control line ensures the test is working correctly.



### Objective/performance

- Intended for qualitative detection of allergen proteins in food products or solution
- Sample solution containing allergen at  $\geq 25$  ng/mL yields positive result

### Kit contents

A : Test strip	2 tests $\times$ 10 packs
B : Dilution Buffer	1
C : Extraction buffer concentrate (10 $\times$ concentrated)	1
D : Instruction manual	1
E : Plastic bag with zipper	1



### Additionally required materials and instruments

#### [1: Food samples]

Utensils to homogenize sample (grinder, mixer mill, homogenizer, etc.), balance 50 mL plastic centrifuge tubes (with cup) centrifuge (recommended: capable of  $\geq 3,000 \times g$  at 4°C), sedimentation tubes, filter paper, funnel, graduated cylinder, beaker, micropipettes, disposable tips, etc.

Note) To prevent contamination, wash the instruments to be used in the test thoroughly before use. Make sure to wash off proteins on the surfaces of homogenizers. (Washing with neutral detergent should be followed by overnight soaking or ultrasonic cleaning in alkaline detergent.)

#### [2: Surfaces]

Test tube, swab, swabbing solution, etc.

Note) 1) Users may use swabbing kits for microbiological tests. Users should refer to the composition of the solution provided with the kit to find it applicable or not.

2) Do not use the buffers provided with the kit (dilution buffer, extraction buffer) as swabbing solution. Avoid contamination of the manufacturing machines and devices by those buffers.

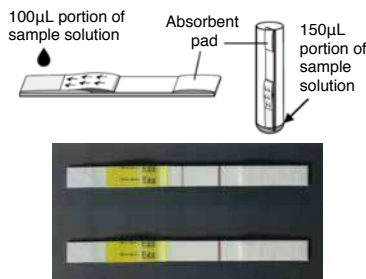
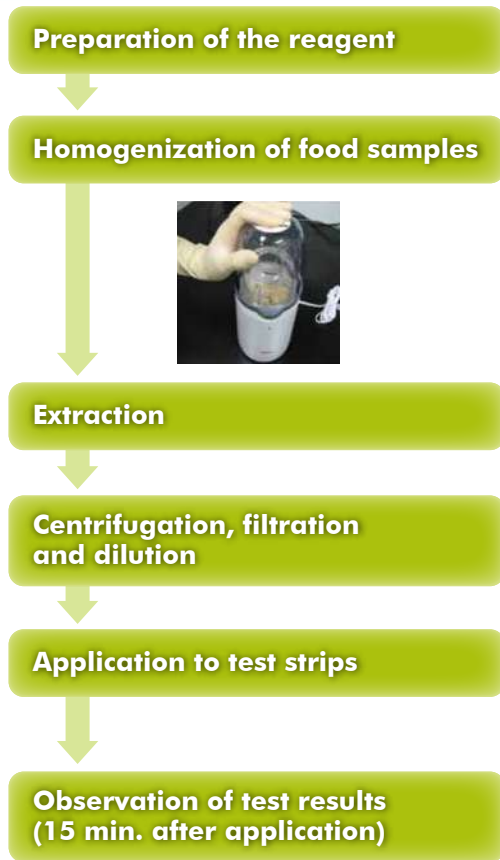
3) Sensitivity can vary depending on the amount of the swabbing solution. Recommended minimum volume of the swabbing solution is 1 mL. The users should determine the optimal volume of swabbing solution.

### Storage and expiration date

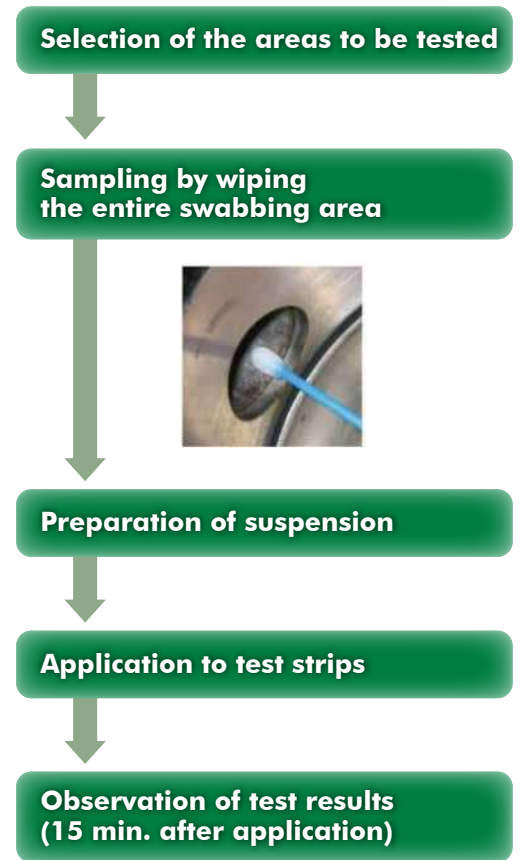
- 1) Storage: Store at refrigerated temperature (2 to 8°C) under protection from the light. Avoid freezing.
- 2) Expiration date: 12 months from the date of manufacture.

## Test procedures

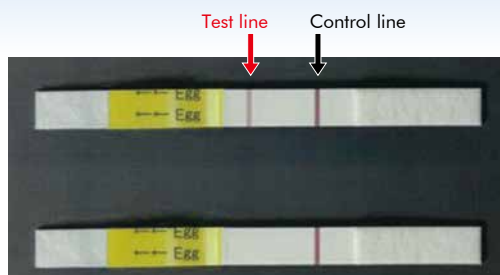
### Food samples



### Surfaces



## Interpretation of the test results



**Positive results:** Reddish purple lines appear in the test zone and the control zone in 15 minutes after application of sample solutions.

**Negative results:** A reddish purple line appears in the control zone.

\*Invalid results: No reddish purple line appears in the control zone.

## FASTKIT slim

Product	Storage	Package Size	Wako Cat. No.
FASTKIT slim Egg	2-10 °C	20 tests	300-88231
FASTKIT slim Milk	2-10 °C	20 tests	307-88241
FASTKIT slim Wheat	2-10 °C	20 tests	304-88251
FASTKIT slim Buckwheat	2-10 °C	20 tests	301-88261
FASTKIT slim Peanut	2-10 °C	20 tests	308-88271
FASTKIT slim Soy bean	2-10 °C	20 tests	305-88281

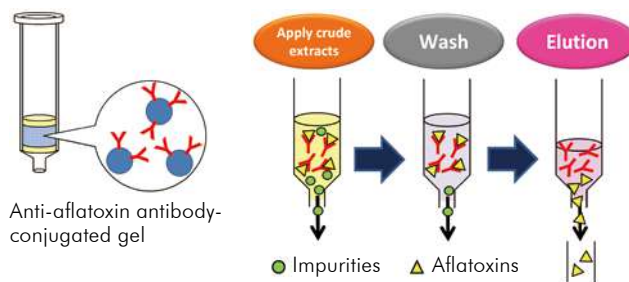
# Immunoaffinity column for aflatoxin

## MycoCatch total Aflatoxin

- Applicable to a wide range of food products such as grains, nuts, seeds, fruits, legumes, spices and processed foods.
- Excellent organic solvent tolerance: crude extracts containing high concentration of organic solvent (up to 40% methanol or 10% acetonitrile) can be purified.
- Superior liquid permeability and excellent recovery enable high yield in short operating time.
- Capable of purification of aflatoxins B<sub>1</sub>, B<sub>2</sub>, G<sub>1</sub>, G<sub>2</sub>, and M<sub>1</sub>.

### Principle of assay

1. The crude extract is applied to the column.
2. Aflatoxins in the crude extract bind to the anti-aflatoxin antibody-conjugated gel in the column and thus the aflatoxins are retained in the column. Impurities in the crude extract pass through without binding to the gel.
3. Washing the column with purified water removes impurities further.
4. An organic solvent is applied to the column to denature the antibody and aflatoxins are eluted.
5. A purified and concentrated aflatoxin solution is obtained.



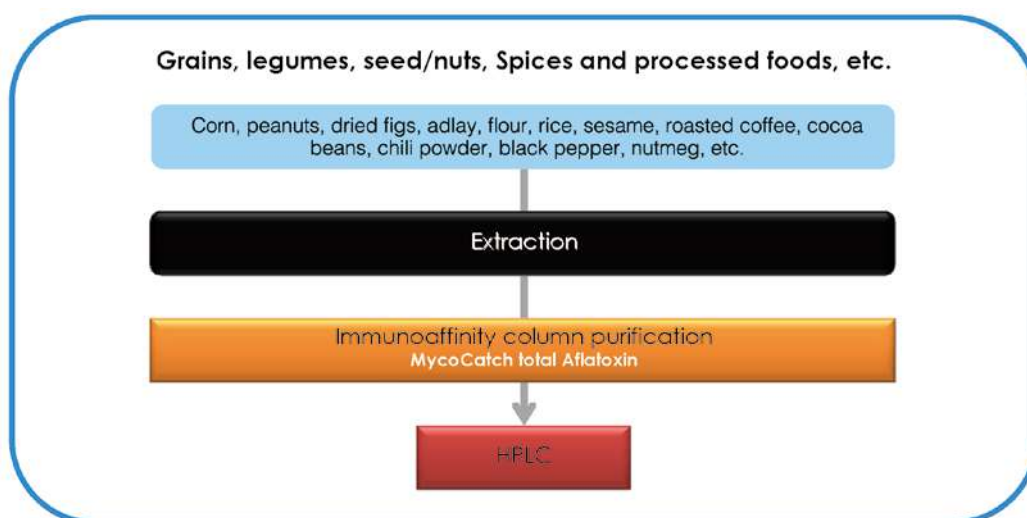
### Kit contents

A : Anti-aflatoxin monoclonal antibody-conjugated gel packed column 5columns × 4packs



### Storage and expiration date

- 1) Storage: Store at refrigerated temperature (2 to 8°C). Avoid freezing.
- 2) Expiration date: 12 months from the date of manufacture.



## MycoCatch total Aflatoxin

Product	Storage	Package Size	Wako Cat. No.
MycoCatch total Aflatoxin	2-10°C	20 units	389-02401



# Wako Products List

## Food analysis

Pesticide Residue Analysis

Food Components and Additives

Genetic Testing

As Japan's leading reagent company  
Wako Pure Chemical Industries, Ltd.,  
we believe in supporting your R&D endeavors and addressing  
next generation needs through continued  
excellence in technology and quality.

The Wako logo consists of a solid red square with the word "Wako" written in white, bold, sans-serif font in the center.

# Pesticide Residue Analysis

## Pesticide Mixture Standard Solutions

Product Name	Test components	Storage	Analysis equipment	Pkg. Size	Wako Cat.No.
Pesticide Mixture Standard Solution PL-1-2 (20µg/mL each in acetone solution)	31	-20°C	GC/MS	1 mL × 5A 1 mL	161-26643 165-26641
Pesticide Mixture Standard Solution PL-2-1 (20µg/mL each in acetone solution)	31	-20°C	GC/MS	1 mL × 5A 1 mL	168-22971 164-22973
Pesticide Mixture Standard Solution PL-3-3 (20µg/mL each in acetone solution)	27	-20°C	GC/MS	1 mL × 5A 1 mL	162-26673 166-26671
Pesticide Mixture Standard Solution PL-4-2 (20µg/mL each in acetone solution)	36	-20°C	GC/MS	1 mL × 5A 1 mL	166-24591 162-24593
Pesticide Mixture Standard Solution PL-5-1 (20µg/mL each in acetone solution)	37	-20°C	GC/MS	1 mL × 5A 1 mL	169-23001 165-23003
Pesticide Mixture Standard Solution PL-6-3 (20µg/mL each in acetone solution)	35	-20°C	GC/MS	1 mL × 5A 1 mL	169-24601 165-24603
Pesticide Mixture Standard Solution PL-7-2 (20µg/mL each in acetone solution)	29	-20°C	LC/MS	1 mL × 5A 1 mL	163-23021 169-23023
Pesticide Mixture Standard Solution PL-8-1 (20µg/mL each in acetone solution)	21	-20°C	LC/MS	1 mL × 5A 1 mL	160-23031 166-23033
Pesticide Mixture Standard Solution PL-10-1 (20µg/mL each in acetone solution)	9	-20°C	GC/MS	1 mL × 5A 1 mL	164-23051 160-23053
Pesticide Mixture Standard Solution PL-12-1 (20µg/mL each in acetone solution)	26	-20°C	GC/MS	1 mL × 5A 1 mL	161-23941 167-23943
Pesticide Mixture Standard Solution PL-13-1 (20µg/mL each in acetone solution)	15	-20°C	GC/MS	1 mL × 5A 1 mL	168-23951 164-23953
Pesticide Mixture Standard Solution PL-14-2 (20µg/mL each in acetone solution)	30	-20°C	LC/MS	1 mL × 5A 1 mL	165-23961 161-23963
Pesticide Mixture Standard Solution PL-15-1 (20µg/mL each in acetone solution)	28	-20°C	LC/MS	1 mL × 5A 1 mL	162-23971 168-23973
Pesticide Mixture Standard Solution PL-16-2 (20µg/mL each in acetone solution)	30	-20°C	LC/MS	1 mL × 5A 1 mL	169-23981 165-23983
Pesticide Mixture Standard Solution PL-17-2 (20µg/mL each in acetone solution)	29	-20°C	LC/MS	1 mL × 5A 1 mL	168-23691 164-23693
Veterinary Drug Mixture Standard Solution PL-1-3 (20µg/mL each in methanol solution)	21	-20°C	LC/MS	1 mL × 5A 1 mL	220-01681 226-01683
Veterinary Drug Mixture Standard Solution PL-2-1 (20µg/mL each in methanol solution)	24	-20°C	LC/MS	1 mL × 5A 1 mL	227-01691 223-01693

The composition of these products are based on multiresidue methods notified by MHLW on November 29, 2005.

Reference URL of multiresidue methods : <http://www.mhlw.go.jp/english/topics/foodsafety/positivelist060228/dl/060526-1a.pdf>

Examples of products combination for Multiresidue Method	Corresponding Products (Brevity Code)
Multiresidue Method for Agricultural Chemicals by GC/MS (Agricultural Products)	Pesticide/PL-1, 2, 3, 4, 5, 6, 11, 12
Multiresidue Method for Agricultural Chemicals by GC/MS (Animal and Fishery Products) [muscle, fat, liver, kidney, and fishery products]	Pesticide/PL-1, 2, 3, 9, 11, 12, 13
Multiresidue Method for Agricultural Chemicals by GC/MS (Animal and Fishery Products) [milk, egg and honey]	Pesticide/PL-1, 2, 3, 9, 10, 11, 12, 13
Multiresidue Method I for Agricultural Chemicals by LC/MS (Agricultural Products).	Pesticide/PL-7, 14, 15
Multiresidue Method II for Agricultural Chemicals by LC/MS (Agricultural Products).	Pesticide/PL-8, 16
Multiresidue Method for Agricultural Chemicals by LC/MS (Animal and Fishery Products) [muscle, fat, liver, kidney, and fishery products]	Pesticide/PL-7, 15, 17
Multiresidue Method for Agricultural Chemicals by LC/MS (Animal and Fishery Products) [milk, egg and honey]	Pesticide/PL-7, 15, 17
Multiresidue Method I for Veterinary Drugs, etc. by HPLC (Animal and Fishery Products)	Veterinary/PL-1, -2
Multiresidue Method II for Veterinary Drugs, etc. by HPLC (Animal and Fishery Products)	Veterinary/PL-2
Multiresidue Method III for Veterinary Drugs, etc. by HPLC (Animal and Fishery Products)	Veterinary/PL-2

### Test component List

#### Pesticide Mixture Standard Solution PL-1-2 (20µg/mL each in acetone solution)

No.	Component Name	No.	Component Name	No.	Component Name	No.	Component Name	No.	Component Name
1	Omethoate	8	Chlorpyrifos-methyl	15	Procymidone	22	Norflurazon	29	Cyfluthrin
2	Trifluralin	9	Terbutryn	16	Methidathion (DMTP)	23	Diflufenican	30	Flucythrinate
3	Dimethoate	10	Benthiocarb	17	Fenamiphos	24	Bifenthrin	31	Fluvalinate
4	Atrazine	11	Malathion (Malathon)	18	Oxadiazon	25	Azinphos-methyl		
5	Terbufos	12	Fenpropimorph	19	Kresoxim-methyl	26	Fenarimol (Bloc)		
6	Tefluthrin (frebane)	13	Pendimethalin	20	Chlorfenapyr	27	trans -Permethirn		
7	Spiroxamine	14	Penconazole	21	Pyrethrin I, II	28	cis -Permethirn		

#### Pesticide Mixture Standard Solution PL-2-1 (20µg/mL each in acetone solution)

No.	Component Name	No.	Component Name	No.	Component Name	No.	Component Name	No.	Component Name
1	Propoxur (PHC)	8	Fenitrothion (MEP)	15	Tetrachlorvinphos (CVMP)	22	Hexazinone	29	Fenbuconazole
2	Carbofuran	9	Metolachlor	16	Isoprothiolane	23	Propargite (BPPS)	30	Fluridone
3	Quintozene (PCNB)	10	Fenthion (MPP)	17	Myclobutanil	24	Phosmet (PMP)	31	Difenoconazole
4	Propyzamide	11	Isofenphos Oxon	18	Buprofezin	25	Methoxychlor		
5	Triallate	12	Chlorfenvinphos (E, Z-)	19	Cyproconazole	26	Pyriproxyfen		
6	Vinclozolin	13	Isofenphos	20	Ethion	27	Pyraclifos		
7	Alachlor	14	Triadimenol	21	Propiconazole	28	Fluquinconazole		

## Pesticide Mixture Standard Solution PL-3-3 (20µg/mL each in acetone solution)

No.	Component Name	No.	Component Name	No.	Component Name	No.	Component Name	No.	Component Name
1	Ethoprop (Ethoprophos)	7	Chlorpyrifos	13	Profenofos	19	Acetamidrid	25	Cypermethrin
2	Simazine (CAT)	8	Parathion	14	Oxyfluorfen	20	Phenisobromolate	26	Fenvalerate
3	Diazinon	9	Triadimefon	15	Chlorobenzilate	21	Fenpropathrin	27	Deltamethrin
4	Propanil (DCPA)	10	Allethrin (Bioallethrin)	16	Triazophos	22	Cyhalothrin		
5	Methylparathion	11	Fipronil	17	Quinoxifen	23	Bitertanol		
6	Pirimiphos-methyl	12	Flutolanil	18	Tebuconazole	24	Pyridaben		

## Pesticide Mixture Standard Solution PL-4-2 (20µg/mL each in acetone solution)

No.	Component Name	No.	Component Name	No.	Component Name	No.	Component Name	No.	Component Name
1	Mevinphos	9	Dimethenamid	17	Phenthoate (PAP)	25	Fluacrypyrim	33	Mefenacet
2	Tecnazene	10	Tolclofos-methyl	18	Butachlor	26	Lenacil	34	Halfenprox
3	Ethalfuralin	11	Ametryn	19	Uniconazole P	27	(E)-Pyriminobac-methyl	35	Tralomethrin
4	Monocrotophos	12	Diethofencarb	20	Pretilachlor	28	Mefenpyr-diethyl	36	Imibenconazole
5	Dicloran (CNA)	13	Chlorthal-dimethyl (Dacthal)	21	Azakonazole	29	Pyridaphenthion		
6	Pyroquilon	14	Fthalide	22	Bupirimate	30	Etoazole		
7	Phosphamidon	15	Fosthiazate	23	Imazamethabenz Methyl Ester	31	Anilofos		
8	δ-BHC	16	Dimepiperate	24	(Z)-Pyriminobac-methyl	32	Tetradifon		

## Pesticide Mixture Standard Solution PL-5-1 (20µg/mL each in acetone solution)

No.	Component Name	No.	Component Name	No.	Component Name	No.	Component Name	No.	Component Name
1	Isoprocarb (MIPC)	9	Acetochlor	17	Diclocymet	24	Isoxathion	32	Bifenox
2	Propachlor	10	Simetryn	18	(E)-Pyrifeno	25	Fensulfotion	33	Phosalone
3	Chloroprotham (Chloro IPC)	11	Prometryn	19	Fenothiocarb	26	Mepronil	34	Acrinathrin
4	Cadusafos	12	Esprocarb	20	Prothiofos	27	Benalaxyl	35	Ethofenprox
5	Pyrimethanil	13	(Z)-Dimethylvinphos	21	Tricyclazole	28	Pyraflufen-ethyl	36	Flumiclorac-pentyl
6	Terbacil	14	Tetraconazole	22	Tribfos (DEF)	29	Thenylchlor	37	Fluthiacet-methyl
7	Iprobenfos (IBP)	15	Bromophos	23	Imibenconazole-debenzyl	30	Zoxamide		
8	Benfuresate	16	Dimethametryn			31	EPN		

## Pesticide Mixture Standard Solution PL-6-3 (20µg/mL each in acetone solution)

No.	Component Name	No.	Component Name	No.	Component Name	No.	Component Name	No.	Component Name
1	XMC	8	Bromobutide	15	(Z)-Pyrifeno	22	Fenoxanil	29	Tebufenpyrad
2	Benfluralin (Bethrodine)	9	Mefenoxam(Metalaxy-M)	16	Quinalphos	23	Oxadixyl	30	Phenothrin (Sumithrin)
3	Propazine	10	Bromacil	17	Paclobutrazol	24	Edifenphos (EDDP)	31	Cyhalofop-butyl
4	Cyanophos (CYAP)	11	Quinoclamine (ACN)	18	Napropamide	25	Trifloxystrobin	32	Pyrazophos
5	Prohydrojasmon	12	Cyanazine	19	Butamifos	26	Diclofop-methyl	33	Cafenstrole
6	Benoxacor	13	Nitrothal-isopropyl	20	Hexaconazole	27	Pyributicarb	34	Flumioxazin
7	Dichlofenthion (ECP)	14	Diphenamid	21	Flamprop-methyl	28	Piperophos	35	Tolfenpyrad

## Pesticide Mixture Standard Solution PL-7-2 (20µg/mL each in acetonitrile solution)

No.	Component Name	No.	Component Name	No.	Component Name	No.	Component Name	No.	Component Name
1	Thiamethoxam	7	Dimethirimol	13	Methoxyfenozide	19	Cyazofamid	25	Indoxacarb (Indoxacarb-MP)
2	Clothianidin	8	Isoxaflutole	14	Iprovalicarb	20	Naproanilide	26	Benzenfenap
3	Chloridazon (PAC)	9	Azinphos-methyl	15	Chromafenozide	21	Fenoxycarb	27	Furathiocarb
4	Thiacloprid	10	Pyrifitalid	16	Butafenacil	22	Anilofos	28	Cloquintocet-mexyl
5	Thiabendazole	11	(E)-Ferimzone	17	Simeconazole	23	Cyflufenamid	29	Abamectin B1a
6	Azamehiphos	12	(Z)-Ferimzone	18	Oryzalin	24	Pyrazolynate (Pyrazolate)		

## Pesticide Mixture Standard Solution PL-8-1 (20µg/mL each in acetonitrile solution)

No.	Component Name	No.	Component Name	No.	Component Name	No.	Component Name	No.	Component Name
1	Flumetsulam	6	Thidiazuron	11	4-Chlorophenoxyacetic Acid (4-CPA)	15	Ioxynil	20	Acifluorfen
2	Thifensulfuron-methyl	7	Forchlorfenuron	12	Bromoxynil	16	Triclopyr	21	Fomesafen
3	Florasulam	8	Haloxifop	13	1-Naphthaleneacetic Acid	17	Mecoprop (MCP)		
4	Cloransulam-methyl	9	Gibberellin (Gibberellin A3)	14	Clopropr	18	Dichlorprop		
5	Diclosulam	10	Fluroxypyr			19	MCPB		

## Pesticide Mixture Standard Solution PL-10-1 (20µg/mL each in acetone solution)

No.	Component Name	No.	Component Name	No.	Component Name	No.	Component Name
1	Aldicarb (deg.)	3	Acephate	6	Carbaryl (NAC)	9	Azoxystrobin
2	Aldoxycarb (Aldicarb sulfone) (deg.)	4	Bendiocarb	7	Metalaxyl		
		5	Metribuzin	8	Thiabendazole		

## Pesticide Mixture Standard Solution PL-12-1 (20µg/mL each in acetone solution)

No.	Component Name	No.	Component Name	No.	Component Name	No.	Component Name	No.	Component Name
1	Chlorethoxyfos	7	Formothion	13	Bromophos-ethyl	19	1,1-Dichloro-2,2-bis (4-ethylphenyl)ethane	24	Fenamidon
2	Diclotophos	8	Fenchlorphos	14	Chromaphos	20	Flufenpyr-ethyl	25	Spirodiclofen
3	Phorate	9	Ethofumesate	15	Chlorbenside	21	Carfentrazone-ethyl	26	Cinidon-ethyl
4	Clomazone	10	1-Naphthylacetamide	16	Flutriafol	22	Epoxiconazole		
5	Isazophos	11	Methoprene	17	Chlorofenson (CPCBS)	23	Picolinafen		
6	Ethylthiomethone	12	Mecarbam	18	Carboxin				

## Pesticide Mixture Standard Solution PL-13-1 (20µg/mL each in acetone solution)

No.	Component Name	No.	Component Name	No.	Component Name	No.	Component Name	No.	Component Name
1	Nitrapyrin	4	Oxabetrinil	7	Triflumizole	10	Furathiocarb	13	Thiacloprid
2	Methacrifos	5	S-Metolachlor	8	Azamehiphos	11	Triticonazole	14	Famoxadone
3	Tebuthiuron	6	Flufenacet	9	Resmethrin	12	Boscalid	15	Propaquizafop

## Pesticide Mixture Standard Solution PL-14-2 (20µg/mL each in acetonitrile solution)

No.	Component Name	No.	Component Name	No.	Component Name	No.	Component Name	No.	Component Name
1	Methomyl	7	Methabenzthiazuron	13	Cumyluron	19	Carpropamid	25	Oxaziclomefone
2	Imidacloprid	8	Furametpyr	14	Chloroxuron	20	Imazalil	26	Fenoxaprop-ethyl
3	Oxycarboxin	9	Azoxystrobin	15	Mepanipyrim	21	Pencycuron	27	Flufenoxuron
4	Bendiocarb	10	Methiocarb	16	Triticonazole	22	Hexaflumuron	28	Cycloprothrin
5	Thiodicarb	11	Acibenzolar-S-methyl	17	Indanofan	23	Cycloate	29	Spinosad
6	Pirimicarb	12	Dymron (Daimuron)	18	Tetrachlorvinphos (CVMP)	24	Pentoxazon	30	Silafluofen

## Pesticide Mixture Standard Solution PL-15-1 (20µg/mL each in acetonitrile solution)

No.	Component Name	No.	Component Name	No.	Component Name	No.	Component Name	No.	Component Name
1	Aldoxycarb (Aldicarb Sulfone)	7	Monolinuron	13	Diflubenzuron	19	Propaquizafop	25	Boscalid
2	Oxamyl	8	Fluridone	14	Cyprodinil	20	(Z)-Fenpyroximate	26	Tebufenozide
3	Aldicarb	9	Dimetomorph	15	Triflumuron	21	Hexythiazox	27	Novalron
4	Carbofuran	10	Fenamidon	16	Clofentezine	22	(E)-Fenpyroximate	28	Teflubenzuron
5	Tebuthiuron	11	Flufenacet	17	Quizalofop-ethyl	23	Diuron (DCMU)		
6	Carbaryl (NAC)	12	Epoxiconazole	18	Lufenuron	24	Linuron		

## Pesticide Mixture Standard Solution PL-16-2 (20µg/mL each in acetonitrile solution)

No.	Component Name	No.	Component Name	No.	Component Name	No.	Component Name	No.	Component Name
1	Metsulfuron-methyl	7	Imazosulfuron	13	Trifloxysulfuron	19	Sulfentrazone	25	Cyclosulfamuron
2	Azimsulfuron	8	Triasulfuron	14	Iodosulfuron-methyl	20	Prosulfuron	26	Fenhexamid
3	Cinosulfuron	9	Mesosulfuron-methyl	15	Metosulam	21	Fluazifop	27	Halosulfuron-methyl
4	Sulfosulfuron	10	Ethamsulfuron-methyl	16	Penoxsulam	22	Triflusulfuron-methyl	28	2,4-D (2,4-PA)
5	Propoxycarbazone	11	Pyrazosulfuron-ethyl	17	Chlorimuron-ethyl	23	Bensulfuron-methyl	29	MCPA (MCP)
6	Flazasulfuron	12	Naptalam	18	Ethoxysulfuron	24	Primsulfuron-methyl	30	Clodinafopacid

## Pesticide Mixture Standard Solution PL-17-2 (20µg/mL each in acetonitrile solution)

No.	Component Name	No.	Component Name	No.	Component Name	No.	Component Name	No.	Component Name
1	Pymetrozine	7	Ametryn	13	Clodinafop-propargyl	19	Pyrazophos	25	Chlorfluazuron
2	3-Hydroxycarbofuran	8	Pyrimethanil	14	Carfentrazone-ethyl	20	Trifloxystrobin	26	Amitraz
3	Carbetamide	9	Barban	15	Benalaxyl	21	Triflumizole	27	Carbosulfan
4	Bromacil	10	Flamprop-methyl	16	Mefenpyr-diethyl	22	Benfuracarb	28	Fenpropimorph
5	Oxabetrinil	11	Trifl. umizole Metabolite	17	Pyraclostrobin	23	Fluazuron	29	Cymoxanil
6	Chlorbufam	12	Prometryn	18	Phoxim	24	Etoazole		

## Veterinary Drug Mixture Standard Solution PL-1-3 (20µg/mL each in methanol solution)

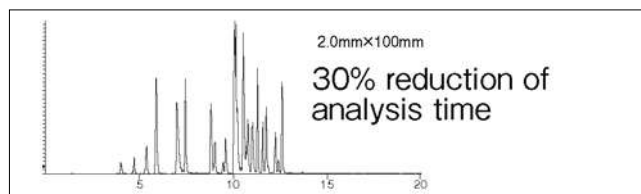
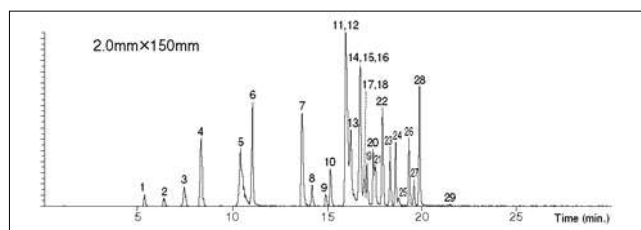
No.	Component Name	No.	Component Name	No.	Component Name	No.	Component Name	No.	Component Name
1	Lincomycin	6	Pyrimethamine	11	Hydrocortisone	16	Temephos (Abate)	21	Clorsulon
2	Sulfacetamide	7	Trichlorfon (DEP)	12	Dexamethasone	17	Allethrin		
3	Danofloxacin	8	Tilmicosin	13	Emamectin B1a	18	Monensin		
4	Xylazine	9	Tiamulin	14	Famphur	19	Florfenicol		
5	Clenbuterol	10	Prednisolone	15	Fenobucarb (BPMC)	20	2-Acetylamino-5-nitrothiazole		

## Veterinary Drug Mixture Standard Solution PL-2-1 (20µg/mL each in methanol solution)

No.	Component Name	No.	Component Name	No.	Component Name	No.	Component Name	No.	Component Name
1	5-Propylsulfonyl-1H-benzimidazole-2-amine	5	Sulfadiazine	10	Thiamphenicol	15	Sulfamethoxazole	20	Sulfanitran
2	Levamisole	6	Ormetoprim	11	Sulfadimidine	16	Sulfadoxine	21	β-Trenbolone
3	Thiabendazole	7	Sulfathiazole	12	Sulfamethoxyypyridiazine	17	Ethopabate	22	α-Trenbolone
4	Trimethoprim	8	Sulfapyridine	13	Sulfamonomethoxine	18	Sulfaquinoxaline	23	Melengestrol Acetate
		9	Sulfamerazine	14	Sulfachlorpyridazine	19	Sulfadimethoxine	24	Zeranol

## Simultaneous LC/MS/MS analysis of pesticides under positive list system

## Pesticide mixture standard solution PL-7-2

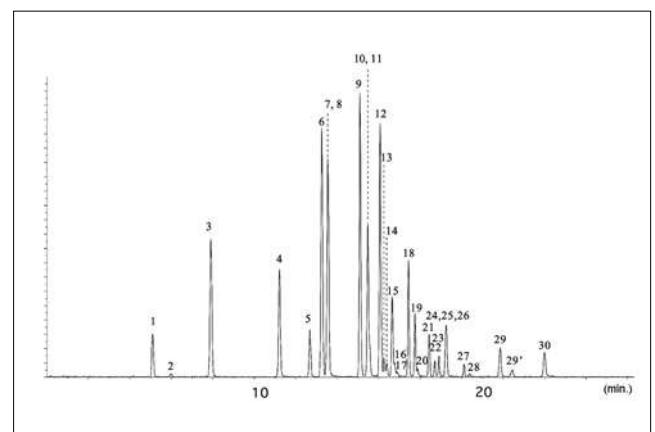


[Pos. mode: 29 components]  
[Column : Wakopak® Wakosil-II 3C18 HG]

## [Analytical columns]

Product Name	Column Type	Size	Wako Cat.No.
Wakopak® Wakosil-II 3C18 HG	DuPont Waters	2.0×150 mm	231-50241 237-50243

## Pesticide Mixture Standard Solution L-14-2



[Pos. mode: 30 components]  
[Column : Wakopak® Wakosil-II 3C18 HG]

## Veterinary Drug Mixture Standard Solution

Veterinary drugs used for prevention and treatment of diseases in livestock can remain in the livestock meat, thereby posing a risk to humans consuming the meat.

Product Name	Test components	Storage	Grade	Pkg. Size	Wako Cat. No.
Veterinary Drug Mixture Standard Solution (Quinolone) (20 $\mu$ g/mL each)	13	-20 $^{\circ}$ C	for High Performance Liquid Chromatography	1 mL $\times$ 5A 1 mL	223-02053 227-02051
Veterinary Drug Mixture Standard Solution (Sulfonamide+Antifolate) (20 $\mu$ g/mL each)	27	-20 $^{\circ}$ C	for High Performance Liquid Chromatography	1 mL $\times$ 5A 1 mL	224-02083 228-02081
Veterinary Drug Mixture Standard Solution (Macrolide) (20 $\mu$ g/mL each in acetonitrile solution)	7	-20 $^{\circ}$ C	for High Performance Liquid Chromatography	1 mL $\times$ 5A 1 mL	221-02093 225-02091
Veterinary Drug Mixture Standard Solution (Dye) (20 $\mu$ g/mL each in methanol solution)	3	-20 $^{\circ}$ C	for High Performance Liquid Chromatography	1 mL $\times$ 5A 1 mL	224-02103 228-02101
Veterinary Drug Mixture Standard Solution (Hormone) (20 $\mu$ g/mL each in acetonitrile solution)	6	-20 $^{\circ}$ C	for High Performance Liquid Chromatography	1 mL $\times$ 5A 1 mL	224-02201 220-02203

### Test component List

Veterinary Drug Mixture Standard Solution (Quinolone) (20 $\mu$ g/mL each)

No.	Component Name	No.	Component Name	No.	Component Name	No.	Component Name	No.	Component Name
1	Marbofloxacin	4	Ciprofloxacin	7	Orbifloxacin	10	Oxolinic acid	13	Piromidic acid
2	Norfloxacin	5	Danofloxacin	8	Sarafloxacin	11	Nalidixic acid		
3	Ofloxacin	6	Enrofloxacin	9	Diffloxacin	12	Flumequine		

Veterinary Drug Mixture Standard Solution (Sulfonamide+Antifolate) (20 $\mu$ g/mL each)

No.	Component Name	No.	Component Name	No.	Component Name	No.	Component Name	No.	Component Name
1	Sulfanilamide	7	Ormetoprim	13	Sulfadimidine	19	Sulfadoxine	25	Sulfaquinoxaline
2	Sulfacetamide	8	Sulfathiazole	14	Sulfamethoxyppyridazine	20	Sulfatroxazole	26	Sulfanitran
3	Diaveridine	9	Sulfapyridine	15	Pyrimethamine	21	Sulfaethoxyppyridazine	27	Sulfabromomethazine
4	Sulfisomidine	10	Sulfamerazine	16	Sulfamonomethoxine	22	Sulfisoxazole		
5	Sulfadiazine	11	Sulfisozole	17	Sulfachlorpyridazine	23	Sulfabenzamide		
6	Trimethoprim	12	Sulfamethoxydiazine	18	Sulfamethoxazole	24	Sulfadimethoxine		

Veterinary Drug Mixture Standard Solution (Macrolide) (20 $\mu$ g/mL each in acetonitrile solution)

No.	Component Name	No.	Component Name	No.	Component Name	No.	Component Name
1	Neospiramycinl	3	Tilmicosin	5	Tylosin	7	Leucomysin A <sub>5</sub>
2	Spiramycinl	4	Erythromycin A	6	Tiamulin		

Veterinary Drug Mixture Standard Solution (Dye) (20 $\mu$ g/mL each in methanol solution)

No.	Component Name	No.	Component Name	No.	Component Name
1	Methylene blue	2	Crystal violet	3	Brilliant green

Veterinary Drug Mixture Standard Solution (Hormone) (20 $\mu$ g/mL each in acetonitrile solution)

No.	Component Name	No.	Component Name	No.	Component Name	No.	Component Name
1	Prednisolone	3	$\beta$ -Trenbolone	4	$\alpha$ -Trenbolone	5	Zeranol
2	Methylprednisolone					6	Clostebol

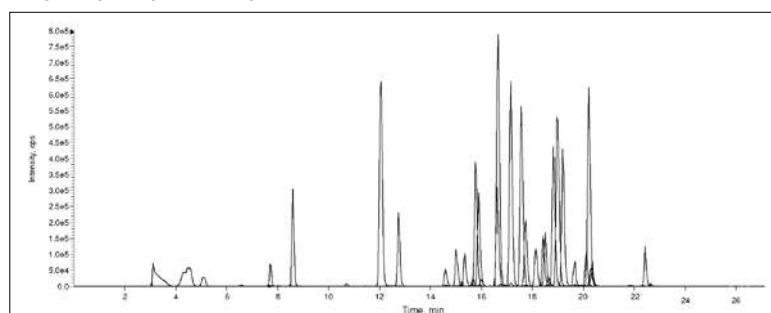
## Organophosphorus Pesticide Mixture Standard Solution [FA series]

Organophosphorus pesticides have been detected in imported frozen goods.

Product Name	Test components	Storage	Grade	Pkg. Size	Wako Cat. No.
Organophosphorus Pesticide Mixture Standard Solution FA-1 (20 $\mu$ g/mL each)	24	-20 $^{\circ}$ C	for Pesticide Residue Analysis	1 mL	152-02931
Organophosphorus Pesticide Mixture Standard Solution FA-2 (20 $\mu$ g/mL each)	22	-20 $^{\circ}$ C	for Pesticide Residue Analysis	1 mL	159-02941
Organophosphorus Pesticide Mixture Standard Solution FA-3 (20 $\mu$ g/mL each in acetone solution)	10	-20 $^{\circ}$ C	for Pesticide Residue Analysis	1 mL	156-02951

## Simultaneous LC/MS/MS analysis of organophosphorus pesticides

Organophosphorus pesticide mixture standard solution FA Series



[Column : Wakopak<sup>®</sup> Wakosil-II 3C18 HG]

[Analytical columns]

Product Name	Column Type	Size	Wako Cat. No.
Wakopak <sup>®</sup> Wakosil-II 3C18 HG	DuPont Waters	2.0 $\times$ 150 mm	231-50241 237-50243

## Test component List

## Organophosphorus Pesticide Mixture Standard Solution FA-1 (20µg/mL each)

No.	Component Name	No.	Component Name	No.	Component Name	No.	Component Name
1	DDVP (Dichlorvos)	6	Diazinon	11	(E)-Dimethylvinphos	16	β-CVP [(Z)-Chlorfenvinphos]
2	Methamidophos	7	IBP (Iprobenfos)	12	Malathion	17	Fosthiazate
3	Acephate	8	CYAP (Cyanophos)	13	(Z)-Dimethylvinphos	18	Propaphos
4	Cadusafos	9	Chlorpyrifosmethyl	14	α-CVP [(E)-Chlorfenvinphos]	19	Profenofos
5	Salithion	10	Pirimiphos-methyl	15	Quinalphos	20	Ethion
						21	EDDP (Edifenphos)
						22	CYP (Cyanofenphos)
						23	Pyridaphenthion
						24	Phosalone

## Organophosphorus Pesticide Mixture Standard Solution FA-2 (20µg/mL each)

No.	Component Name	No.	Component Name	No.	Component Name	No.	Component Name
1	Ethoprophos	6	ECP (Dichlofenthion)	11	MPP (Fenthion)	16	DMTP (Methidathion)
2	Phorate	7	Dimethoate	12	MEP (Fenitrothion)	17	Butamifos
3	Thiometon	8	Tolclofos-methyl	13	Isofenphos	18	Sulprofos
4	Terbufos	9	Chlorpyrifos	14	PAP (Phenthoate)	19	Fensulfiothion
5	Etrifos	10	Formothion	15	Prothiofos	20	EPN
						21	PMP (Phosmet)
						22	Pyraclofos

## Organophosphorus Pesticide Mixture Standard Solution FA-3 (20µg/mL each in acetone solution)

No.	Component Name	No.	Component Name	No.	Component Name	No.	Component Name
1	Omethoate	3	Monocrotophos	5	Fenamiphos	7	Vamidathion
2	Ethylthiomethon (Disulfoton)	4	Bromophos-ethyl	6	Isoxathion	8	Azinphos-methyl
						9	Azinphos-ethyl
						10	Coumaphos

## TraceSure, Traceable Reference Material

TraceSure is an agricultural chemical reference substance for volumetric analysis. It is a certified reference material that has obtained ASNITE (Guide34) at Wako. It is harmonized to the international MRA of APLAC.

## TraceSure

Product Name	Storage	Grade	Pkg. Size	Wako Cat.No.
Acephate Reference Material	2-10°C	TraceSure	100 mg	010-23681
Alachlor Reference Material	2-10°C	TraceSure	100 mg	011-24211
Anilofos Reference Material	2-10°C	TraceSure	100 mg	013-23671
Asulam Reference Material	2-10°C	TraceSure	100 mg	016-23661
Atrazine Reference Material	2-10°C	TraceSure	100 mg	019-23651
Bensulfuron-methyl Reference Material	2-10°C	TraceSure	100 mg	024-17271
Bensulide Reference Material	2-10°C	TraceSure	100 mg	021-17301
Bentazone Reference Material	2-10°C	TraceSure	100 mg	025-17681
Benthiocarb Reference Material	2-10°C	TraceSure	100 mg	023-17241
Bethrodine Reference Material	2-10°C	TraceSure	100 mg	028-17291
Bifenox Reference Material	2-10°C	TraceSure	100 mg	027-17261
Bifenthrin Reference Material	2-10°C	TraceSure	100 mg	021-17661
BPMC Reference Material	2-10°C	TraceSure	100 mg	020-17251
Butamifos Reference Material	2-10°C	TraceSure	100 mg	028-17671
Carbofuran Reference Material	2-10°C	TraceSure	100 mg	037-22571
Carboxin Reference Material	2-10°C	TraceSure	100 mg	031-23331
CAT Reference Material	2-10°C	TraceSure	100 mg	030-22561
Chlorfenapyr Reference Material	2-10°C	TraceSure	100 mg	039-22531
Chlorfluazuron Reference Material	2-10°C	TraceSure	100 mg	037-22071
Chloro IPC Reference Material	2-10°C	TraceSure	100 mg	033-22551
Chloroneb Reference Material	2-10°C	TraceSure	100 mg	036-22041
Clothianidin Reference Material	2-10°C	TraceSure	100 mg	034-22581
CNP-amino Reference Material	2-10°C	TraceSure	100 mg	036-22541
Coumaphos Reference Material	2-10°C	TraceSure	100 mg	030-22061
Cumyluron Reference Material	2-10°C	TraceSure	100 mg	033-22051
Cymoxanil Reference Material	2-10°C	TraceSure	100 mg	032-22521
Cyprodinil Reference Material	2-10°C	TraceSure	100 mg	034-22081
Daminozide Reference Material	2-10°C	TraceSure	100 mg	042-32451
DCMU Reference Material	2-10°C	TraceSure	100 mg	049-31861
DEP Reference Material	2-10°C	TraceSure	100 mg	041-31681
Diazinon Reference Material	2-10°C	TraceSure	100 mg	040-31891
Diflubenzuron Reference Material	2-10°C	TraceSure	100 mg	043-31901
Dimepiperate Reference Material	2-10°C	TraceSure	100 mg	043-31881
Dithiopyr Reference Material	2-10°C	TraceSure	100 mg	046-31871
Echlomezol Reference Material	2-10°C	TraceSure	100 mg	057-08251
EPN Reference Material	2-10°C	TraceSure	100 mg	050-08241
Esprocarb Reference Material	2-10°C	TraceSure	100 mg	051-08271
Etofenprox Reference Material	2-10°C	TraceSure	100 mg	053-08231
Ethylthiometon Reference Material	2-10°C	TraceSure	100 mg	053-08731
Famoxadone Reference Material	2-10°C	TraceSure	100 mg	066-05841
Flazasulfuron Reference Material	2-10°C	TraceSure	100 mg	069-05831
Fludioxonil Reference Material	2-10°C	TraceSure	100 mg	064-06001
Flufenoxuron Reference Material	2-10°C	TraceSure	100 mg	062-05821
Flusulfamide Reference Material	2-10°C	TraceSure	100 mg	067-05991
Flutolanil Reference Material	2-10°C	TraceSure	100 mg	065-05811
Fthalide Reference Material	2-10°C	TraceSure	100 mg	061-06011
Glyphosate Reference Material	2-10°C	TraceSure	100 mg	071-05951
Imazosulfuron Reference Material	2-10°C	TraceSure	100 mg	092-06321
Indanofan Reference Material	2-10°C	TraceSure	100 mg	094-06521
Iprodione Reference Material	2-10°C	TraceSure	100 mg	095-06291
Isofenphos Reference Material	2-10°C	TraceSure	100 mg	098-06541
Isothiolane Reference Material	2-10°C	TraceSure	100 mg	098-06281

Product Name	Storage	Grade	Pkg. Size	Wako Cat. No.
Isoxaben Reference Material	2-10°C	TraceSure	100 mg	091-06531
Isoxathion Reference Material	2-10°C	TraceSure	100 mg	095-06311
Linuron Reference Material	2-10°C	TraceSure	100 mg	124-06131
Malathion Reference Material	2-10°C	TraceSure	100 mg	133-16891
MCP Reference Material	2-10°C	TraceSure	100 mg	135-16971
MCPP Reference Material	2-10°C	TraceSure	100 mg	136-16901
Mefenacet Reference Material	2-10°C	TraceSure	100 mg	130-16921
MEP Reference Material	2-10°C	TraceSure	100 mg	133-16911
Mepronil Reference Material	2-10°C	TraceSure	100 mg	134-16941
Metalaxyl Reference Material	2-10°C	TraceSure	100 mg	137-16931
Methomyl Reference Material	2-10°C	TraceSure	100 mg	132-17461
Methyl Thioacetohydroxamate Reference Material	2-10°C	TraceSure	100 mg	138-17441
MIPC Reference Material	2-10°C	TraceSure	100 mg	139-17971
Molinate Reference Material	2-10°C	TraceSure	100 mg	131-16951
MPP Reference Material	2-10°C	TraceSure	100 mg	135-17451
Myclobutanil Reference Material	2-10°C	TraceSure	100 mg	138-16961
NAC Reference Material	2-10°C	TraceSure	100 mg	144-09031
Napropamide Reference Material	2-10°C	TraceSure	100 mg	144-09151
2,4-PA Reference Material	2-10°C	TraceSure	100 mg	163-25101
PAP Reference Material	2-10°C	TraceSure	100 mg	164-25491
Pendimethalin Reference Material	2-10°C	TraceSure	100 mg	166-25071
cis-Permethrin Reference Material	2-10°C	TraceSure	100 mg	165-25161
trans-Permethrin Reference Material	2-10°C	TraceSure	100 mg	162-25171
Phosalone Reference Material	2-10°C	TraceSure	100 mg	160-25471
Probenazole Reference Material	2-10°C	TraceSure	100 mg	163-25081
Prochloraz Reference Material	2-10°C	TraceSure	100 mg	164-25131
Procymidone Reference Material	2-10°C	TraceSure	100 mg	162-25051
Profenofos Reference Material	2-10°C	TraceSure	100 mg	168-26251
Propaphos Reference Material	2-10°C	TraceSure	100 mg	167-25481
Propyzamide Reference Material	2-10°C	TraceSure	100 mg	169-25061
Pyrazoxyfen Reference Material	2-10°C	TraceSure	100 mg	166-25451
Pyributicarb Reference Material	2-10°C	TraceSure	100 mg	160-25111
Pyridaphenthion Reference Material	2-10°C	TraceSure	100 mg	160-25091
Pyrimethanil Reference Material	2-10°C	TraceSure	100 mg	163-25461
Silafloufen Reference Material	2-10°C	TraceSure	100 mg	198-16261
Simetryn Reference Material	2-10°C	TraceSure	100 mg	191-16251
Tebufenpyrad Reference Material	2-10°C	TraceSure	100 mg	202-19091
Teflubenzuron Reference Material	2-10°C	TraceSure	100 mg	202-18751
Tetraconazole Reference Material	2-10°C	TraceSure	100 mg	205-19101
Thiacloprid Reference Material	2-10°C	TraceSure	100 mg	205-19081
Thiamethoxam Reference Material	2-10°C	TraceSure	100 mg	201-19061
Thiophanate Reference Material	2-10°C	TraceSure	100 mg	204-18711
Thiuram Reference Material	2-10°C	TraceSure	100 mg	204-18691
Tiadinil Reference Material	2-10°C	TraceSure	100 mg	205-18741
Tolclofos-methyl Reference Material	2-10°C	TraceSure	100 mg	208-19071
Triadimefon Reference Material	2-10°C	TraceSure	100 mg	201-18721
Tricyclazole Reference Material	2-10°C	TraceSure	100 mg	202-19111
Trifloxystrobin Reference Material	2-10°C	TraceSure	100 mg	208-18731
Vinclozolin Reference Material	2-10°C	TraceSure	100 mg	220-01941
Warfarin Reference Material	2-10°C	TraceSure	100 mg	236-02441
XMC Reference Material	2-10°C	TraceSure	100 mg	249-00911

### Traceable Reference Material (TRM)

TRM series: A traceable reference material evaluated by the National Metrology Institute of Japan (NMIJ) of the National Institute of Advanced Industrial Science and Technology and established for uncertainty at Wako. The purity of this product is guaranteed through quantitative NMR.

Product Name	Storage	Grade	Pkg. Size	Wako Cat. No.
Acetamiprid Reference Material	2-10°C	Traceable Reference Material	100 mg	010-24541
Acrinathrin Reference Material	2-10°C	Traceable Reference Material	100 mg	012-24361
Ametryn Reference Material	2-10°C	Traceable Reference Material	100 mg	014-24181
Azimsulfuron Reference Material	2-10°C	Traceable Reference Material	100 mg	017-24171
Azoxystrobin Reference Material	2-10°C	Traceable Reference Material	100 mg	010-24281
Benfuresate Reference Material	2-10°C	Traceable Reference Material	100 mg	023-17621
Benzoepin Sulfate Reference Material	2-10°C	Traceable Reference Material	100 mg	022-17951
Benzofenap Reference Material	2-10°C	Traceable Reference Material	100 mg	028-17931
Bromacil Reference Material	2-10°C	Traceable Reference Material	100 mg	020-17511
Buprofezin Reference Material	2-10°C	Traceable Reference Material	100 mg	020-17631
Chlorpyrifos Reference Material	2-10°C	Traceable Reference Material	100 mg	032-22881
Deltamethrin Reference Material	2-10°C	Traceable Reference Material	100 mg	049-32221
Dimethoate Reference Material	2-10°C	Traceable Reference Material	100 mg	041-32661
Etoazole Reference Material	2-10°C	Traceable Reference Material	100 mg	050-08481
Fenpropathrin Reference Material	2-10°C	Traceable Reference Material	100 mg	065-05931
Fenpyroximate Reference Material	2-10°C	Traceable Reference Material	100 mg	063-05971
Fipronil Reference Material	2-10°C	Traceable Reference Material	100 mg	069-05951
Fosthiazate Reference Material (mixture of isomers)	2-10°C	Traceable Reference Material	100 mg	062-05941
Hexaconazole Reference Material	2-10°C	Traceable Reference Material	100 mg	083-09731
Hydroxyisoxazole Reference Material	2-10°C	Traceable Reference Material	100 mg	086-09841
Imazalil Reference Material	2-10°C	Traceable Reference Material	100 mg	092-06681
Indoxacarb-MP Reference Material	2-10°C	Traceable Reference Material	100 mg	099-06691
Iprodione Metabolite Reference Material	2-10°C	Traceable Reference Material	100 mg	096-06601
Lufenuron Reference Material	2-10°C	Traceable Reference Material	100 mg	122-06171
Metalaxyl-M Reference Material	2-10°C	Traceable Reference Material	100 mg	132-17601

Product Name	Storage	Grade	Pkg. Size	Wako Cat.No.
2-Methylimidazole Reference Material	2-10°C	Traceable Reference Material	100 mg	138-17181
4-Methylimidazole Reference Material	2-10°C	Traceable Reference Material	100 mg	135-17191
PHC Reference Material	2-10°C	Traceable Reference Material	100 mg	165-25421
Piperonyl Butoxide Reference Material	2-10°C	Traceable Reference Material	100 mg	162-25431
Pirimiphos-methyl Reference Material	2-10°C	Traceable Reference Material	100 mg	162-25671
Prometryn Reference Material	2-10°C	Traceable Reference Material	100 mg	166-25331
Siduron Reference Material	2-10°C	Traceable Reference Material	100 mg	194-16001
Tebufenozide Reference Material	2-10°C	Traceable Reference Material	100 mg	207-19041
Thiabendazole Reference Material	2-10°C	Traceable Reference Material	100 mg	206-19251
Tolfenpyrad Reference Material	2-10°C	Traceable Reference Material	100 mg	208-19451
TPN Reference Material	2-10°C	Traceable Reference Material	100 mg	207-19301
Trifluralin Reference Material	2-10°C	Traceable Reference Material	100 mg	200-19031

## Solvents for Pesticide Residue and PCB Analysis

These products ensure safety as each contains no interfering substances in the 300-fold or 5000-fold concentrated solution, and are ideal for the extraction of pesticides from the test substances and for purification.

The 300- and 5000-fold concentrated solution guarantee the followings :

1 With the GC-ECD, the level of impurities does not exceed 1/2 of the peak of the organochlorine pesticide  $\gamma$ -BHC (20pg).

2 With GC-FPC, the level of impurities does not exceed 1/25 of the peak of the organophosphorous pesticide MPP (0.5ng)

Product Name	Storage	Grade	Pkg. Size	Wako Cat.No.
Acetone 300	Protect from light.	for Pesticide Residue & PCB Analysis	1 L	015-11281
			3 L	011-11283
Acetone 5,000	Protect from light.	for Pesticide Residue & PCB Analysis	1 L	011-19201
			3 L	017-19203
Acetonitrile 300	RT	for Pesticide Residue & PCB Analysis	1 L	015-11301
			3 L	011-11303
Acetonitrile 5,000	RT	for Pesticide Residue & PCB Analysis	1 L	013-19401
			3 L	019-19403
Acetonitrile	RT	for Tiuram Analysis	1 L	011-15281
			3 L	017-15283
Benzene 300	RT	for Pesticide Residue & PCB Analysis	1 L	021-08631
Benzene 5,000	RT	for Pesticide Residue & PCB Analysis	1 L	028-14751
<i>t</i> -Butyl Methyl Ether 300	Protect from light.	for Pesticide Residue & PCB Analysis	1 L	024-14351
<i>t</i> -Butyl Methyl Ether 5,000	Protect from light.	for Pesticide Residue & PCB Analysis	1 L	020-14831
Chloroform 300	RT	for Pesticide Residue & PCB Analysis	1 L	039-11801
Chloroform 5,000	RT	for Pesticide Residue & PCB Analysis	1 L	033-18641
Cyclohexane 300	RT	for Pesticide Residue & PCB Analysis	1 L	038-16751
			3 L	034-16753
Cyclohexane 5,000	RT	for Pesticide Residue & PCB Analysis	1 L	036-18631
Dichloromethane 300	Protect from light.	for Pesticide Residue & PCB Analysis	1 L	133-08841
			3 L	139-08843
Dichloromethane 5,000	Protect from light.	for Pesticide Residue & PCB Analysis	1 L	043-28451
			3 L	049-28453
Diethyl Ether 300	Protect from light.	for Pesticide Residue & PCB Analysis	1 L	050-04461
Diethyl Ether 5,000	Protect from light.	for Pesticide Residue & PCB Analysis	1 L	040-28461
Distilled Water, Hexane Washed	RT	for Pesticide Residue	1 L	040-28081
			3 L	046-28083
Ethanol (99.5) 300	RT	for Pesticide Residue & PCB Analysis	1 L	056-04441
			3 L	052-04443
Ethanol (99.5) 5,000	RT	for Pesticide Residue & PCB Analysis	1 L	053-07011
Ethyl Acetate 300	RT	for Pesticide Residue & PCB Analysis	1 L	052-04421
			3 L	058-04423
Ethyl Acetate 5,000	RT	for Pesticide Residue & PCB Analysis	1 L	052-06981
			3 L	058-06983
Hexane 300	RT	for Pesticide Residue & PCB Analysis	1 L	084-04761
			3 L	080-04763
Hexane 5,000	RT	for Pesticide Residue & PCB Analysis	1 L	083-07911
			3 L	089-07913
Methanol 300	RT	for Pesticide Residue & PCB Analysis	1 L	139-08821
			3 L	135-08823
Methanol 5,000	RT	for Pesticide Residue & PCB Analysis	1 L	132-14161
			3 L	138-14163
Petroleum Ether 300	Protect from light.	for Pesticide Residue & PCB Analysis	1 L	165-12971
Petroleum Ether 5,000	Protect from light.	for Pesticide Residue & PCB Analysis	1 L	162-20671
Toluene 300	RT	for Pesticide Residue & PCB Analysis	1 L	203-11601
			3 L	209-11603
Toluene 5,000	RT	for Pesticide Residue & PCB Analysis	1 L	209-15581
			3 L	205-15583

\*RT: Keep at room temperature



## Solid-Phase Extraction Columns; Presep® Series

The solid-phase extraction method for pretreatment of samples is used widely in various fields, including pharmaceutical, food and environmental analyses, because the method is simple and uses smaller amounts of solvents.

In addition, the method has various advantages, for example, it can treat many samples simultaneously in a short time.

### Features

1. The columns can be used for solid-phase extraction by any of the compression and decompression methods. (Presep®-C Type)
2. Some columns can be connected depending on the kind and amount of filler. (Presep®-C Type)
3. High flow velocity obtained by the sharp filler particle size distribution.
4. High recovery realized by the fillers designed for solidphase extraction.
5. High reproducibility ensured by strict quality control.



Presep®-C (Short)



Presep® Syringe Type with one end open

Product Name	Amount of filler (mg/cartridge)	Use	Pkg. Size	Wako Cat.No.
Presep® Polyamide C-200 Type M	2000 / 25 mL	for Sample Pretreatment (crude drug)	10 EA × 5	298-33571
Presep®-C C18 (ODS) (Short)	470	for Sample Pretreatment	10 EA × 5	297-47451
Presep®-C C18 (ODS)	900	for Sample Pretreatment	10 EA × 5	292-32251
Presep® C18 (ODS)	2000 / 25 mL	for Sample Pretreatment	100 EA	296-34091
Presep® C18 (ODS) Type M	5000 / 25 mL	for Sample Pretreatment	20 EA 100 EA	293-48553 297-48556
Presep®-C NH <sub>2</sub> (Short)	400	for Sample Pretreatment	10 EA × 5	299-48751
Presep®-C NH <sub>2</sub>	820	for Sample Pretreatment	10 EA × 5	295-48851
Presep®-C Silica Gel	800	for Sample Pretreatment	50 EA	294-31851
Presep®-C Alumina	1700	for Sample Pretreatment	10 EA × 5	290-32051
Presep®-C Florisil®	800	for Sample Pretreatment	10 EA × 5	290-31951
Presep® Florisil	1000 / 6 mL	for Sample Pretreatment	10 EA × 5	291-44051
Presep®-C Na <sub>2</sub> SO <sub>4</sub>	2300	for Sample Pretreatment	10 EA × 5	296-32151
Presep® Diatomaceous Earth, Granular	1000 / 6 mL 2000 / 15 mL	for Sample Pretreatment	100 EA 100 EA	292-35051 298-35151
Presep® Diatomaceous Earth, Granular Type M	4500 / 25 mL	for Sample Pretreatment	100 EA	291-33561
Presep®-C RPP (Short)	190	for Sample Pretreatment	10 EA × 5	297-41851
Presep®-C RPP (Long)	360	for Sample Pretreatment	10 EA × 3	293-41951
Presep® RPP	60 / 3 mL 200 / 6 mL 500 / 6 mL	for Sample Pretreatment	10 EA × 5 10 EA × 5 10 EA × 5	294-36851 290-36951 290-37051
Presep® RPP-SAX	60 / 3 mL	for Sample Pretreatment	10 EA × 10	297-33301
Presep® RPP-WAX	60 / 3 mL	for Sample Pretreatment	10 EA × 10	291-33941
Presep® RPP-SCX	60 / 3 mL	for Sample Pretreatment	10 EA × 10	291-34921
Presep® RPP-WCX	60 / 3 mL	for Sample Pretreatment	10 EA × 10	292-34831
Presep® DEA	250 / 6 mL	for Sample Pretreatment	10 EA × 5	292-61701
Presep® QA	250 / 6 mL	for Sample Pretreatment	10 EA × 5	296-61601
Presep® CM	250 / 6 mL	for Sample Pretreatment	10 EA × 5	298-61801
Presep® S	250 / 6 mL	for Sample Pretreatment	10 EA × 5	294-61901
Presep® PFC-II	60 / 3 mL	for Sample Pretreatment (PFCs)	10 EA × 10	291-33441
Presep®-C PFC (Short)	220	for Sample Pretreatment (PFCs)	10 EA × 5	297-49651
Presep®-C Agri (Short)	220	for Pesticide Residue Analysis	10 EA × 5	296-32651
Presep®-Agri	500 / 6 mL	for Pesticide Residue Analysis	50 EA	291-26851
Presep® PolyChelate	250 / 3 mL	for Trapping of Metal Elements	10 EA × 5	296-33491

## QuEChERS Extraction Tube

The "QuEChERS" (Quick, Easy, Cheap, Effective, Rugged, and Safe) method for solid phase extraction is becoming an increasingly popular way of preparing sample, especially for the analysis of agrochemical residue in food products. This product is a 50 mL centrifuge tube complete with the exact amount of reagent required, and been approved for acetate buffer extraction for the AOAC official method 2007.01 for analyzing pesticide residues in foods.

Composition (per tube): magnesium sulfate 6 g, anhydrous sodium acetate 1.5 g



QuEChERS Extraction Tube

Product Name	Storage	Grade	Pkg. Size	Wako Cat.No.
QuEChERS Extraction Tube for AOAC Method	RT	for Sample Pretreatment	5 EA × 10	176-00731
QuEChERS Extraction Tube for EN Method	RT	for Sample Pretreatment	5 EA × 10	173-00741

### Related Products

Product Name	Storage	Grade	Pkg. Size	Wako Cat.No.
Magnesium Sulfate (Anhydrous)	RT	Wako Special Grade	500 g	137-12335
Sodium Acetate	RT	JIS Special Grad	500 g 20 kg	192-01075 198-01077
Sodium Chloride	RT	for Pesticide Residue & PCB Analysis	500 g	199-10015
Trisodium Citrate Dihydrate	RT	JIS Special Grad	500 g 10 kg	191-01785 197-01787
Disodium Hydrogen Citrate 1.5-Hydrate	RT	Wako 1st Grade	500 g	042-27125

## for Analysis of Food Components and Additives

### Dietary Fiber Assay Kit

A simple and modified version of Prosky's method. Compared to conventional Prosky's method, it assures high measurement accuracy. Furthermore, enzyme treatment time is shortened.

#### Operation Procedure

1. Addition of Sample
2. Digestion with thermostable  $\alpha$ -amylase
3. Wash the Beaker and Cool it
4. Digestion with protease and amyloglucosidase
5. Ethanol Precipitation
6. Filtration
7. Wash
8. Drying and Weighing
9. Protein Determination
10. Ash Determination
11. Calculation of Total Dietary Fiber Content

#### Kit Contents:

- Thermostable alpha-Amylase Solution (20 mL  $\times$  1 vial)
- Protease Solution (20 mL  $\times$  1 vial)
- Amyloglucosidase Solution (20 mL  $\times$  1 vial)
- Diatomaceous Earth (100 g  $\times$  1 vial)



Product Name	Storage	Grade	Pkg. Size	Wako Cat.No.
Dietary Fiber Assay Kit	RT	for Food Analysis	100 Tests	291-59701

#### Reagents required but not supplied in the kit

Product Name	Storage	Grade/Manufacture	Pkg. Size	Wako Cat.No.
2 (- N-Morpholino) ethanesulfonic Acid [MES]	RT	Dojindo Molecular Technologies, Inc.	25 g	341-01622
2-Amino-2-hydroxymethyl-1,3-propanediol [TRIS]	RT	JIS Special Grade	25 g	203-06272
Sodium Chloride	RT	JIS Special Grade	500 g	191-01665
Calcium Chloride Dihydrate	RT	JIS Special Grade	100 g	039-00431
Ethanol (95)	RT	JIS Special Grade	500 mL	051-00476
Acetone	Protect from light.	JIS Special Grade	500 mL	016-00346
Potassium Sulfat	RT	JIS Special Grade	500 g	169-04485
Copper (II) Sulfate Pentahydrate	RT	JIS Special Grade	25 g	039-04412
Sulfuric Acid	RT	JIS Special Grade	500 mL	192-04696
Hydrogen Peroxide	Protect from light.	JIS Special Grade	500 mL	081-04215
Boric Acid	RT	JIS Special Grade	25 g	027-02192
Sodium Hydroxide	RT	for Nitrogen Analysis	100 g	199-08621

### Sweetener

#### ■ Analytical Standards for Synthetic Sweeteners

Although artificial sweeteners such as dulcin and sodium cyclamate (commonly referred to as cyclamate) are prohibited due to being carcinogenic, these sweeteners are being detected in import food items even today.

Product Name	Storage	Grade	Pkg. Size	Wako Cat.No.
Saccharin Sodium Dihydrate Standard	2-10°C	for Food Analysis	100 mg	195-15551
Aspartame Standard	2-10°C	for Food Analysis	100 mg	017-22611
Acesulfame K Standard	2-10°C	for High Performance Liquid Chromatography	500 mg	019-19481
Sucralose Standard	2-10°C	for High Performance Liquid Chromatography	1 g	198-12241
Dulcin Standard	2-10°C	for Food Analysis	100 mg	043-31021
Cyclamic Acid Sodium Salt Standard	2-10°C	for Food Analysis	100 mg	035-21031
Glutamyl-Valyl-Glycine Standard	2-10°C	for Food Analysis	100 mg	077-06391

#### Analytical columns

Product Name	Storage	Size	Type	Wako Cat.No.
Wakopak® Wakosil -II 5C18 HG	RT	4.6mm $\phi$ $\times$ 150mm	Waters DuPont	234-51113 238-51111
	RT	4.6mm $\phi$ $\times$ 250mm	Waters DuPont	238-51133 232-51131
Wakopak® Navi C18-5	RT	4.6mm $\phi$ $\times$ 250mm	Waters DuPont	231-60533 235-60531
Wakopak® Ultra C18-5	RT	4.6mm $\phi$ $\times$ 250mm	Waters	232-02661

Product Name	Storage	Grade	Pkg. Size	Wako Cat.No.
Dulcoside A Standard	-20°C	for Food Analysis	25 mg 100 mg	048-31211 044-31213
Isosteviol Standard	2-10°C	for Stevioside Determination	1 g	098-05681

## ■ for Stevioside Determination

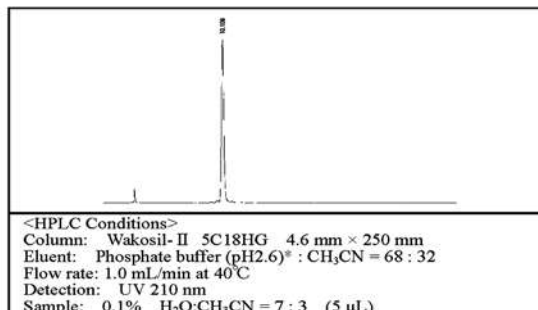
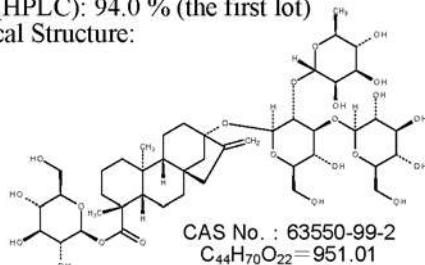
Stevia rebaudiana (Stevia) is a plant native to South America. The leaf of the Stevia plant contains sweet components, called steviol and steviol glycosides which includes Stevioside, Dulcoside A, Rebaudioside A, B, C, D, F and others. There are also listed as Steviol Glycosides in JECFA Monographs. They have been used as sweeteners around the world. Wako can provide the highly purified products and they can be used for determination of the steviol glycosides.

### Rebaudioside C

Appearance: White, Crystals - powder

Assay (HPLC): 94.0 % (the first lot)

Chemical Structure:



Product Name	Storage	Grade	Pkg. Size	Wako Cat.No.
Rebaudioside A Standard	-20°C	for Food Analysis	100 mg 1 g	189-02581 185-02583
Rebaudioside B Standard	2-10°C	for Food Analysis	25 mg 100 mg	188-02551 184-02553
Rebaudioside C	2-10°C	for Food Analysis	25 mg	181-02541
Rebaudioside D	-20°C	for Food Analysis	5 mg	180-02511
Rebaudioside F	2-10°C	for Food Analysis	5 mg	186-02611
Rubusoside Standard	-20°C	for Food Analysis	25 mg 100 mg	187-02521 183-02523
Steviol Standard	2-10°C	for Food Analysis	25 mg 100 mg	192-15701 198-15703
Steviolbioside Standard	2-10°C	for Food Analysis	25 mg 100 mg	199-15691 195-15693
Stevioside Standard	2-10°C	for Food Analysis	100 mg	199-16291

## ■ Saccharide-related products

Product Name	Storage	Pkg. Size	Manufacture's Code	Wako Cat.No.
Ascorbic Acid 2-Glucoside	RT	25 g	AG121	638-04142
Ascorbic Acid 2-Glucoside 999	RT	1 g	AG124	637-04151
Erllose	RT	100 mg	GF131	635-04093
Isomaltose	RT	1 g	IM121	632-04081
MALTOHEPTAOSE	RT	1 g	MA171	637-09031
MALTOPENTAOSE	RT	1 g	MA151	633-09011
Maltose 999	RT	5 g	MA124	633-04011
MALTOSE H	RT	500 g	MA121	630-08965
MALTOSE HH	RT	500 g	MA122	637-08975
MALTOSE HHH	RT	500 g	MA123	634-08985
MALTOTETRAOSE	RT	1 g	MA141	636-09001
MALTOTRIOSE	RT	10 g	MA131	639-08991
MONOGLUCOSYL HESPERIDIN	RT	250 mg	HG131	638-07361
Neotrehalose	RT	100 mg	TH122	638-04103
PANOSE	RT	1 g	IM231	639-09091
PULLULAN	RT	10 g	PU101	635-09071
Pullulanase (Crystal)	2-10°C	1 mg	EN202	637-04173
TREHALOSE	RT	500 g	TH222	632-09145
Trehalose 999	RT	5 g	TH224	633-04131
Trehalose Anhydrous	RT	100 g	TH221	639-04111
Trehalose, Endotoxin Free	RT	100 g	TH223	636-04121

## Unspecified Additive Standards

As a principle, manufacture, import, use or sale of food products containing additives other than those specified by the Minister of Health, Labour and Welfare is prohibited, and any such activity is a violation of Article 10 of the Food Sanitation Act.

Product Name	Storage	Grade	Pkg. Size	Wako Cat.No.
Dulcin Standard	2-10°C	for Food Analysis	100 mg	043-31021
Cyclamic Acid Sodium Salt Standard	2-10°C	for Food Analysis	100 mg	035-21031
TBHQ Standard	2-10°C	for Food Analysis	100 mg	200-17691
Sudan I Standard	2-10°C	for High Performance Liquid Chromatography	200 mg	193-14131
Sudan II Standard	2-10°C	for High Performance Liquid Chromatography	200 mg	190-14141
Sudan III Standard	2-10°C	for High Performance Liquid Chromatography	200 mg	197-14151
Sudan IV Standard	2-10°C	for High Performance Liquid Chromatography	200 mg	194-14161
Para Red Standard	2-10°C	for High Performance Liquid Chromatography	200 mg	160-22171
Methyl p-Hydroxybenzoate Standard	2-10°C	for Food Analysis	100 mg	133-16151

### Standards of Melamine and the related compounds

Melamine occurs as monoclinic crystals and is used mainly as a raw material of melamine resin for decorative sheet, molded plateware, molded machines and electric parts, baking paint, and textile processing agent. After the case of melamine contamination in pet foods in the U.S. in 2007, the Ministry of Health, Labour and Welfare has instructed to perform a monitoring test for proteins (including gluten) made from rice from China and wheat and for flour and powder prepared using flour.

Product Name	Storage	Grade	Pkg. Size	Wako Cat.No.
Melamine Standard	2-10°C	for Food Analysis	100 mg	132-15881
Isocyanuric Acid Standard	2-10°C	for High Performance Liquid Chromatography	200 mg	091-05311
Ammeline Standard	2-10°C	for Food Analysis	100 mg	012-22041
Ammelide Standard	2-10°C	for Food Analysis	100 mg	019-22051

## Internal Standard for Quantitative NMR

Product Name	Storage	Grade	Pkg. Size	Wako Cat.No.
Dimethyl Sulfone Reference Material	2-10°C	TraceSure	100 mg	048-33271
Maleic Acid Reference Material	2-10°C	TraceSure	100 mg	135-17951

### Related Products

Product Name	Storage	Grade	Pkg. Size	Wako Cat.No.
NMR Test Tube HG-Type (OD4.951-4.965×7in.)	RT	for Nuclear Magnetic Resonance	10 pcs 100 pcs	297-47951 293-47953
NMR Test Tube HG-Type (OD4.951-4.965mm×8in.)	RT	for Nuclear Magnetic Resonance	10 pcs 100 pcs	295-48351 291-48353

## Food Additives (Fungicides) quantitative Reference Materials

### Fludioxonil, Azoxystrobin, Pyrimethanil

Product Name	Storage	Grade	Pkg. Size	Wako Cat.No.
Fludioxonil Reference Material	2-10°C	TraceSure	100 mg	064-06001
Azoxystrobin Reference Material	2-10°C	Traceable Reference Material	100 mg	010-24281
Pyrimethanil Reference Material	2-10°C	TraceSure	100 mg	163-25461

### ISO/IEC 17025(JIS Q 17025) accredited

It is used as a normal solution for volumetric analysis (acid-alkaline titration). It is a reference standard according to JIS K8001.

Product Name	Storage	Grade	Pkg. Size	Wako Cat.No.
0.1mol/L Hydrochloric Acid	RT	for Volumetric Analysis	100 mL 500 mL 3 L	081-01111 083-01115 087-01113
1mol/L Hydrochloric Acid	RT	for Volumetric Analysis	100 mL 500 mL 3 L	081-01091 083-01095 087-01093
0.05mol/L Sulfuric Acid	RT	for Volumetric Analysis	100 mL 500 mL 3 L	194-04771 196-04775 190-04773
0.5mol/L Sulfuric Acid	RT	for Volumetric Analysis	100 mL 500 mL	190-04751 192-04755
0.1mol/L Sodium Hydroxide Solution	RT	for Volumetric Analysis	100 mL 500 mL 3 L	194-02191 196-02195 190-02193
1mol/L Sodium Hydroxide Solution	RT	for Volumetric Analysis	100 mL 500 mL 3 L	190-02171 192-02175 196-02173
0.1mol/L Sodium Thiosulfate Solution	RT	for Volumetric Analysis	100 mL 500 mL 3 L	199-03621 191-03625 195-03623
0.005mol/L Potassium Permanganate Solution	RT	for Volumetric Analysis	500 mL 3 L	161-08225 169-08221
0.1mol/L Silver Nitrate Solution	RT	for Volumetric Analysis	100 mL 500 mL	190-00851 192-00855
Magnolol	2-10°C	for the Japanese Pharmacopoeia Crude Drugs Test	20 mg	130-16781
Paeonol	2-10°C	for the Japanese Pharmacopoeia Crude Drugs Test	10 mg	164-24891
Geniposide	2-10°C	for the Japanese Pharmacopoeia Crude Drugs Test	20 mg	073-05891

## Irradiated food testing reagent

This product consists of sodium polytungstate, used in thermoluminescence (TL). Using this product and dedicated equipment will allow for the detection of food items subjected to irradiation.

### Sodium Metatungstate (Sodium Polytungstate)

Product Name	Storage	Grade	Pkg. Size	Wako Cat. No.
Sodium Metatungstate	below 25°C	—	25 g	191-15092
			250 g	193-15091

### Related Products

Product Name	Storage	Grade	Pkg. Size	Wako Cat. No.
1mol/L Hydrochloric Acid	RT	for Volumetric Analysis	100 mL 500 mL	081-01091 083-01095
28% Ammonia Solution	Protect from light.	JIS Special Grade	500 mL	016-03146
Acetone	Protect from light.	JIS Special Grade	500 mL 3 L	016-00346 012-00343
Distilled Water	RT	—	500 mL	043-16785
			2 L	047-16783
			5 L	041-16786

### Standards for hydrocarbon method

Product Name	Storage	Grade	Pkg. Size	Wako Cat. No.
Tetradecane Standard	2-10°C	for Gas Chromatography	100 mg	200-17211
1-Tetradecene Standard	2-10°C	for Gas Chromatography	100 mg	207-17221
Pentadecane Standard	2-10°C	for Gas Chromatography	100 mg	168-23451
Hexadecane Standard	2-10°C	for Gas Chromatography	100 mg	084-08781
1-Hexadecene Standard	2-10°C	for Gas Chromatography	100 mg	084-08801
Heptadecane Standard	2-10°C	for Gas Chromatography	100 mg	081-08791
Eicosane Standard	2-10°C	for Gas Chromatography	100 mg	052-07721
(Z)-8-Heptadecene Standard	2-10°C	for Food Analysis	50 mg	082-08841
1,7-Hexadecadiene Standard (mixture of isomers)	-20°C	for Food Analysis	50 mg	089-08851

## High-sealed Storage Bottles

These high-performance hermetic containers are ideal for storing volatile solvents, agrochemicals, dioxins, and other types of standard solutions. Specially designed to be completely airtight, the Perfluoro O-ring between the mouth and the cap ensures preventing swelling of the container affected by expansion and contraction due to temperature fluctuations and organic solvent vaporization. This enables long storage of various types of solvents at temperatures between ambient (room temperature) and the freezer (-20°C).

### Features

- Provides 99+% hermeticity when organic solvents are stored at room temperature or at freezer temperature as low as -20°C, for up to three months.
- Comes in sizes of 1mL, 2mL, 5mL, and 10mL
- A microsyringe is available for drawing samples directly from the specially designed upper extraction cap

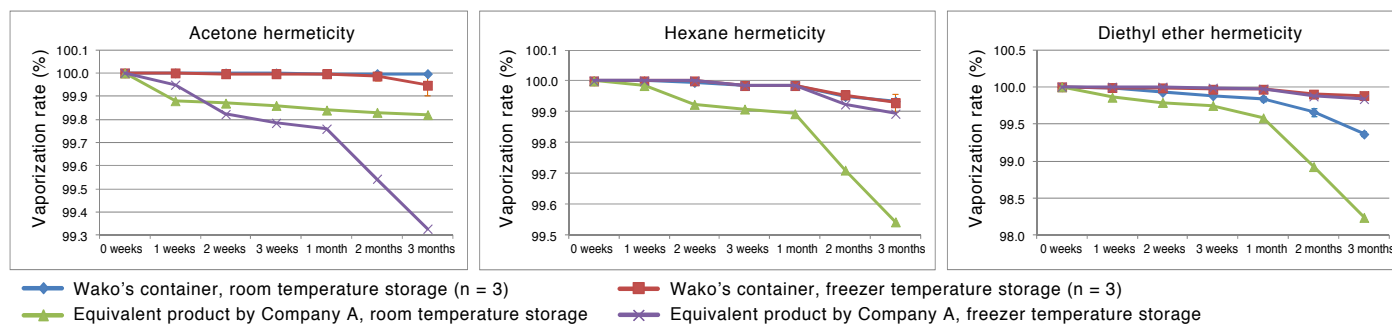
### Applications

Storage of commercial standard solutions removed from ampoules  
Long storage of reagent samples



### Hermeticity tests for various solvents

Used Wako's high-performance hermetic containers (10mL) and their equivalent products by Company A (10mL). Added acetone, hexane, and diethyl ether (10mL each) respectively, sealed, and stored both at room temperature and at freezer temperature (-20°C). Measured the mass of each content at various intervals from a week to 3 months after the seal.



Product Name	Bottle Size	Pkg. Size	Wako Cat. No.
High-sealed Storage Bottle, Brown	1 mL	1 bottle	296-34731
	2 mL	1 bottle	293-34741
	5 mL	1 bottle	297-34761
	10 mL	1 bottle	294-34771

## Reagents for Genetic Testing

### Reagents for variety identification

#### ■ mtDNA Extractor CT kit

This product is a kit designed to easily extract mitochondrial DNA (mtDNA) from the tissues or cells of mammalian species in a comparatively short period of time. This kit can also be used for the mtDNA extraction from compound feed.

Product Name	Storage	Grade	Pkg. Size	Wako Cat.No.
mtDNA Extractor CT Kit	2-10°C	for Cell and Tissue mtDNA Extraction	25 Tests	291-55301

#### Related Product

Product Name	Storage	Grade	Pkg. Size	Wako Cat.No.
Agarose S	RT	Nippon Gene Co., Ltd.	5 g 100 g	316-01191 312-01193

### Genetically Modified Organism (GMO) Qualitative Test Reagents

In April 2001, it became mandatory in Japan to openly display whether agricultural produce was genetically modified or processed goods included genetically modified ingredients, according to the good quality labelling system of JAS Law. Accordingly, the Ministry of Agriculture, Forestry and Fisheries released the JAS analytical test handbook, the 'Genetically Modified Food Inspection and Analysis Manual', the Consumer Affairs Agency released 'Inspection methods for recombinant DNA technology food that completed safety inspection', while the Ministry of Health, Labour and Welfare released the 'Inspection methods for food produced with recombinant DNA techniques'. Furthermore, in 2005, 'Detailed official and standard testing methods, standard methods of analysis in food safety regulation, Physical and chemical sciences edition 2005' was also published. This reagent conforms with all above methods.

Testing methods are outlined on the official Ministry of Agriculture, Forestry and Fisheries, Consumer Affairs Agency and Ministry of Health, Labour and Welfare websites.

#### ■ GM Soybean Quantitative Test Reagents

Target Manuals: Ministry of Agriculture, Forestry and Fisheries JAS analytical test handbook, the 'Genetically Modified Food Inspection and Analysis Manual'  
Target Manuals: Ministry of Health, Labour and Welfare released the 'Inspection methods for food produced with recombinant DNA techniques'.

#### Oligonucleotide Sets

Product Name	Storage	Pkg. Size	Wako Cat.No.
GM Soybean (RRS) Detection Le1 (for endogenous gene) Oligonucleotide Set	-20°C	1 Set	319-05601
GM Soybean (RRS) Detection RRS Oligonucleotide Set	-20°C	1 Set	316-05611
GMO Detection P35S Oligonucleotide Set	-20°C	1 Set	313-05621
GMO Detection NOS Oligonucleotide Set	-20°C	1 Set	310-05631

#### Plasmids

Product Name	Storage	Pkg. Size	Wako Cat.No.
GM Soybean (RRS) Detection Plasmid Set-ColE1/TE	-20°C	90 µL × 2	316-05971
GMO Detection No Template Control-ColE1/TE	-20°C	90 µL × 2	318-06031

#### ■ GM Soybean RR2 Quantitative Test Reagents

#### Oligonucleotide Sets

Product Name	Storage	Pkg. Size	Wako Cat.No.
GM Soybean (RRS) Detection Le1 (for endogenous gene) Oligonucleotide Set	-20°C	1 Set	319-05601
GM Soybean (RR2) Detection RR2 Oligonucleotide Set	-20°C	1 Set	319-07661
GMO Detection P35S Oligonucleotide Set	-20°C	1 Set	313-05621

#### Plasmid

Product Name	Storage	Pkg. Size	Wako Cat.No.
GM Soybean(RR2) Detection Plasmid Set -ColE1/TE-	-20°C	1 Set	316-07671

#### ■ GM Soybean LLS Quantitative Test Reagents

#### Oligonucleotide Sets

Product Name	Storage	Pkg. Size	Wako Cat.No.
GM Soybean (RRS) Detection Le1 (for endogenous gene) Oligonucleotide Set	-20°C	1 Set	319-05601
GM Soybean (LLS) Detection LLS Oligonucleotide Set	-20°C	1 Set	312-07391

#### Plasmid

Product Name	Storage	Pkg. Size	Wako Cat.No.
GM Soybean(LLS) Detection Plasmid Set-ColE1/TE-	-20°C	1 Set	315-07381

#### ■ GM Soybean Qualitative Test Reagents

Target Manuals: Ministry of Agriculture, Forestry and Fisheries JAS analytical test handbook, the 'Genetically Modified Food Inspection and Analysis Manual'

#### Oligonucleotides

Product Name	Storage	Pkg. Size	Wako Cat.No.
GM Soybean (RRS) Detection Le1n02 (for endogenous gene) Oligonucleotide	-20°C	60 µL 180 µL	313-05501 319-05503

Product Name	Storage	Pkg. Size	Wako Cat.No.
GM Soybean (RRS) Detection RRS-01 Oligonucleotide	-20°C	60 µL 180 µL	310-05511 316-05513
GMO Detection P35S-1 Oligonucleotide	-20°C	60 µL 180 µL	317-05521 313-05523
GMO Detection NOS ter-2 Oligonucleotide	-20°C	60 µL 180 µL	314-05531 310-05533

#### Plasmid

Product Name	Storage	Pkg. Size	Wako Cat.No.
GM Soybean (RRS) Detection Positive Control Plasmid	-20°C	50 µL	311-04941

### GM Maize Quantitative Test Reagents

Target Manuals: Ministry of Agriculture, Forestry and Fisheries JAS analytical test handbook, the 'Genetically Modified Food Inspection and Analysis Manual'  
Target Manuals: Ministry of Health, Labour and Welfare released the 'Inspection methods for food produced with recombinant DNA techniques'.

#### Oligonucleotides

Product Name	Storage	Pkg. Size	Wako Cat.No.
GM Maize Detection SS II b-3 (for endogenous gene) Oligonucleotide Set	-20°C	1 Set	319-06061
GM Maize Detection SS II b (for endogenous gene) Oligonucleotide Set	-20°C	1 Set	311-05541
GM Maize Detection GA21 Oligonucleotide Set	-20°C	1 Set	318-05551
GM Maize Detection Bt11 Oligonucleotide Set	-20°C	1 Set	315-05561
GM Maize Detection E176 Oligonucleotide Set	-20°C	1 Set	312-05571
GM Maize Detection T25 Oligonucleotide Set	-20°C	1 Set	319-05581
GM Maize Detection M810 Oligonucleotide Set	-20°C	1 Set	316-05591
GMO Detection P35S Oligonucleotide Set	-20°C	1 Set	313-05621
GMO Detection NOS Oligonucleotide Set	-20°C	1 Set	310-05631

#### Plasmid

Product Name	Storage	Pkg. Size	Wako Cat.No.
GM Maize Detection Plasmid Set-ColE1/TE	-20°C	90 µL × 2	313-05981

### GM Maize Qualitative Test Reagents

Target Manuals: Ministry of Agriculture, Forestry and Fisheries JAS analytical test handbook, the 'Genetically Modified Food Inspection and Analysis Manual'

#### Oligonucleotides

Product Name	Storage	Pkg. Size	Wako Cat.No.
GM Maize Detection SS II b-3 (for endogenous gene) Oligonucleotide	-20°C	60 µL 180 µL	312-06051 318-06053
GM Maize Detection SS II b (for endogenous gene) Oligonucleotide	-20°C	60 µL 180 µL	315-05441 311-05443
GM Maize Detection GA21-3 Oligonucleotide	-20°C	60 µL 180 µL	312-05451 318-05453
GM Maize Detection Bt11-3 Oligonucleotide	-20°C	60 µL 180 µL	319-05461 315-05463
GM Maize Detection E176-2 Oligonucleotide	-20°C	60 µL 180 µL	316-05471 312-05473
GM Maize Detection T25-1 Oligonucleotide	-20°C	60 µL 180 µL	313-05481 319-05483
GM Maize Detection M810-2 Oligonucleotide	-20°C	60 µL 180 µL	310-05491 316-05493
GMO Detection P35S-1 Oligonucleotide	-20°C	60 µL 180 µL	317-05521 313-05523
GMO Detection NOS ter-2 Oligonucleotide	-20°C	60 µL 180 µL	314-05531 310-05533

#### Plasmid

Product Name	Storage	Pkg. Size	Wako Cat.No.
GM Maize Detection Positive Control Plasmid	-20°C	50 µL	314-04811

### GM Maize Bt10 Qualitative Test Reagents

Target Manuals: Ministry of Health, Labour and Welfare released the 'Inspection methods for food produced with recombinant DNA techniques'.

#### Oligonucleotides

Product Name	Storage	Pkg. Size	Wako Cat.No.
GM Maize Detection Zein (for endogenous gene) Oligonucleotide	-20°C	60 µL 180 µL	318-05671 314-05673
GM Maize Detection Bt10 Oligonucleotide	-20°C	60 µL 180 µL	313-06601 319-06603
GM Maize Detection Bt10 (2nd Screening) Oligonucleotide	-20°C	60 µL 180 µL	310-06611 316-06613

## Plasmid

Product Name	Storage	Pkg. Size	Wako Cat.No.
GM Maize Detection Bf10 Positive Control Plasmid	-20°C	50 µL 50 µL × 5	317-06621 313-06623

## ■ GMGM Maize CBH351 Qualitative Test Reagents

Target Manuals: Ministry of Health, Labour and Welfare released the 'Inspection methods for food produced with recombinant DNA techniques'.

## Oligonucleotide

Product Name	Storage	Pkg. Size	Wako Cat.No.
GM Maize Detection Zein (for endogenous gene) Oligonucleotide	-20°C	60 µL 180 µL	318-05671 314-05673
GM Maize Detection CBH351 (for 1st screening) Oligonucleotide	-20°C	60 µL 180 µL	315-05681 311-05683
GM Maize Detection CBH351 (for 2nd screening) Oligonucleotide	-20°C	60 µL 180 µL	312-05691 318-05693

## Plasmid

Product Name	Storage	Pkg. Size	Wako Cat.No.
GM Maize Detection CBH351 Positive Control Plasmid	-20°C	50 µL 50 µL × 5	317-04921 313-04923

## ■ GM Maize Qualitative Test Reagents (Grain unit testing method)

## Plasmid

Product Name	Storage	Pkg. Size	Wako Cat.No.
GM Maize (Single Kernel) Detection Positive Control Plasmid	-20°C	50 µL	314-07231

## Oligonucleotide

Product Name	Storage	Pkg. Size	Wako Cat.No.
GM Maize Detection SS II b-3 (for endogenous gene) Oligonucleotide	-20°C	60 µL 180 µL	312-06051 318-06053

## Oligonucleotide Set

Product Name	Storage	Pkg. Size	Wako Cat.No.
GM Maize Detection GA21 Oligonucleotide Set	-20°C	1 set	318-05551
GMO Detection P35S Oligonucleotide Set	-20°C	1 set	313-05621

## ■ GM Potato Qualitative Test Reagents

Target Manuals: Detailed official and standard testing methods, standard methods of analysis in food safety regulation, Physical and chemical sciences edition 2005

## Oligonucleotide

Product Name	Storage	Pkg. Size	Wako Cat.No.
GM Potato Detection UGPase Oligonucleotide	-20°C	60 µL 180 µL	310-05991 316-05993
GM Potato Screening CryIIIA Oligonucleotide	-20°C	60 µL 180 µL	310-06471 316-06473
GM Potato Detection New Leaf Oligonucleotide	-20°C	60 µL 180 µL	317-06481 313-06483
GM Potato Detection New Leaf Plus (NLP01) Oligonucleotide	-20°C	60 µL 180 µL	314-06491 310-06493
GM Potato Detection New Leaf Y SEMT 15-02 (for 2nd screening) Oligonucleotide	-20°C	60 µL 180 µL	314-06011 310-06013

## Plasmid

Product Name	Storage	Pkg. Size	Wako Cat.No.
GM Potato Positive Control Plasmid (for qualitative analysis)	-20°C	50 µL 50 µL × 5	317-06501 313-06503

## ■ GM Potato New Leaf Qualitative Test Reagents

Target Manuals: Ministry of Agriculture, Forestry and Fisheries JAS analytical test handbook, the 'Genetically Modified Food Inspection and Analysis Manual'

## Oligonucleotide

Product Name	Storage	Pkg. Size	Wako Cat.No.
GM Potato Detection Pss (for endogenous gene) Oligonucleotide	-20°C	60 µL 180 µL	315-05701 311-05703
GMO Detection P35S-1 Oligonucleotide	-20°C	60 µL 180 µL	317-05521 313-05523

## Plasmid

Product Name	Storage	Pkg. Size	Wako Cat.No.
GM Potato Detection New Leaf Plus Positive Control Plasmid	-20°C	50 µL 50 µL × 5	311-05301 317-05303



Product Name	Storage	Pkg. Size	Wako Cat. No.
GM Maize Detection Positive Control Plasmid	-20°C	50 µL	314-04811
GM Soybean (RRS) Detection Positive Control Plasmid	-20°C	50 µL	311-04941

### GM Potato New Leaf Plus Qualitative Test Reagents

Target Manuals: Ministry of Agriculture, Forestry and Fisheries JAS analytical test handbook, the 'Genetically Modified Food Inspection and Analysis Manual'

#### Oligonucleotides

Product Name	Storage	Pkg. Size	Wako Cat. No.
GM Potato Detection Pss (for endogenous gene) Oligonucleotide	-20°C	60 µL 180 µL	315-05701 311-05703
GM Potato Detection New Leaf Plus (for 1st screening) Oligonucleotide	-20°C	60 µL 180 µL	312-05711 318-05713
GM Potato Detection New Leaf Plus (for 2nd screening) Oligonucleotide	-20°C	60 µL 180 µL	319-05721 315-05723

#### Plasmid

Product Name	Storage	Pkg. Size	Wako Cat. No.
GM Potato Detection New Leaf Plus Positive Control Plasmid	-20°C	50 µL 50 µL × 5	311-05301 317-05303

### GM Potato New Leaf Y Qualitative Test Reagents

Target Manuals: Ministry of Health, Labour and Welfare released the 'Inspection methods for food produced with recombinant DNA techniques'.

#### Oligonucleotides

Product Name	Storage	Pkg. Size	Wako Cat. No.
GM Potato Detection Pss (for endogenous gene) Oligonucleotide	-20°C	60 µL 180 µL	315-05701 311-05703
GM Potato Detection New Leaf Y (for 1st screening) Oligonucleotide	-20°C	60 µL 180 µL	316-05731 312-05733
GM Potato Detection New Leaf Y (for 2nd screening) Oligonucleotide	-20°C	60 µL 180 µL	313-05741 319-05743

#### Plasmid

Product Name	Storage	Pkg. Size	Wako Cat. No.
GM Potato Detection New Leaf Y Positive Control Plasmid	-20°C	50 µL 50 µL × 5	319-05341 315-05343

### GM Potato New Leaf Y · SEMT15-02 Qualitative Test Reagents

Target Manuals: Ministry of Health, Labour and Welfare released the 'Inspection methods for food produced with recombinant DNA techniques'.

#### Oligonucleotides

Product Name	Storage	Pkg. Size	Wako Cat. No.
GM Potato Detection UGPase Oligonucleotide	-20°C	60 µL 180 µL	310-05991 316-05993
GM Potato Detection New Leaf Y SEMT 15-02(for 1st screening) Oligonucleotide	-20°C	60 µL 180 µL	317-06001 313-06003
GM Potato Detection New Leaf Y SEMT 15-02(for 2nd screening) Oligonucleotide	-20°C	60 µL 180 µL	314-06011 310-06013

#### Plasmids

Product Name	Storage	Pkg. Size	Wako Cat. No.
GM Potato Detection New Leaf Y SEMT 15-02 Positive Control Plasmid	-20°C	50 µL 50 µL × 5	311-06021 317-06023

### Pest-resistant Genetically Modified (GM) Rice (63Bt Rice, NNBt Rice, CpTI Rice) Qualitative Test Reagents

#### Oligonucleotide

Product Name	Storage	Pkg. Size	Wako Cat. No.
GM Rice Detection (CpTI) Oligonucleotide 2	-20°C	60 µL 180 µL	313-07561 317-07581

#### Primer & Oligonucleotide Sets

Product Name	Storage	Pkg. Size	Wako Cat. No.
GM Rice Detection PLD (for endogenous gene) Oligonucleotide Set 2	-20°C	1 Set	312-07531
GM Rice Detection (63Bt) Oligonucleotide Set 2	-20°C	1 Set	319-07541
GM Rice Detection (NNBt) Oligonucleotide Set 2	-20°C	1 Set	316-07551

#### Plasmid

Product Name	Storage	Pkg. Size	Wako Cat. No.
GM Rice Detection (IR) Rice Positive Control Plasmid 2	-20°C	50 µL 50 µL × 5	310-07571 316-07573

### ■ GM Rice (Bt Rice) Qualitative Test Reagents

Target Manuals: Ministry of Health, Labour and Welfare Food Safety Notice Number 0126005 Article 8: January 26, 2007 'Detection methods of Chinese rice-processed foods that have not completed safety inspection'

#### Oligonucleotides

Product Name	Storage	Pkg. Size	Wako Cat.No.
GM Rice Detection SPS (for endogenous gene) Oligonucleotide	-20°C	60 µL 180 µL	316-06691 312-06693
GM Rice Detection Cry1Ac Oligonucleotide	-20°C	60 µL 180 µL	319-06701 315-06703
GM Rice Detection Bt rice (for 1st screening) Oligonucleotide	-20°C	60 µL 180 µL	316-06711 312-06713
GM Rice Detection Bt rice (for 2nd screening) Oligonucleotide	-20°C	60 µL 180 µL	313-06721 319-06723

#### Plasmid

Product Name	Storage	Pkg. Size	Wako Cat.No.
GM Rice Detection Bt rice Positive Control Plasmid	-20°C	50 µL 50 µL × 5	317-06741 313-06743

#### HEX Calibration Probe

Product Name	Storage	Pkg. Size	Wako Cat.No.
HEX Calibration Probe	-20°C	3 mL	318-06771

### ■ GM Papaya PRSV Qualitative Test Reagent

#### Oligonucleotide

Product Name	Storage	Pkg. Size	Wako Cat.No.
GM Papaya Detection Chy (for endogenous gene) Oligonucleotide	-20°C	60 µL 180 µL	314-81231 310-81233

#### Primer & Oligonucleotide Sets

Product Name	Storage	Pkg. Size	Wako Cat.No.
GM Papaya Detection PRSV-YK(YK-2) Oligonucleotide Set	-20°C	1 Set	313-81201
GM Papaya Detection PRSV-SC Oligonucleotide Set	-20°C	1 Set	315-07881
GM Papaya Detection PRSV-YK(35S) Oligonucleotide Set		1 Set	310-81211

#### Plasmid

Product Name	Storage	Pkg. Size	Wako Cat.No.
GM Papaya Detection PRSV Positive Control Plasmid	-20°C	50 µL 50 µL × 5	312-07891 318-07893

### ■ GM Papaya (55-1) Qualitative Test Reagents

#### Oligonucleotide

Product Name	Storage	Pkg. Size	Wako Cat.No.
GM Papaya Detection Chy (for endogenous gene) Oligonucleotide	-20°C	60 µL 180 µL	314-81231 310-81233

#### Primer & Oligonucleotide Set

Product Name	Storage	Pkg. Size	Wako Cat.No.
GM Papaya Detection 55-1 (Event-specific) Oligonucleotide Set	-20°C	1 Set	310-07711

#### Plasmid

Product Name	Storage	Pkg. Size	Wako Cat.No.
GM Papaya Detection 55-1 Positive Control Plasmid 2	-20°C	50 µL 50 µL × 5	317-07721 313-07723

### ■ GM Papaya Qualitative Test Reagents

Target Manuals: Ministry of Health, Labour and Welfare released the 'Inspection methods for food produced with recombinant DNA techniques'.

#### Oligonucleotides

Product Name	Storage	Pkg. Size	Wako Cat.No.
GM Papaya Detection Papain (for endogenous gene) Oligonucleotide	-20°C	60 µL 180 µL	310-05751 316-05753
GM Papaya Detection 55-1 (for 1st screening) Oligonucleotide	-20°C	60 µL 180 µL	317-05761 313-05763
GM Papaya Detection 55-1 (for 2nd screening) Oligonucleotide	-20°C	60 µL 180 µL	314-05771 310-05773

## Plasmids

Product Name	Storage	Pkg. Size	Wako Cat. No.
GM Papaya Detection 55-1 Positive Control Plasmid	-20°C	50 µL 50 µL × 5	314-05411 310-05413

### ■ GM Canola (RT73 *B. rapa*) Qualitative Test Reagent Oligonucleotides

Product Name	Storage	Pkg. Size	Wako Cat. No.
B.rapa Discrimination ACCg8 Oligonucleotide	-20°C	60 µL 180 µL	313-07181 319-07183
B.rapa Discrimination BnC1 Oligonucleotide	-20°C	60 µL 180 µL	310-07191 316-07193

## Plasmids

Product Name	Storage	Pkg. Size	Wako Cat. No.
B.rapa Discrimination B.napus Positive Control Plasmid	-20°C	50 µL 50 µL × 5	316-07171 312-07173
B.rapa Discrimination B.rapa Positive Control Plasmid	-20°C	50 µL 50 µL × 5	317-07221 313-07223

## GMO DNA Extraction Kit for Grain

### ■ GM quicker [DNA Extraction Kit for Grain (such as maize and soybean)]

Product Name	Storage	Pkg. Size	Wako Cat. No.
GM quicker	2-10°C	50 Tests	317-06361

### ■ GM quicker 2 [DNA Extraction Kit for Rice, Canola, and Potato]

Product Name	Storage	Pkg. Size	Wako Cat. No.
GM quicker 2	2-10°C	50 Tests	310-06591
GM quicker 2 Enzyme Set	-20°C	1 Set	312-06671

### ■ GM quicker 3, GM quicker 4 [DNA Extraction Kit for processed food]

Product Name	Storage	Pkg. Size	Wako Cat. No.
GM quicker 3	2-10°C	50 Tests	311-07241
GM quicker 4	-20°C	50 Tests	316-07791

### ■ GM quicker 96 [DNA Extraction Kit for crushed corn seed]

Product Name	Storage	Pkg. Size	Wako Cat. No.
GM quicker 96	RT	384 Tests	319-07161

### ■ On-Site Column Set for GM quicker

This product consists of two types of columns. By using this product in conjunction with the buffer of the GM quicker component, DNA can be quickly extracted and purified from grain seed.

In addition, high-purity DNA extraction can be conducted without having to use large-scale machinery (e.g., centrifuge).

Product Name	Storage	Pkg. Size	Wako Cat. No.
On-Site Column Set for GM quicker	2-10°C	20 Tests	317-07341
GE1 Buffer	RT	500 mL	314-06371
GE2 Buffer	RT	200 mL	311-06381
RNase A (100 mg/mL)	RT	2.5 mL	318-06391
GW Buffer	RT	40 mL × 2	311-06641
GE2-K Buffer	RT	100 mL	318-06651
GB3 Buffer	RT	12.5 mL × 2	315-06661

## Others

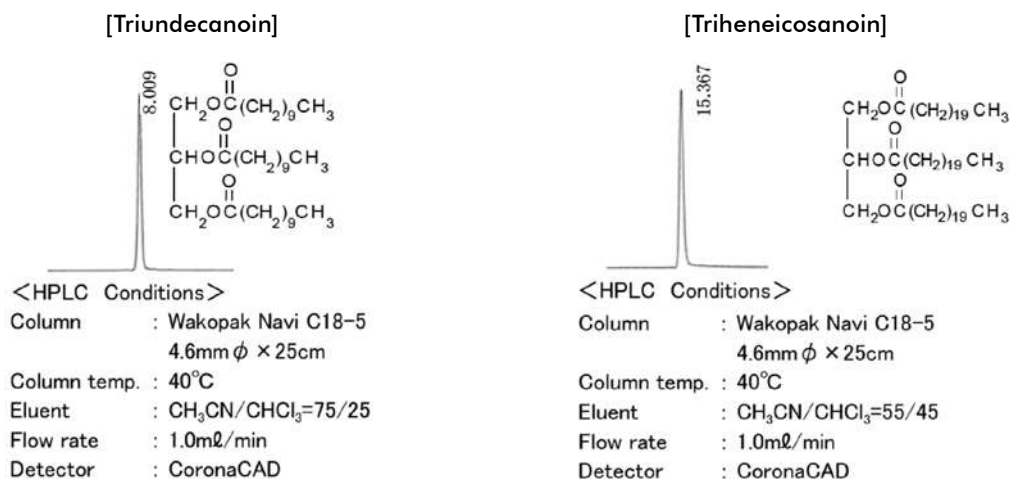
### trans-Fatty Acid Analysis

It is known that *trans*-fatty acid is produced by hydrogenation, etc., in the process of manufacture of hydrogenated oils such as margarine or shortening, etc. There are reports that the action of *trans*-fatty acid increases LDL cholesterol, known as bad cholesterol, and that continuing to ingest large quantities of *trans*-fatty acid increases the risk of ischemic heart disease due to arteriosclerosis, etc. Against this background, there are moves to investigate making it obligatory to label the content of *trans*-fatty acid in food in Japan too.

Capillary gas chromatography has been adopted as the provisional method \* for the measurement of *trans*-fatty acid content in JOCS Standard Methods for the Analysis of Fats, Oils and Related Materials.

We handles the *trans*- substances methyl linolenate and  $\alpha$ -methyl linolenate, which are useful in confirming the detection position of *trans* -fatty acids.

\* Reference: JOCS Standard Methods for the Analysis of Fats, Oils and Related Materials: Provisional method 17-2007 *trans*-fatty acid content (capillary gas chromatography)



### Internal standards

Product Name	Storage	Grade	Pkg.Size	Wako Cat.No.
Triundecanoin Standard	-20°C	for Food Analysis	100 mg	203-18781
Triundecanoin Standard	-20°C	for Food Analysis	100 mg	200-18791
Triheptadecanoin Standard	-20°C	for Food Analysis	100 mg	203-18801
Triheneicosanoin Standard	-20°C	for Food Analysis	100 mg	205-18501
Tritricosanoin Standard	-20°C	for Food Analysis	100 mg	200-18811

### Related Products

#### • Internal standard

Product Name	Storage	Grade	Pkg.Size	Wako Cat.No.
Heptadecanoic Acid Standard	2-10°C	for Food Analysis	100 mg	084-08661

#### • Esterification reagent

Product Name	Storage	Grade	Pkg.Size	Wako Cat.No.
Boron Trifluoride Methanol Complex Methanol Solution [About 14-15% (BF <sub>3</sub> )]	RT	for Gas Chromatography	25 g 400 g	029-06172 021-06171

#### • Standards (Highly-Unsaturated Fatty Acid C:18)

Product Name	Storage	Grade	Pkg.Size	Wako Cat.No.
Methyl 9,12-Octadecadienoate Standard (mixture of <i>cis</i> - and <i>trans</i> -) [ <i>trans</i> -Methyl Linoleate]	2-10°C	for Food Analysis	200 mg	133-16271
Methyl 9,12,15-Octadecatrienoate Standard (mixture of <i>cis</i> - and <i>trans</i> -) [ <i>trans</i> -Methyl $\alpha$ -Linolenate]	2-10°C	for Food Analysis	200 mg	130-16281

### Fatty Acid Methyl Esters

#### Saturated Fatty Acid Methyl

Product Name	Storage	Grade	Pkg.Size	Wako Cat.No.
Methyl Palmitate Standard	2-10°C	for Gas Chromatography	1 g	135-07963
Methyl Stearate Standard	2-10°C	for Gas Chromatography	5 g	136-07971
Methyl Arachidate Standard	-20°C	for Food Analysis	100 mg	130-17261

#### Mono Unsaturated Fatty Acids (*cis*-)

Product Name	Storage	Grade	Pkg.Size	Wako Cat.No.
Methyl Oleate Standard	2-10°C	for Gas Chromatography	1 g	139-08583
Methyl <i>cis</i> -11-Octadecenoate Standard	-20°C	for Food Analysis	100 mg	133-17251
Methyl <i>cis</i> -11-Eicosenoate Standard	-20°C	for Food Analysis	100 mg	137-17271

**Mono Unsaturated Fatty Acids (*trans*)**

Product Name	Storage	Grade	Pkg. Size	Wako Cat. No.
Methyl Elaidate Standard	-20°C	for Food Analysis	100 mg	136-17241
Methyl Vaccenate Standard	-20°C	for Food Analysis	100 mg	134-17281

**■  $\alpha$ -Linolenic Acid, Linolenic Acid**

Product Name	Storage	Grade	Pkg. Size	Wako Cat. No.
$\alpha$ -Linolenic Acid, from Plants	-20°C	Wako Special Grade	1 g 5 g	122-05831 128-05833
Linoleic Acid, from Plants	-20°C	Wako Special Grade	5 g 25 g	125-05821 123-05822





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Listed products are intended for laboratory research use only, and not to be used for drug, food or human use.  
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