Analysis of Pesticide residue (Chlorothalonil) in Spinach

INTRODUCTION

Chlorothalonil is a pesticides used as a disinfectant. The standard value for the residue in farm products is specified as shown in the table below by the Food Sanitation Law. This time, by using the analysis kit which allows simple and rapid preparation, chlorothalonil in spinach was assayed. The addition recovery test at 1/10 of the concentration for the standard (0.4 ppm) showed that the recovery was 103 ± 11 %. Thus, it was confirmed that the highly sensitive assay is possible.

METHOD

Analyte : Chlorothalonil (organochlorine disinfectant)
Measurement method : Pesticide residue analysis by ELISA (immunoassay)
Reagent : Pesticide residue analysis kit by HORIBA, Ltd.
“SmartAssay series analysis kit for chlorothalonil”
pH-adjusting reagent by HORIBA, Ltd.
Assay range : 0.15 - 1.5 ppb

PREPARATION

Refer to the following pages.
(Sheet No. UV080019-02, UV080019-03)

INSTRUMENT CONDITIONS

INSTRUMENT : U-1900
BANDPASS : 4 nm
WAVELENGTH : 450 nm

OTHER INSTRUMENTS

Micro cell
(P/N : 130-0622)
Micro cell holder
(P/N : 330-0102)

Working Curve

![Absorbance vs Concentration Graph]

Standard values for chlorothalonil in farm products

<table>
<thead>
<tr>
<th>Farm products</th>
<th>Standard value (ppm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Spinach</td>
<td>4</td>
</tr>
<tr>
<td>Cabbage</td>
<td>2</td>
</tr>
<tr>
<td>Chinese cabbage</td>
<td>2</td>
</tr>
<tr>
<td>Lettuce</td>
<td>1</td>
</tr>
<tr>
<td>Green onion</td>
<td>5</td>
</tr>
<tr>
<td>Cucumber</td>
<td>5</td>
</tr>
<tr>
<td>Tomato</td>
<td>5</td>
</tr>
<tr>
<td>Green pepper</td>
<td>7</td>
</tr>
<tr>
<td>Apple</td>
<td>2</td>
</tr>
<tr>
<td>Strawberry</td>
<td>8</td>
</tr>
</tbody>
</table>

Addition Recovery Test (Added at the standard value)

<table>
<thead>
<tr>
<th>Spinach</th>
<th>Spinach + 4 ppm</th>
<th>Recovery</th>
</tr>
</thead>
<tbody>
<tr>
<td>ND</td>
<td>3.81 ± 0.28 ppm</td>
<td>95 ± 7%</td>
</tr>
</tbody>
</table>

Addition Recovery Test (Added at 1/10 of the standard value)

<table>
<thead>
<tr>
<th>Spinach</th>
<th>Spinach + 0.4 ppm</th>
<th>Recovery</th>
</tr>
</thead>
<tbody>
<tr>
<td>ND</td>
<td>0.41 ± 0.05 ppm</td>
<td>103 ± 11%</td>
</tr>
</tbody>
</table>

KEY WORDS


Spectrophotometer (UV)

Sheet No. UV080019-01

Hitachi High-Technologies Corporation
Pretreatment for Analysis of Pesticide Residue (Chlorothalonil)

[1. Preparation of Sample Solution]

- Pulverize 300 g of samples such as vegetables and fruits by food processor.
- Collect 1 mL of the filtrate. Container: Screw top bottle (transparent)
- Add 30 mL of pH-adjusting reagent (*1)
- Pulverize the sample (homogenization) Use a homogenizer
- Collect 5.5 g of the sample. Container: centrifuge tube
- Add 25 mL of methanol
- Extraction 30 min Use a shaker (120 times/min)
- Filtration
- Collect 1 mL of the filtrate. Container: Screw top bottle (transparent)
- Add 7.5 mL of purified water (*2)
- Sample solution (high concentration) Dilute with 10% methanol
- Sample for measurement

[2-1. Preparation of Sample for Measurement]

- Collect 150 μL of the sample for measurement. Container: glass test tube
- Add 150 μL of enzyme labeling solution (*3)
- Stir
- Sample mix solution
- Collect 100 μL of sample mix solution. Container: micro plate (*4)
- Reaction 15 - 30°C, 1 hour
- Sample mix solution Removal by suction
- Clean with the cleaning solution (*5) 300 μL × 3 times
- Add 100 μL of coloring reagent (*6)
- Reaction 15 - 30°C, 10 min
- Add 100 μL of coloring stopping reagent (*7)
- Absorbance measurement at 450 nm

*1 : pH-adjusting reagent for chlorothalonil analysis
*2 - *7 : Pesticide residue analysis kit, SmartAssay series analysis kit for chlorothalonil

- For the operative methods for *1 - *7, check the instructions for each reagent.
- Please contact HORIBA for the effects of the interfering substances and details of the reagents when using the reagents.

KEY WORDS

Spectrophotometer (UV)

Sheet No. UV080019-02

Hitachi High-Technologies Corporation
**[Pretreatment of Solutions for Calibration Curve]**

**[2-2. Pretreatment of Solutions for Calibration Curve]**

- **Collect 150 μL of the standard solution** (*8)
  Container: glass test tube
  Add 150 μL of enzyme labeling solution (*3)
  Stir
  **Collect 100 μL of standard mix solution**
  Container: micro plate (*4)
  Reaction at 15 - 30°C, 1 hour
  **Standard mix solution**
  **Competitive reaction**
  Clean with the cleaning solution (*5)
  300 μL × 3 times
  Add 100 μL of coloring reagent (*6)
  Reaction at 15 - 30°C, 10 min
  Add 100 μL of coloring stopping reagent (*7)
  Absorbance measurement at 450 nm

*3 - *8: Pesticide residue analysis kit, SmartAssay series analysis kit for chlorothalonil

- For the operative methods for *1 - *7, check the instruction for each reagent.
- Please contact HORIBA for the effects of the interfering substances and details of the reagents when using the reagents.