

# PRM Implementation: Sampling Techniques

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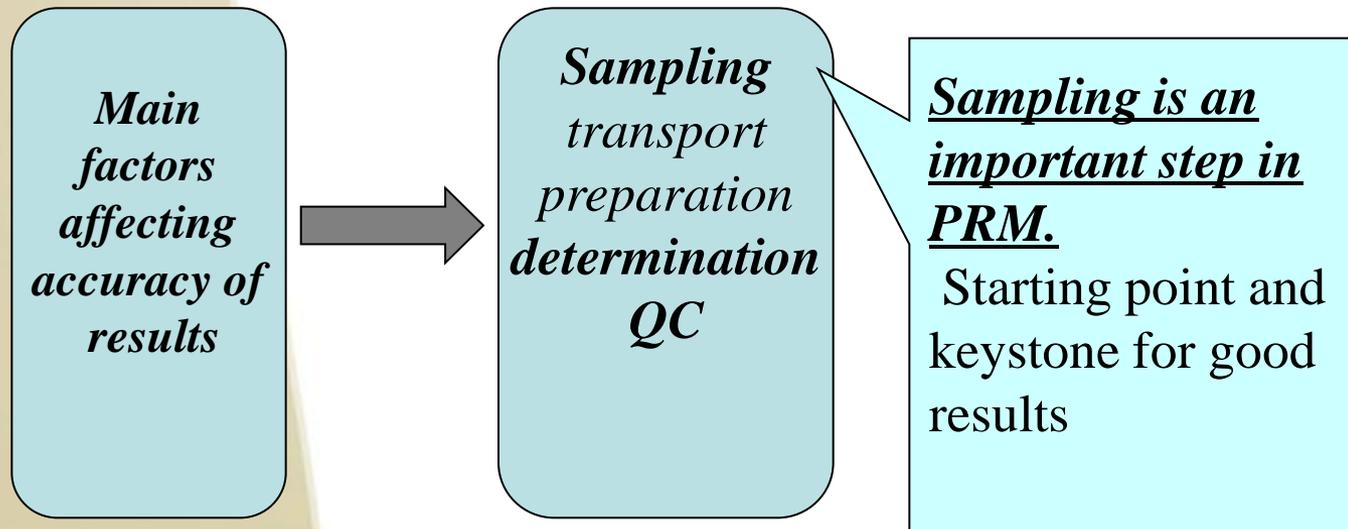
- Principle of sampling
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# 1. Principle of Sampling

## Concept of sampling

- Sampling: The **procedure** used to draw and constitute a sample.

The objective of these sampling procedures is to enable a representative sample to be obtained from a lot for analysis



# 1. Principle of Sampling

## **Purpose of sampling**

- **Compliance testing :**

Surveillance of pesticide residue, whether comply with MRL.

Representativeness of sampling is critical

- **Forensic testing :**

Testing existence of specific property. Timeliness and specific sampling

# 1. Principle of Sampling

- **Randomness**

Non-selective sampling, sample is taken in the lot should preferably be chosen

- **Representativeness**

The primary samples must consist of sufficient material to provide the laboratory sample(s) required from the lot. The lot can not be represented by a single unit.

Avoid abnormal unit such as plant with pest and disease.

# 1. Principle of Sampling

- **Feasibility**

Sampling procedures, tools, sampling quantity should be practical.

Efficient, economic in the basis of ensuring randomness, representativeness.

- **Impartiality**

Sampling should be completed under the direction of organization in charge. Sampling officers should take sample in person.

## 2. Sampling Design

### **Background investigation:**

- Review of residue data
- Regional intelligence on pesticide use
- Dietary importance of the food
- Information on the amount of imported food and domestic food
- Chemical characteristics and toxicity of the pesticide
- Production volume/pesticide usage patterns

## 2. Sampling Design

### **Sampling design Including:**

(1) **Purpose** : incidence/level monitoring, focused sampling

(2) **monitoring site:**

- geographic area (latitude and longitude cross point)
- Planting region
- Countryside/city
- Population

(3) **sampling site** : production base, production enterprise, wholesale market, supermarket, farmers market

## 2. Sampling Design

### (4) Sampling time:

production base: before harvest

production enterprise: production in storeroom

wholesale market: trading peak

### (5) Sample quantity :

$$n_0 = \frac{(Z_{\alpha/2})^2 \sigma^2}{L^2}$$

$n_0$ : minimal quantity

$\alpha$  : type I error (two-sided test, 0.05)

$Z_{\alpha/2}$ : critical value of normal distribution

$\sigma$  : degree of variation (residue level)

L: error (10~20%)

## 2. Sampling Design

### (6) Sampling procedure setting:

training- preparation- sampling- record- sample preparation-  
package- storage- shipping

### (7) Sampling officer: designated

## 2. Sampling Design

### Example 1:

PRM–MOA, China

- Sampling time : 4-a year
- Regional coverage : nationwide
- Variety : vegetable, fruit, tea, edible mushrooms
- Sampling quantity : vegetable 4000, fruit 540, tea 360, mushroom 610
- Pesticide coverage : 80 commonly used pesticides

## 2. Sampling Design

### Example 2:

Risk assessment—CFSA, China

- Sampling time : Fiscal year
- Regional coverage : nationwide
- Variety : vegetable, tea
- Sampling quantity : vegetable 9000, tea 1500
- Pesticide coverage : 35 commonly used pesticides

## 2. Sampling Design

### Example 3:

PRM – FDA, United States

- Sampling time : Fiscal Year
- Geographic Coverage: domestic (42 states) and imported (99 country)
- Variety : representative food, animal feed
- Sampling quantity : 1080 domestic samples, 4897 imported food
- Pesticide coverage: 203 detected /500 method detectable

## 2. Sampling Design

### Example 4:

Supervision and spot-check— MOA, China

### Example 5:

Focused sampling—FDA, United States



# 3. Conduct of Sampling

## Precautions

- Contamination and deterioration of samples must be prevented
- Preparation of sampling tools, files, record form, etc.
- Technical training of sampling officer



### 3. Conduct of Sampling

#### **Sampling officer :**

- Authorized by corresponding authorities
- Responsible
- Familiar with sampling procedures
- Consistent adherence to the specified sampling procedures

### 3. Conduct of Sampling

#### Collection of primary samples

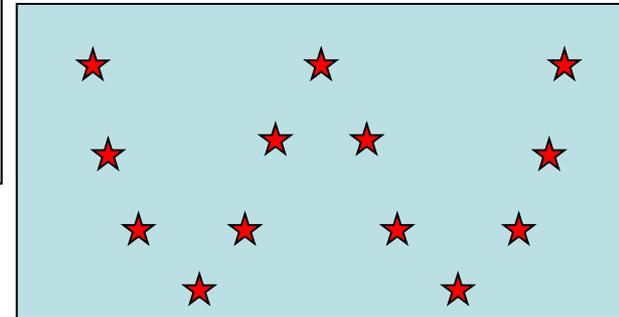
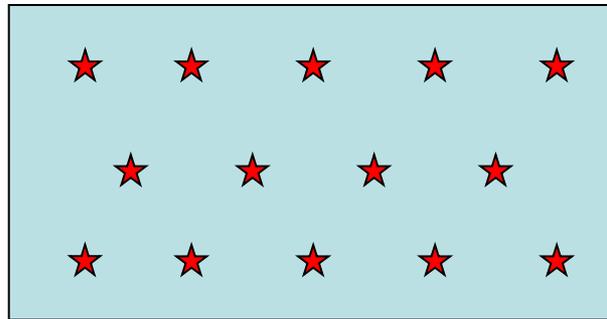
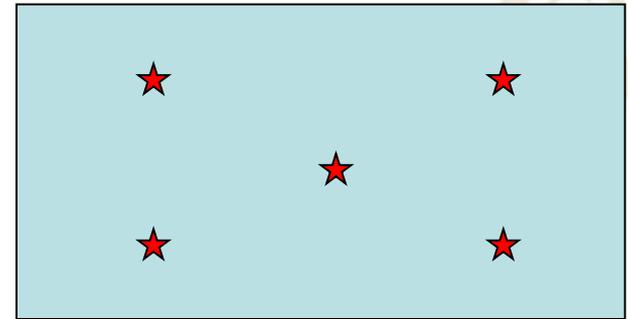
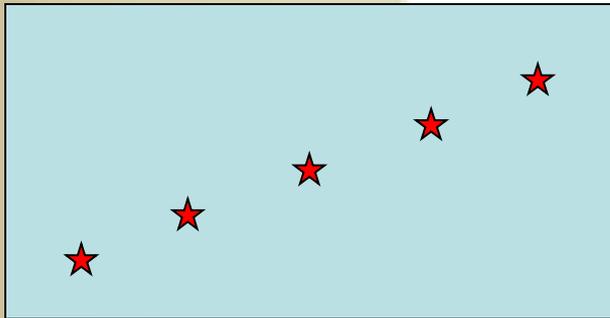
- Sampling from production base

Sample quantity: according to planting area

Planting area	Batch area	
< 10 hm <sup>2</sup>	1~3 hm <sup>2</sup>	One batch
> 10 hm <sup>2</sup>	3-5 hm <sup>2</sup>	One batch

# 3. Conduct of Sampling

*Sampling point*



### 3. Conduct of Sampling

- **FDA recommends**

superimposing an imaginary grid on the field, dividing it into approximately 100 areas, randomly selecting 10 areas, and collecting 0.5 kg portions from each section. This yields 10 increments in the composite, which is typical for medium-sized crops.

# 3. Conduct of Sampling

## Sampling from storeroom and market

(1) For packaged products:

<b>Package number in a lot</b>	<b>number of primary samples to be taken from the lot</b>
$\leq 100$	5
101~300	7
301~500	9
501~1000	10
$\geq 1000$	15 (minimum)

# 3. Conduct of Sampling

## Sampling from storeroom and market

(2) For bulk goods:

Weight (kg) or units in a lot	number or weight (kg) of primary samples to be taken from the lot
$\leq 200$	10
201~500	20
501~1000	30
1001~5000	60
$\geq 5000$	100 (minimum)

At least 5 units are sampled for large size fruit and vegetables (> 2kg for one unit)

# 3. Conduct of Sampling

## **Preparation of the laboratory sample**

- Where the bulk sample is larger than is required for a laboratory sample, it should be divided to provide a representative portion.
- A sampling device, quartering, or other appropriate size reduction process may be used but units of fresh plant products or whole eggs should not be cut or broken.

# 3. Conduct of Sampling

## Preparation of the laboratory sample

<b>products</b>	<b>Units or weight of samples</b>
Small fruits, walnut, hazel, chestnut, pea, green soy bean and others not included below	1kg
Cherry, morello, plum	2kg
Apricot, banana, pawpaw, citrus fruits, peach, apple, pear, grape, avocado, garlic, eggplant, beet, cucumber, cabbage, root vegetables, onion, pepper, radish, tomato	3kg
Pumpkin, watermelon, muskmelon, pineapple	5 units
Chinese cabbage, cauliflower, lettuce	10 units
sweet corn	10 units
Packaged vegetable	10 packages

# 3. Conduct of Sampling

## Packaging of laboratory samples

- Pack separately, avoid cross contamination
- Clean, inert container which provides secure protection from contamination, damage and leakage
- The container should be sealed, securely labelled and the sampling record must be attached

# 3. Conduct of Sampling

## Sampling Record

Sampling officers must record the complete information

- Sample name
- Sample number
- Sample status (brand name, grade, certificate, production date/batch lot, etc.)
- Sample size
- Sampling date
- location ( GPS coordinate if needed )
- Information of producer (name, address, contacts, phone)
- Name of sampling officer

# 3. Conduct of Sampling

## Transmission of the laboratory sample

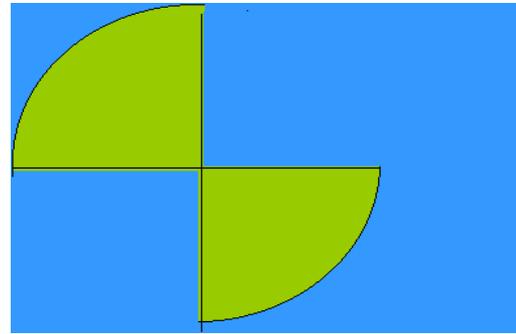
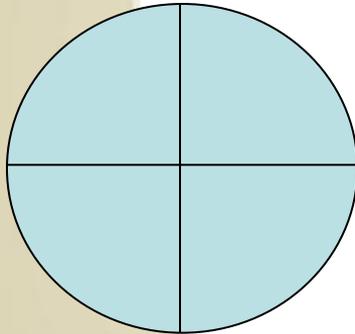
- Once packed, do not open the samples during the transmission
- Specialized staff in charge of transmission or mailing
- Fresh samples should be kept cool
- Frozen samples must remain frozen
- Receiving laboratories check the information and status of samples

## 4. Preparation of analytical sample

- **Pre-preparation**

Remove debris in the sample, deduct the sample to appropriate portion

- **Reduction method**



- **Specified samples**

Consistent to the specific requirement of analytical method

- Prepared sampled stored in appropriate container and stored

# REFERENCE

- **ISO 874:1980** Fresh fruits and vegetables – Sampling
- **COMMISSION DIRECTIVE 2002/63/EC** establishing community methods of sampling for the official control of pesticide residue in and on products of plant and animal origin
- U.S. Food and Drug Administration. **Investigation Operations Manual**, <http://www.fda.gov/ICECI/Inspections/IOM/default.htm>
- **Codex Alimentarius Commission. CAC/GL 33-1999**. Recommended Methods of Sampling for the Determination of Pesticide Residues for Compliance with MRLs, 1999; <http://www.fao.org/home/en/> (accessed Jan 31, 2015).
- U.S. Department of Agriculture. Pesticide Data Program, Sampling SOPs and Commodity Specific Fact Sheets; <http://www.ams.usda.gov/AMSV1.0/> (4th quarter 2014).

***THANK YOU!***