GUIDELINES ON RESIDUE DATA REQUIREMENTS FOR PESTICIDE REGISTRATION

PESTICIDE BOARD
MALAYSIA

TABLE OF CONTENT

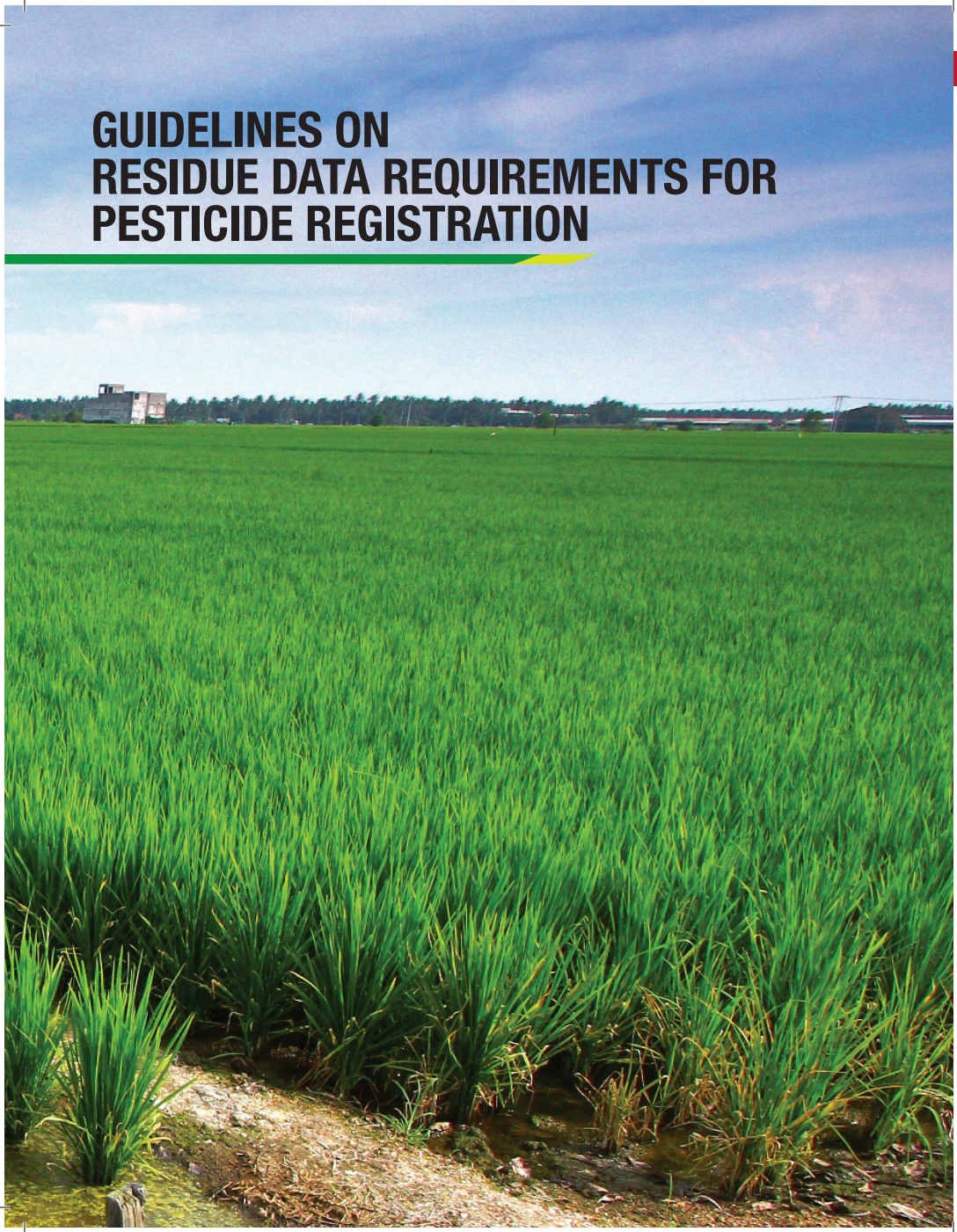
GLOSSARY

pesticide residue	"Pesticide residue" means any specified substances in food, agricultural commodities, or animal feed resulting from the use of a pesticide. The term includes any derivatives of a pesticide, such as conversion products, metabolites, reaction products, and impurities considered to be of toxicological significance. (Note: The term "pesticide residue" includes residues from unknown or unavoidable sources (e.g., environmental), as well as known uses of the chemical).
MRL	Maximum Residue Limit "MRL" is the maximum concentration of a pesticide residue (expressed as mg/kg), recommended to be legally permitted in or in food commodities and animal feeds. MRLs are based on GAP data and commodities that comply with the respective MRLs are intended to be toxicologically acceptable
PHI	Pre Harvest Interval "Pre Harvest Interval" is the time interval between the last pesticide application and harvest of the treated crops.
PSI	Pre Slaughter Interval "Pre Slaughter Interval" is the time interval between the last pesticide application and slaughter of the treated animal.
proprietary products	Any pesticide registered in Malaysia less than ten years
commodity products	Any pesticide which is not a proprietary pesticide

new recommendations	New crop recommended for any commodity pesticide
supervised residue trials	Residue trial designed in line with the requirements stated in 'Supervised Residue Trials in Crops and Plant Products, part 3 of 'FAO/WHO Codex Alimentarius Commission Guidelines on Producing Residues Data from Supervised Trials, 1990'.
local conditions	Local agriculture conditions that follow national GAP, which include weather, rainfall broadcast and climatic changes.
ADI	Acceptable Daily Intake "ADI" of a chemical is the daily intake which, during an entire lifetime, appears to be without appreciable risk to the health of the consumer on the basis of all the known facts at the time of the evaluation of the chemical. It is expressed in milligrams of the chemical per kilogram of body weight.
NOAEL	No Adverse Effects Level "No Adverse Effects Level" is the highest level of continual exposure to a chemical which causes no significant adverse effect on morphology, biochemistry, functional capacity, growth, development or life span of individuals of the target species which may be animal or human
Limit of Determination	"Limit of determination" is the lowest concentration of a pesticide residue or contaminant that can be identified and quantitatively measured in a specified food, agricultural commodity, or animal feed with an acceptable degree of certainty by a regulatory method of analysis.
pre-mixture product	Combination of an authorised pre-mix and one or more

subsequent protection product	active ingredient which are intended for the manufacture of a ready to use crop
field experiments	Experiment, research or trial conducted under actual use condition, instead of other controlled condition in the laboratory.

GUIDELINES ON RESIDUE DATA REQUIREMENTS FOR PESTICIDE REGISTRATION



A. INTRODUCTION

Residue data is required for registration of pesticides in order to:

(a) ensure that any residue of pesticides at the time of harvest does not exceed the maximum residue limits (MRLs), or in the absence of MRLs, either to enable MRLs to be established or to establish that MRLs are not necessary;

(b) recommend a suitable waiting period between the last application and harvest/ slaughter (pre-harvest interval, PHI/ pre-slaughter interval, PSI) or consumption of the commodity so that residues of pesticides would not exceed MRLs or in the absence of MRLs, are at levels which would not be of concern to human and animal health, and

(c) ensure that a workable method is available to analyze for pesticide residues in food and/ or in the environment.

B. REQUIREMENTS

The following requirements must be submitted:

1. **For all products**, a proposed label with clear instructions on how the pesticide is to be used. This is to enable correlation of the proposed use patterns with the method of application used in obtaining the residue data. The following must be clearly stated:

   (a) The target crop, stored product or livestock.

   (b) The method of application. This includes information on the equipment used, dosage (expressed as unit a.i. per unit area/volume), number of applications, timing of applications, etc.;

   (c) The stage of growth of the crop or the livestock when the pesticide is applied, if applicable; and

   (d) The recommended PHI, PSI, re-entry time, aeration period and other observations and limitations.

2. **For proprietary products only**, information on the physical, chemical and biological properties of the pesticide, nature and amounts of isomers, impurities and by-products which may be present in the technical or formulated products.

3. **For proprietary products only**, information on the behavior and metabolism/ degradation of the pesticide in crops and plant/ animal products and soil and the nature of the residues as well as its degradability as indicated by its half-life ($t_{½}$) in soil and water at 25° C and its mobility in soils as indicated by adsorption studies. The metabolism studies are to characterize the residues, usually by employing radio-labeled compounds. Information on the amount of bound residues in soil and plants and their bio-availability may also be requested. For studies with livestock, the study should indicate the distribution of residues in tissues, milk or eggs and whether the residues are accumulated in any part of the animal.

4. **For proprietary products, and commodity products with new recommendations**, detailed reports on supervised residue trials. Trials must be carried out on the recommended crops, livestock and stored products with the pesticides applied in the same manner as in the proposed label. In addition to the proposed label rates, an exaggerated rate (usually 2 times the proposed rate) should be studied. Studies should preferably be conducted under local conditions or in locations with similar conditions.

5. In addition the design and implementation of supervised residue trials should follow proposed critical Good Agriculture Practice (GAP) (maximum number of applications, timing of application(s) at the latest stage permitted within application scope, maximum application rate, minimum PHI/PSI), which would likely result in maximum residue. Other factors such as weather condition and agronomic/husbandry practice should also be considered when designing supervised residue trials.

6. **For proprietary products and commodity products with new recommendations,** a method of analysis for residues of the pesticide in the relevant matrix. For pesticides not used on food or on animals for consumption, a method of analysis for residues in the environment is required. The method can be a company method or a published method for which the source must be given. For methods to be accepted, the % recovery must be within the range of 70%-120%. If 70%-120% recovery is not attainable, methods having lower recoveries may be accepted if consistency can be shown. The recovery tests should be at levels found in practice and actual analysis of treated samples. Evidence on the workability, reproducibility, selectivity and sensitivity of the method must be submitted.

7. Information on MRL enforcement method (or known as post-registration method) should also be provided if possible. MRL enforcement method is usually in the form of multi-residue method used by regulatory authorities in enforcement of MRLs. Single-residue method may not be suitable for MRL enforcement as enforcement laboratories do not have sufficient capacity to perform single-residue methods on all pesticides. However certain active ingredients may not be suitable to be detected by enforcement method. Registrant should consult the Pesticide Board for possible establishment of enforcement method.

8. **For proprietary products, and commodity products with new recommendations,** proposals of PHI/PSI, other limitations and MRLs. The basis of the proposals must be clearly given and related to the residue and other data submitted. A statement on the Acceptable Daily Intake (ADI) and No Observed Adverse Effect Level (NOAEL) as derived from the toxicological data must be submitted. Similar information from other countries or international organizations should also be submitted as additional information.

9. Additional information in the form of summaries of residue trials may also be submitted but the complete report must be available on request. Evaluations by the FAO/WHO Joint Meeting on Pesticide Residues (JMPR) are acceptable as additional information ONLY and cannot replace actual residue studies.

10. If residue trial information on a particular commodity is not available, the applicant may request for information on a representative commodity to be accepted. See Appendix I for the grouping of commodities and the commodity which may be regarded as representative of those in the group. The onus is on the applicant to request for extrapolation of the data.

11. Residue data generated under local conditions is preferred but data from other countries/ locations with similar condition which reflect the principal growing regions of the recommended crop may be accepted. Published reports on relevant trials by researchers are acceptable as additional information.

12. For major crops, which are paddy, palm oil, cocoa beans, and black pepper, at least one field experiment must be generated under local condition.

13. Residue trials on certain commodities may not be required under certain situations such as when an insecticide/ fungicide is applied as a seed treatment or at the nursery stage of a perennial crop. (see Appendix III for the list of residue data exemption)

C. RESIDUE TRIALS

1. The FAO Guidelines on Producing Pesticide Residues Data from Supervised Trials, 1990, Part 3 on Residue Trials in Crops should be used as a basis in the design and execution of residue field trials. Where appropriate, Good Laboratory Practices (GLP) should be followed in carrying out the studies.

2. For crops not included in the Codex Classification of Foods and Animal Feeds (Guide to Codex Recommendations concerning Pesticide Residues, Part 4), the applicant is advised to submit a proposed residue trial protocol to the Pesticides Board for approval before commencing the trial. Appendix II contains examples of protocols for residue trials on oil palm and cocoa and residue requirements.

3. Field experiments must reflect the proposed use with respect to:
   - The rate and mode of application;
   - The number and timing of applications and
   - The formulations proposed

4. The location of the field experiments should reflect the principal growing regions of the crop.

   The field experiments must provide for residue dissipation or decline studies in which samples are taken at intervals during the period from the last applications of the pesticide to normal harvest. Sample for residue analysis must be taken at different period after the last application of the pesticide. The first sampling shall be done 2 hour after application (0 day). Sample shall be taken at least 4 times at various intervals depending on characteristic of pesticide and crop. The data obtained should indicate the pattern of uptake of the pesticide and its decline.

5. For pre-mixture product, a residue trial data based on a single active ingredient of the pre-mixture product is not accepted.

6. At least three field experiments done at different sites must be submitted. Replicate treatment of individual sites is usually not necessary since within-site variations are usually small compared to the variation between sites.

7. For fumigation trials on store products, the studies should adequately represent those commodities which might be treated, such as oily foods (nuts, copra), and high surface area foods (flour). The studies should reflect the effect of parameters such as temperature, time of exposure, dosage, pressure, aeration time etc. on the residue reduction.

8. For studies on livestock, data must show the level of residues that will result in the meat (muscle, liver, kidney and fat), poultry, (muscle, liver, kidney and fat), eggs and milk. The FAO Guidelines on Producing Pesticide Residues Data from Supervised Trials, 1990, Part 4 on Metabolism Studies and Supervised Residue Trials in Animals may be used in carrying out the studies.

9. Additional information on the reduction or concentration of residues due to post-harvest processing or household cooking would also be useful.

10. All data belonging to another company can only be evaluated if a letter of authorization is given.

D. RESIDUE TRIAL REPORT

1. The behavior of the pesticide deposit from application until harvest, possible formation of metabolites and identity of the metabolites should be reported in order to predict residue levels at harvest and to reach a preliminary judgement on the acceptability of the residues. The report should be certified by an authorized person of the agency or research institution carrying out the field trial and must contained the following information.

(a) General information

- Pesticide (active ingredient and trade name);
- Formulation;
- Trial number and type (field, glasshouse);
- Commodity (crop, animal etc);
- Variety;
- Test locations (country and site);
- Soil characteristics, pH, physical and chemical properties;
- Name(s) and signature(s) of the person(s) responsible for the trial.

(b) Application data for field trials.

- Crop planting or sowing date; & harvest date
- Plot plan, crop layout or cropping system;
- Plot size or number of plants per plot/unit area;
- Number of plots per treatment;
- Method of application and equipment;
- Number of applications and application dates;
- Application details (overall, banded or circle);
- Dose rate - weight of a.i. per hectare (in kg or g a.i/ha)
  - weight/volume of formulation/ hectare
  - applied dilution
- Climatic conditions during and after applications preferably for the whole period of the trial;
- Other pesticides applied to the trial plot; and
- Growth stage at (last) treatment.

(c) Sampling data

- Growth stage at sampling;
- Method of sampling;
- Sampled part(s);
- Number of units in sample, if relevant;
- Sample weight and preparation (trimming, washing or other common practices in preparing the commodity);
- Control and treated samples;
- Date of sampling with time interval between last application and sampling;
- Storage conditions before transporting to laboratory and
- Date shipped.

E. RESIDUE ANALYSIS REPORT

Analysis of major metabolites should also be included. Data obtained from surface striping are not acceptable except for crops where other data on that crop have established that the total residues are in fact only surface residues.

(a) Details on the method used.

- Full description or adequate reference;
- Apparatus;
- Chemicals and reagents;
- Data on selectivity of method;
- Data on limits of determination and quantification of the method for the commodity in question;
- Adequate recovery data at levels corresponding to those found in practice. The raw agricultural commodity, or a macerate thereof, should be fortified for the recovery tests, and not the crop extracts. For data to be accepted, the % recovery must be within the range of 70%-120%. The recovery tests should be at levels corresponding to those found in practice and actual analysis of treated samples. Evidence on the workability, reproducibility, selectivity and sensitivity of the method must be submitted.
- A statement on whether or not the results have been corrected for blanks, recoveries or both.
- In all cases, Good Laboratory Practices (GLP) or International Standard Scheme Accreditation must be adhered to.

(b) Preparation of sample.
Peeling, chopping, washing, removing of soil, drying, separation of oil or fat or juice, cooking, separation of seed from the pulp, milling.

(c) Presentation of data.
All analytical data obtained from the analysis of samples should be provided, and not just a summary or an average figure. It should be clearly stated how the residues are calculated and expressed. Chromatographic and/or spectrophotometric evidence to support the analysis data must be submitted. Raw data from the laboratory need not be submitted but must be available on request.

REFERENCES

1. Codex Alimentarius Commission Vol. 2 – Pesticides Residues in Food, 1993.

2. EPA Code of Federal Regulations, 40, Parts 150-189, 1986

3. EPA Good Laboratory Practices Standards, Code of Federal Regulations, 40, Part 160, 1990

4. FAO/WHO Codex Alimentarius Commission Guidelines on Producing Residues Data for Supervised Trials, 1990 in 5 Parts

5. FAO Manual on the Submission and Evaluation of Pesticide Residues Data for the Estimation of Maximum residue Levels in Food and Feed, 2009

6. Official Journal of the European Communities, Vol. 4.89, 1989

7. Principles for Identifying Unacceptable Pesticides, The Swedish National Chemicals Inspectorate 1992

8. Report on Short-term Consultancy by J.A.R. Bates to the Malaysian-German Pesticide Project 1987

9. United States Environment Protection Agency Pesticide Assessment Guidelines, Sub-division O, Residue Chemistry

IMPORTANT NOTES

1. THE COMMODITY GROUPS OF APPENDIX I MAY CONTAIN THE NAMES OF ONLY THE MORE IMPORTANT OR FAMILIAR COMMODITIES. IF A COMMODITY IS NOT LISTED IN THE GROUP IT IS SUPPOSED TO BE, REFER TO THE PESTICIDES BOARD OR CODEX "INDEX OF FOOD AND ANIMAL FEED COMMODITIES" TO DETERMINE THE COMMODITY GROUP OF THAT COMMODITY.

2. IN SOME GROUPS, ANY COMMODITY IN A GROUP CAN REPRESENT ANOTHER COMMODITY IN THE SAME GROUP IN RESIDUE TRIALS. NOTWITHSTANDING THAT HOWEVER, IF THE PESTICIDES BOARD IS OF THE OPINION THAT THE RESIDUE TRIALS OF A COMMODITY DO NOT TRULY REPRESENT THE EXPOSURE TO PESTICIDES OF ANOTHER COMMODITY FOR WHICH THE PESTICIDE IS RECOMMENDED, THEN RESIDUE TRIALS OF THE SPECIFIC COMMODITY FOR WHICH THE PESTICIDE IS RECOMMENDED WILL BE REQUIRED.

APPENDIX

APPENDIX I

INDEX OF CLASSES, TYPES AND GROUPS OF COMMODITIES

	No.	Group
CLASS A	*PRIMARY FOOD COMMODITIES OF PLANT ORIGIN*	
Type 1	FRUITS	
	001	Citrus fruits
	002	Pome fruits
	003	Stone fruits
	004	Berries and other small fruits
	005	Assorted tropical and sub-tropical fruits-edible peel
	006	Assorted tropical and sub-tropical fruits-inedible peel
Type 2	VEGETABLES	
	009	Bulb vegetables
	010	Brassica (cole or cabbage) vegetables, Head cabbage, Flowerhead brassicas
	011	Fruiting vegetables, Cucurbits
	012	Fruiting vegetables, other than cucurbits
	013	Leafy vegetables (including brassica leafy vegetables)
	014	Legume vegetables
	015	Pulses
	016	Root and tuber vegetables
	017	Stalk and stem vegetables
Type 3	GRASSES	
	020	Cereal grains
	021	Grasses for sugar or syrup production

	No.	Group
Type 4	**NUTS AND SEEDS**	
	022	Tree nuts
	023	Oilseed
	024	Seed for beverages and sweets
Type 5	**HERBS AND SPICES**	
	027	Herbs
	028	Spices

COMMODITY GROUPS

CLASS A : PRIMARY FOOD COMMODITIES OF PLANT ORIGIN

TYPE 1: FRUITS

Group No. 001 : Citrus fruits

Citrus fruits are produced on trees or shrubs of the family *Rutaceae*. These fruits are characterized by aromatic oily peels, globular forms and interior segments of juice-filled vesicles. The fruit is fully exposed to pesticides during the growing season.

Post-harvest treatments with pesticides and liquid waxes are often carried out to avoid deterioration during transport and distribution due to fungal diseases, insect pests or loss of moisture.

The fruit pulp may be consumed in succulent form and as a juice. The entire fruit may be used for preserves.

Portion of the commodity to which the MRL applies (and which is analyzed): ***Whole commodity***.

Common Name	Local Name/Other Name	Scientific Name
Lemon	Lemon	*Citrus limon*
Pomelo	Limau bali, limau besar, limau tambun	*Citrus grandis / Citrus maxima*
Grapefruit	Limau gedang	*Citrus paradise*
Musk lime / Calamondin	Limau kasturi	*Citrus mitis*
Mandarin orange	Limau madu / limau langkat	*Citrus suhuiensis, Citrus reticulata*
Lime	Limau nipis	*Citrus aurantifolia*
Kaffir lime / Leech lime	Limau purut	*Citrus hystrix*

Representative Crop : Mandarin orange

Group No. 002 : Pome fruits

Pome fruits are produced on trees and shrubs belonging to certain genera of the rose family *(Rosaceae)*, especially the genus *Malus* and *Pyrus*. They are characterized by fleshy tissue surrounding a core consisting of parchment-like carpels enclosing the seeds.

Pome fruits are fully exposed to pesticides applied during the growing season. Post-harvest treatments directly after harvest may also occur. The entire fruit, except the core, may be consumed in the succulent form or after processing.

Portion of the commodity to which the MRL applies (and which is analyzed): ***Whole commodity after removal of stems.***

Common Name	Local Name/Other Name	Scientific Name
Apple	Epal	*Malus pumila*
Pear	Pir	*Pyrus communis L.*

Representative crop : any of the group

Group No. 003 : Stone fruits

Stone fruits are produced on trees belonging to the genus *Prumus* of the rose family *(Rosaceae)*. They are characterized by fleshy tissue surrounding a single hard-shelled seed. The fruit is fully exposed to pesticides applied during the growing season (from fruit setting until harvest). Dipping of fruit after harvest, especially with fungicides, may also occur.

The entire fruit, except the seed, may be consumed in a succulent or processed form.

Portion of the commodity to which the MRL applies (and which is analyzed): ***Whole commodity after removal of stems and stones, but the residue calculated and expressed on the whole commodity without stem.***

Common Name	Local Name/Other Name	Scientific Name
Cherries	Ceri	*Prunus avium*
Apricot	Apricot	*Prunus armeniaca L.*
Peach	Pic	*Prunus persica L.*
Plum (including prunes)	Plum	*Prunus domestica L.*

Representative crop : any of the group

Group No. 004 : Berries and other small fruits

Berries and other small fruits are derived from a variety of perennial plants and shrubs having fruit characterized by a high surface: weight ratio. The fruits are fully exposed to pesticides applied during the growing season (blossoming until harvest).

The entire fruit, often including seed, may be consumed in a succulent or processed form.

Portion of the commodity to which the MRL applied (and which is analyzed): ***Whole commodity after removal of cap and stems. Currants, Black, Red, White: fruit with stem.***

Common Name	Local Name/Other Name	Scientific Name
Grapes	Anggur	*Vitis vinifera*
Strawberry	Strawberri	*Fragaria vesca*

Representative crop : any of the group

Group No. 005 : Assorted tropical and sub-tropical fruits-edible peel

The assorted tropical and sub-tropical fruits-edible peel are derived from the immature or mature fruits of a large variety of perennial plants, usually shrubs or trees. The fruits are fully exposed to pesticides during the growing season. (period of fruit development).

The whole fruit may be consumed in a succulent or processed form.

The Group 005 Miscellaneous fruits - edible peel is divided in 3 subgroups:

005 A Assorted tropical and sub tropical fruits - edible peel - small
005 B Assorted tropical and sub tropical fruits - edible peel - medium to large
005 C Assorted tropical and sub tropical fruits - edible peel - palms

Portion of the commodity to which the MRL applies (and which is analyzed): ***Whole commodity. Dates and Olives: Whole commodity after removal of stems and stones but residue calculated and expressed on the whole fruit.***

005 A Assorted tropical and sub tropical fruits - edible peel - small

Common Name	Local Name/Other Name	Scientific Name
Rose Apple/ Melaka jambu	Jambu bol	*Syzygium jambos/malaccense*
Water apple	Jambu air	*Syzygium javanica/aqueum*
Otaheite gooseberry	Cermai	*Phyllanthus acidus*

Representative crop : any of the group

005 B Assorted tropical and sub tropical fruits - edible peel - medium to large

Common Name	Local Name/Other Name	Scientific Name
Carambola	Starfruit, belimbing	*Averrhoa segi carambola*
Bilimbi	Belimbing buluh	*Averrhao bilimbi*
Guava	Jambu batu	*Psidium guajava*
Ambarella	Kedondong	*Spondias dulcis*
Sentul	Sentul	*Sandoricum koetjape*

Representative crop: guava, carambola

005 C Assorted tropical and sub tropical fruits – edible peel – palms

Common Name	Local Name/Other Name	Scientific Name
Date	Kurma	*Phoenix dactylifera L.*

Group No. 006 : Assorted tropical and sub-tropical fruits-inedible peel

The assorted tropical and sub-tropical fruits-inedible peel are derived from the immature or mature fruits of a large variety of perennial plants, usually shrubs or trees. Fruits are fully exposed to pesticides applied during the growing season (period of fruit development) but the edible portion is protected by skin, peel or husk.

The edible part of the fruits may be consumed in a fresh or processed form.

The group Miscellaneous fruits - inedible peel is divided in 5-6 subgroups:

006 A Assorted tropical and sub-tropical fruits - inedible peel - small
006 B Assorted tropical and sub-tropical fruits - inedible smooth peel - large
006 C Assorted tropical and sub-tropical fruits - inedible rough or hairy peel – large
006 D Assorted tropical and sub-tropical fruits - inedible peel - cactus
006 E Assorted tropical and sub-tropical fruits - inedible peel - vines
006 F Assorted tropical and sub-tropical fruits – inedible peel – palms

Portion of the commodity to which the MRL applies (and which is analyzed): ***Whole fruit unless qualified: e.g., banana pulp. Pineapple after removal of crown. Avocado, mangos and similar fruits with hard seeds: Whole commodity after removal of stone but calculated on whole fruit.***

006 A Assorted tropical and sub-tropical fruits – inedible peel – small

Common Name	Local Name/Other Name	Scientific Name
Cat's eyes	Mata kucing, Longan	*Euphoria malaiensis*
Laici/ Litchi	Laici	*Litchi chinensis*
Dokong	Dokong	*Lansium domesticum*
Duku	Duku	*Lansium domesticum*
Duku langsat	Duku langsat	*Lansium domesticum*
Langsat	Langsat	*Lansium domesticum*
Rambai	Rambai	*Baccaurea motleyana*

Representative crop : longan

006 B Assorted tropical and sub-tropical fruits – inedible smooth peel – large

Common Name	Local Name/Other Name	Scientific Name
Horse mango	Bacang	*Mangifera foetida*
Kuini	Kuini	*Mangifera odorata*
Mango	Mangga, mempelam, pauh	*Mangifera indica*
Plum mango/Gandaria	Kundang/kemior	*Bouea macrophylla*
Papaya	Betik	*Carica papaya*
Banana	Pisang	*Musa sapientum*
Mangosteen	Manggis	*Garcinia mangostana*
Pomegranate	Delima	*Punica granatum*
Avocado	Avokado	*Persea americana*

Representative crop : banana, papaya, mango

006 C Assorted tropical and sub-tropical fruits –inedible rough or hairy peel– large

Common Name	Local Name/Other Name	Scientific Name
Chempedak	Cempedak	*Artocarpus integer*
Jack fruit	Nangka	*Artocarpus heterophyllus*
Bread fruit	Sukun	*Artocarpus altilis*
Pineapple	Nenas	*Ananas comosus*
Durian	Durian	*Durio zibethinus*
Custard apple	Anona	*Annona squamosa*
Soursop	Durian belanda	*Annona muricata*
Bullock's heart	Nona kapri	*Annona reticulate*
Rambutan	Rambutan	*Nephelium lappaceum*
Pulasan	Pulasan	*Nephelium mutabile*
Chiku	Ciku, sapodilla	*Manilkara zapota*

Representative crop : pineapple

006 D Assorted tropical and sub-tropical fruits – inedible peel – cactus

Common Name	Local Name/Other Name	Scientific Name
Dragon fruit	Buah mata naga	*Hylocereus undatus*

006 E Assorted tropical and sub-tropical fruits – inedible peel – vines

Common Name	Local Name/Other Name	Scientific Name
Passion fruit	Markisa	*Passiflora edulis*
Kiwi fruit	Kiwi	*Actinidia deliciosa*

Representative crop : any of the group

006 F Assorted tropical and sub-tropical fruits – inedible peel – palms

Common Name	Local Name/Other Name	Scientific Name
Snakeskin fruit	Salak	*Salacca edulis*
Coconut, Young	Kelapa	*Cocus nucifera L.*

Representative crop : any of the group

TYPE 2 : VEGETABLES

Group No. 009 : Bulb vegetables

Bulb vegetables are pungent highly flavoured foods derived from fleshy scale bulbs in some commodities (including stem and leaves), of the *genus Allium* of the lily family *(Liliaceae)*. Bulb fennel is included in this group; the bulb-like growth of this commodity gives rise to similar residues.

The subterranean parts of the bulbs and shoots are protected from direct exposure to pesticides during the growing season.
The entire bulb may be consumed after removal of the parchment-like skin. The leaves and stems of some species or cultivars may also be consumed.

Bulb onions are bulb vegetables with mature bulbs. The entire bulb may be consumed after removal of the parchment-like skin.

Green onions are bulb vegetables with immature bulbs. Immature bulbs may be consumed and also leaves and stems of some species of cultivars may also be consumed.

009A Bulb onions : mature bulbs (dry)
009B Green onions : immature bulbs including leaves stems and flowers.

Portion of the commodity to which the MRL applies (and which is analyzed):
Bulb/dry onions and garlic: Whole commodity after removal of roots and adhering soil and whatever parchment skin is easily detached. Leeks and spring onions: Whole vegetable after removal of roots and adhering soil.

009A Bulb onions : mature bulbs (dry)

Common Name	Local Name/Other Name	Scientific Name
Garlic	Bawang putih	*Allium sativum*
Onion	Bawang besar	*Allium cepa*
Shallot	Bawang merah	*Allium cepa*

Representative crop : any of the group

009B Green onions : immature bulbs including leaves stems and flowers.

Common Name	Local Name/Other Name	Scientific Name
Chives/ Spring onion	Daun bawang	*Allium schoenoprasum*
Chinese chives	Kucai	*Apium odorum*
Leek	Bawang sayuran	*Allium ampeloprasum*

Representative crop : any of the group

Group No. 010 : Brassica (cole or cabbage) vegetables, Head cabbages, Flowerhead brassicas

Brassica (cole or cabbage) vegetables and flowerhead brassicas are foods derived from the leafy heads, stems and immature inflorescences of plants belonging to the *genus Brassica* of the family *Crucifera*. Although Kohlrabi does not fully comply with the description above, for convenience and because of the similarity in residue behaviour, the commodity is classified in this group. Kohlrabi has a tuber-like enlargement of the stem.

The edible part of the crop is partly protected from pesticides applied during the growing season by outer leaves, or skin (Kohlrabi).

The entire vegetable after discarding obviously decomposed or whitered leaves may be consumed.

010 A Flowerhead Brassicas
010 B Head Brassicas
010 C Stem Brassicas

Portion of the commodity to which the MRL applies (and is analyzed): ***Head cabbages and Kohlrabi: Whole commodity as marketed, after removal of obviously decomposed or withered leaves. Cauliflower and broccoli: flower heads (immature inflorescence only). Brussels sprouts: "buttons" only.***

010 A Flowerhead Brassicas

Common Name	Local Name/Other Name	Scientific Name
Broccoli	Bunga brokoli	*Brassica oleracea var. botrytis*
Cauliflower	Kubis bunga	*Brassica oleracea var. cauliflora*

Representative crop : broccoli

010 B Head Brassicas

Common Name	Local Name/Other Name	Scientific Name
Cabbages, head	Kubis bulat	*Brassica oleracea L.var. capitata L.*
Chinese cabbage	Kubis cina, wong nga pak	*Brassica chinensis*
Brussels sprouts		*Brassica oleracea L.var. gemmifera*

Representative crop : cabbage

Group No. 011 : Fruiting vegetables, Cucurbits

Fruiting vegetables, Cucurbits are derived from the immature fruits of various plants, belonging to the botanical family *Cucurbitaceae*; usually these are annual vines or bushes.

These vegetables are fully exposed to pesticides during the period of fruit development.
The edible portion of these fruits of which the inedible peel is discarded before consumption is protected from most pesticides, by the skin or peel, except from pesticides with a systemic action.

The entire fruiting vegetable or the edible portion after discarding the inedible peel may be consumed in the fresh form or after processing. The entire immature fruit of some of the fruiting vegetable species may be consumed, where as only the edible portion of the mature fruit of the same species, after discarding the then inedible peel, is consumed.

Portion of the commodity to which the MRL applies (and which is analyzed): ***Whole commodity after removal of stems.***

Common Name	Local Name/Other Name	Scientific Name
Angled loofah	Ketola, petola	*Luffa acutangula*
Bitter gourd	Peria	*Momordica charantia*
Cucumber	Timun	*Cucumis sativus*
Gherkin	Timun kecil	*Cucumis sativus*
Snake gourd	Ketola ular, petola ular	*Trichosanthes anguina*
Wax gourd	Kundor, winter melon	*Benincasa hispida*
Bottle gourd	Labu air	*Lagenaria siceraria*
Chayote	Labu siam	*Sechium edule*
Pumpkin	Labu manis	*Cucurbita moschata*
Squash	Labu	*Cucurbita maxima*
Zucchini	Zucchini	*Cucurbita pepo*
Melon (various varieties and cultivars)	Honey dew melon, muskmelon, rock melon, kantalop	*Cucumis melo*
Watermelon	Tembikai	*Citrullus lanatus*

Representative crop: cucumber, pumpkin, watermelon

Group No. 012 : Fruiting vegetables, other than Cucurbits

Fruiting vegetables, other than Cucurbits are derived from the immature and mature fruits of various plants, usually annual vines and bushes. The group includes edible fungi and mushrooms, being comparable organs of lower plants. Many plants of this group belong to the botanical family *Solanaceae*.

This group does not include fruits of vegetables of the botanical family *Cucurbitaceae* or the pods of vegetables of the *Leguminosae* family.

The vegetables of this group are fully exposed to pesticides applied during the period of fruit development, except those of which the edible portions are covered by husks, such as sweet corn and ground cherries (*Physalis spp.*). The latter fruiting vegetables are protected from most pesticides by the husk except from pesticides with a systemic action.

The entire fruiting vegetable or the edible portion after discarding husks or peels may be consumed in a fresh from or after processing.

Three subgroups are defined:
012A Tomatoes
012B Pepper and pepper-like commodities
012C Eggplant and eggplant-like commodities

Portion of the commodity to which the MRL applies (and which is analyzed): ***Whole commodity after removal of stems. Mushrooms: Whole commodity. Sweet corn*** **and** ***fresh corn: kernels plus cob without husk.***

012A Tomatoes

Common Name	Local Name/Other Name	Scientific Name
Tomato (various varieties and cultivars)	Tomato	*Lycopersium esculentum*

012B Pepper and pepper-like commodities

Common Name	Local Name/Other Name	Scientific Name
Capsicum	Lada besar, sweet pepper, Cili besar, bell pepper var.	*Capsicum annum grossum*
Chilli	Cili, cabai, lada	*Capsicum annum var. acuminatum*
Lady's finger	Okra, bendi	*Abelmoschus esculentus*
Roselle	Roselle	*Hibiscus sabdariffa*
Bird Chilli pepper	Cili burung	*Capsicum frutescens*

Representative crop : chilli, capsicum

012C Eggplant and eggplant-like commodities

Common Name	Local Name/Other Name	Scientific Name
Brinjal(various varieties and cultivars)	Eggplant, terung, aubergines	*Solanum melongena*

Group No. 013 : Leafy vegetables (including Brassica leafy vegetables)

Leafy vegetables are foods derived from the leaves of a wide variety of edible plants, usually annuals or biennials. They are characterized by a high surface to weight ratio. The leaves are fully exposed to pesticides applied during the growing season.
The entire leaf may be consumed, either fresh or after processing or household cooking.

013A Leafy greens
013B Brassica Leafy vegetables
013C Leaves of root and tuber vegetables
013D Leaves of trees, shrubs and vines
013E Leafy aquatic vegetables
013F Witloof
013G Leaves of Cucurbitaceae

Portion of the commodity to which the MRL applies (and which is analyzed): ***Whole commodity as usually marketed, after removal of obviously decomposed or withered leaves.***

013A Leafy greens

Common Name	Local Name/Other Name	Scientific Name
Amaranth	Bayam merah, chinese spinach	*Amaranthus gangeticus*
Ceylon spinach	Remayong	*Basella rubra*
Chinese box thorn	Kau kei	*Lycium chinese*
Fern shoots	Pucuk paku	*Athrium esculentum*
Garland chrysanthemum	Tong ho	*Chrysanthemum coronarium var.spatiosum*
Lettuce	Salad bulat, salad	*Lactuca sativa*
Spinach	Por choy	*Spinacia oleracea*
Indian lettuce	You mak, sayur minyak, sawi rana	*Lactuca indica*
Kesum	Kesum	*Polygonum minus*
Sirih	Sirih	*Piper betle*
Sweet shoot	Cekor manis, asin-asin	*Sauropus androgynus*
Meranti leaves	Pucuk meranti	*Shorea spp., Parashorea spp.*

Representative crop : lettuce, spinach

013B Brassica Leafy vegetables

Common Name	Local Name/Other Name	Scientific Name
Kale	Kailan	*Brassica alboglabra*
Leaf mustard	Sawi, sawi bunga/caixin, choy sum	*Brassica chinensis var. parachinensis*
Green mustard,	Indian mustard/ sawi pahit/ Chai sim, kai choy	*Brassica juncea*
Hybrid mustard	Sawi jepun/xiao baicai, sawi hybrid	*Brassica chinensis*
White mustard	Pak choy, sawi putih	*Brassica chinensis var. chinensis*

Representative crop : mustard, kale

013C Leaves of root and tuber vegetables

Common Name	Local Name/Other Name	Scientific Name
Cassava leaves	Pucuk ubi	*Manihot esculenta*
Yam leaves	Daun keladi	*Discorea spp.*

Representative crop : any of the group

013D Leaves of trees, shrubs and vines

Common Name	Local Name/Other Name	Scientific Name
Papaya leaves	Daun betik	*Carica papaya L.*

013E Leafy aquatic vegetables

Common Name	Local Name/Other Name	Scientific Name
Water cress	Semanggi/selada air	*Nasturtium officinale*
Kangkung	Kangkung	*Ipomoea aquatic*

Representative crop : any of the group

Group No. 014 : Legume vegetables

Legume vegetables are derived from the succulent seed and immature pods of leguminous plants commonly known as beans and peas.
Pods are fully exposed to pesticides during the growing season, whereas the succulent seed is protected within the pod from most pesticides, except pesticides with systemic action.

The succulent forms may be consumed as whole pods or as the shelled product.

Portion of the commodity to which the MRL applies (and which is analyzed): ***Whole commodity, unless otherwise specified.***

Common Name	Local Name/Other Name	Scientific Name
Butter bean	Kacang serinding, lima bean	*Phaseolus lunatus*
Four-angled bean, winged bean	Kacang botol, kacang kelisa	*Psophocarpus tetragonolobus*
French bean	Kacang buncis	*Phaseolus vulgaris*
Long bean	Kacang panjang	*Vigna sinensis*
Snow pea	Sweet peas, kacang wangi	*Pisum sativum*

Representative crop : Long bean, French bean

Group No. 015 : Pulses

Pulses are derived from the mature seeds, naturally or artificially dried, of leguminous plants known as beans (dry) and peas (dry).

The seeds in the pods are protected from most pesticides applied during the growing season except pesticides with systemic action. The dried beans and peas are often exposed to post-harvest treatments.

The dry pulses are consumed after processing or household cooking.

Portion of the commodity to which the MRL applies (and which is analyzed): ***Whole commodity.***

Common Name	Local Name/Other Name	Scientific Name
Chick pea (dry)	Kacang kuda	*Cicer arietinum*
Green gram (dry)	Kacang hijau/ mung bean (dry)	*Phaseolus aureus Roxb*
Red bean	Kacang sepalit	*Phaseolus calcaratus*
Sword bean	Kacang parang	*Canavalia gladiate*
Lima bean	Kacang serinding	*Phaseolus lunatus*
Lentil (dry)	Kacang dal	*Lens esculenta*
Cowpea	Kacang bol	*Vigna unguiculata*
Black gram	Kacang hitam	*Phaseolus mungo*
Groundnut	Kacang tanah	*Arachis hypogaea*
Soy bean	Kacang soya	*Glycine max*

Representative crop : any of the group

Group No. 016 : Root and tuber vegetables

Root and tuber vegetables are the starchy enlarged solid roots, tubers, corms or rhizomes, mostly subterranean, of various species of plants, mainly annuals.

The underground location protects the edible portion from pesticides applied to the aerial parts of the crop during the growing season; however, the commodities in this group are exposed to pesticide residues from soil treatments.

The entire vegetable may be consumed in the from of fresh or processed foods.

Portion of the commodity to which the MRL applies (and which is analyzed): ***Whole commodity after removing tops. Remove adhering soil (e.g. by rinsing in running water or by gentle brushing of the dry commodity)***

Common Name	Local Name/Other Name	Scientific Name
Arrow-root	Ubi garut	*Marania arundinacea*
Beet root	Ubi bit	*Beta vulgaris*
Carrot	Lobak merah, karot	*Daucus carota*
Ginger	Halia	*Zingiber officinale*
Lotus root	Leen gnow	*Nelumbo nucifera*
Tumeric	Kunyit	*Curcuma longa*
Radish	Lobak putih	*Raphanus sativus*
Galangal rhizome	Lengkuas	*Kaempferia galanga*
Tapioca	Cassava, ubi kayu	*Manihot esculenta*
Water chestnut	Ma'tai	*Eleocharis dulcis*
Yam	Ubi keladi, taro	*Colocasia esculenta*
Potato	Ubi kentang	*Solanum tuberosum*
Sweet potato	Keledek	*Ipomoea batatas*
Yam bean/ sweet turnip	Sengkuang, local	*Pachyrrhizua erosus*

Representative crop : carrot, potato

Group No. 017 : Stalk and stem vegetables

Stalk and stem vegetables are the edible stalks, leaf stems or immature shoots from a variety of annual or perennial plants. Although not actually belonging to this group, globe artichoke (the immature flowerhead) of the family *Compositae* is included in this group.

Depending upon the part of the crop used for consumption and the growing practices, stalk and stem vegetables are exposed, in varying degrees, to pesticides applied during the growing season.

Stalk and stem vegetables may be consumed in whole or in part and in the form of fresh, dried or processed foods.

Portion of the commodity to which the MRL applies (and which is analyzed): ***Whole commodity as marketed after removal of obviously decomposed or withered leaves. Rhubarb, leaf stems only; globe artichoke, flowerheads only; celery and asparagus, remove adhering soil.***

Common Name	Local Name/Other Name	Scientific Name
Artichokes	Articok	*Cynaria scolymus*
Asparagus	Lo shun	*Asparagus officinalis*
Yam stalk	Batang keladi	*Colocasia esculenta*
Bean sprouts	Taugeh	*Phaseolus aureus*
Celery(stem)	Saderi	*Apium graveolens*
Lemongrass	Batang Serai	*Cymbopogen citratus*
Bamboo shoots	Pucuk rebung	*Bambusa vulgaris*

Representative crop : celery

TYPE 3 : GRASSES

Group No. 020 : Cereal grains

Cereal grains are derived from the ears (heads) of starchy seeds produced by a variety of plants, primarily of the grass family *(Gramineae).*

The edible seeds are protected to varying degrees from pesticides applied during the growing season by husks. Husks are removed before processing and/ or consumption.

Cereal grains are often exposed to post-harvest treatments with pesticides:

Portion of the commodity to which the MRL applies (and which is analyzed): ***Whole commodity.***

Common Name	Local Name/Other Name	Scientific Name
Corn / maize	Jagung	*Zea mays*

Group No. 021 : Grasses for sugar or syrup production

Grasses for sugar or syrup production, includes species of grasses with high sugar content especially in the stem. The stems are mainly used for sugar or syrup production, and to a small extent as vegetables or sweets. The leaves, ears and several wastes of the sugar or syrup manufacturing process are used, among others, as animal feed.

The stems are exposed to pesticides during the growth stage and from pesticides applied for soil treatment.

Portion of the commodity to which the MRL applies (and which is analyzed): ***The stem only.***

Common Name	Local Name/Other Name	Scientific Name
Sugar cane	Tebu	*Saccharum officinarum*

Group No. 022 : The Nuts

Tree nuts are the seeds of a variety of trees and shrubs which are characterized by a hard inedible shell enclosing an oily seed.

The seed is protected from pesticides applied during the growing season by the shell and other parts of the fruit.

The edible portion of the nut is consumed in succulent, dried or processed form.

Portion of the commodity to which the MRL applies (and which is analyzed): ***Whole commodity after removal of shell. Chestnuts: whole in skin.***

Common Name	Local Name/Other Name	Scientific Name
Cashew nut	Biji Gajus	*Anacardium occidentale*
Chestnuts	Buah berangan	*Castanea sativa*

Representative crop : any of the group

Group No. 023 : Oilseed

Oilseed consists of seeds from a variety of plants used in the production of edible vegetable oils, seed meals and cakes for animal feed. Some important vegetable oil seeds are by-productions of fibre or fruit crops (e.g. cotton seed, olives).

Some of the oilseeds are, directly or after slight processing (e.g. roasting), used as food (e.g. peanuts) or for food flavouring (e.g. poppy seed, sesame seed).
Oilseeds are protected from pesticides applied during the growing season by the shell or husk.

Portion of the commodity to which the MRL applies (and which is analyzed): ***Unless specified, seed or kernels, after removal of shell or husk.***

Common Name	Local Name/Other Name	Scientific Name
Mustard seeds	Biji sawi	*Brassica nigra*
Coconut	Kelapa	*Cocos nucifera*
Peanut/ground nut	Kacang tanah	*Arachis hypogaea*

Representative crop : any of the group

Group No. 024 : Seed for beverages and sweets

The seed for beverages and sweets are derived from tropical and sub-tropical trees and shrubs. After processing, the seeds are used in the production of beverages and sweets.
These seed are protected from pesticides applied during the growing season by the shell or other parts of the fruit

Portion of the commodity to which the MRL applies (and which is analyzed): ***Unless specified, whole commodity (seed only, other parts of the fruit not included).***

Common Name	Local Name/Other Name	Scientific Name
Coffee beans	Biji kopi	*Coffea arabica*

TYPE 5: HERBS AND SPICES

Group No. 027 : Herbs

Herbs consist of leaves, flowers, stems and roots from a variety of herbaceous plants, used in relatively small amounts as condiments to flavour foods or beverages. They are used either in fresh or naturally dried form.

Herbs are fully exposed to pesticides applied during the growing season. Post-harvest treatments are often carried out on dried herbs.
Herbs are consumed as components of other foods in succulent and dried forms or as extracts of the succulent products.

Portion of the commodity to which the MRL applies (and which is analyzed): ***Whole commodity as prepared for wholesale or retail distribution.***

Common Name	Local Name/Other Name	Scientific Name
Coriander leaves	Daun ketumbar, chinese parsley	*Coriandrum sativum*
Curry leaves	Daun kari	*Murraya koenigii Spreng.* *Chalcas koenigii*
Pandan leaf	Pandan	*Pandanus amaryllifolius*
Indian pennywort	Pegaga	*Hydrocotyle asiatica*
Parsley	Parsli	*Petroselinum crispum*
Lemongrass	Daun Serai	*Cymbopogen citratus*
Stevia	Daun stevia	*Stevia rebaudiana (Bertoni)*

Representative crop : any of the group

Group No. 028 : Spices

Spices consists of the aromatic seeds, root, berries or other fruits from a variety of plants, which are used in relatively small quantities to flavour foods.

Spices are exposed in varying degrees to pesticides applied during the growing season. Also, post-harvest treatments may be applied to spices in the dried form.

They are consumed primarily in the dried form as condiments.

Portion of the commodity to which the MRL applies (and which is analyzed): ***Unless specified, whole commodity as marketed, mainly in the dried form.***

Common Name	Local Name/Other Name	Scientific Name
Black pepper	Lada hitam	*Piper nigrum*
Cumin, black	Jintan hitam	*Bunium persicum*
Cumin seed	Jintan putih	*Cuminum cyminum L.*
Star anise	Bunga lawang	*Illicium verum Hook. f*
Cinnamon bark	Kayu manis	*Cinnamon verum*

Representative crop : any of the group

APPENDIX II

REPORTING PROTOCOL FOR PESTICIDE RESIDUE TRIALS

RESIDUE TRIAL ON PADDY		
1.	**Objective**	To determine whether residues of the pesticide and its major metabolite(s) (if applicable) are present in various fractions of paddy after several treatments with the pesticide per season.
2.	**Product used**	State trade name, % w/w concentration of active ingredients and formulation
3.	**Test crop and variety must be stated**	
4.	**Location and number of trials:**	At least three (3) trials must be conducted at different locations with different soil conditions – state soil characteristics, PH, physical and chemical properties. 1 trial must be done in Malaysia.
		The trials cannot be considered independent if they are carried out at the same location within a growing season.
5	**Crop seasons:**	State paddy crop seasons. Paddy planting date and harvest date.
6	**Field design:**	Number of plot. Plot size – suggested minimum size plot – 5m x 5m. Replication within the plot is not necessary.
7	**Treatment**	control (no treatment with test pesticide) & at recommended rate
8	**Pesticide application:**	equipment and method of application, date and number of applications, interval between applications, spray volume, stage of crop growth during the applications, other pesticide used, climatic conditions during and after application but preferably during whole period of trial.

9	**Sampling:**	Random sampling. Begin with control plot followed by plot with the lowest rate to the highest rate in the trial.
		Dates of sampling: for herbicide where the application is at early stage – sampling at actual harvest only
		For other than herbicide - sampling at several different days after last treatment for example: 0,7,14, 30 days after last treatment
		Size of sample and sample parts: 1 kg of unpolished rice grain, 1 kg of polished rice grain, 500 g paddy straw and 500 g husk from each plot.
		Storage condition before shipment, date shipped and method of samples packaging –sampling to shipment period must be within 24-36 hours.
10	**Method of analysis:**	Detailed method of sample preparation and method used to analyse the sample, with laboratory evidence to support claims on the limits of detection, recovery at various concentrations, reproducibility of recovery and results obtained. State the reference method of analysis. Storage temperature and period of samples stored before the analysis. Storage stability study must be provided.
		Name of personnel involved in pesticide residue analytical phase. GLP or ISO laboratory certificate.
11	**Results and interpretation**	The analytical results of every sample should be clearly tabulated. This part should include the interpretation of the results and the justification for the proposals on MRL and PHI.
12	**Studies on livestock**	data must show the level of residues that will result in the meat (muscle, liver, kidney and fat), poultry (muscle, liver and fat), eggs and milk.
13	**Processing studies**	information on the reduction or concentration of residues due to post-harvest processing or household cooking

HERBICIDE RESIDUE TRIAL ON OIL PALM

1	**Objective**	To determine whether residues of a herbicide the pesticide and its major metabolite(s) (if applicable) are present in various fractions of palm oil after several treatments with the pesticide per season.
2.	**Product used**	State trade name, % w/w concentration of active ingredients and formulation.
3	**Location and number of trial**	Preferably more than one location At least three (3) trials must be conducted at different locations with differing soil conditions - state soil characteristics, pH, physical and chemical properties. 1 trial must be done in Malaysia.
4.	**Age of oil palms**	Should be fruiting (5 – 15 years old)
5.	**Field design**	Number of plot. Plot size – number of palms per treatment (~~a minimum of 5~~ at least 30 palms per treatment) and how palms are spaced.
		Replication within the plot is not necessary if variation is not expected.
6.	**Treatment**	control (no treatment with test pesticide)
		maximum at recommended rate
		- two times maximum recommended rate
		(expressed as units of active ingredient per unit area)
7.	**Pesticide application**	- Equipment and method of application,
		- Date and number of applications,
		Number of applications
		Interval between applications,
		Spray volume,
		Stage of crop growth during the applications,
		Other pesticides used,
		Climatic conditions during and after application but preferably during whole period of trial.

8. **Sampling**	Random sampling
	Begin with control plot followed by plot with the recommended lowest rate to the highest rate in the trial. and then the plot with 2x the recommended rate
	Dates of sampling – sampling at several different days treatment for example:
	- 0 day (worst case situation when contamination due to drift may occur)
	- 7 days, 14 days and 30 days after last treatment
	Size of sample and sample parts – 1 2 kg of fruitlets for fruit analysis and 40kg for oil analysis (mesocarp oil, mesocarp cake, kernel oil and kernel cake) from all the palms in each treatment to constitute a sample.
	The mesocarp oil is separated from the mesocarp and both the oil and the mesocarp cake are analyzed. The kernel nut is separated and the oil extracted. Both the oil and the kernel cake are analyzed.
	Storage condition before shipment, date shipped and method of samples packaging –sampling to shipment period must be within 24-36 hours.
9. **Treatment of samples**	The mesocarp oil is separated from the mesocarp and both the oil and the mesocarp cake are analyzed. The kernel nut is separated and the oil extracted. Both the oil and the kernel cake are analyzed.

10. **Method of analysis :**	Detailed method of sample preparation and method used to analyze the sample (or reference if already submitted previously), with laboratory evidence to support claims on the limits of detection, recovery at various concentrations, reproducibility of recovery and results obtained.
	State the reference method of analysis. Storage temperature and period of samples stored before the analysis. Storage stability study must be provided.
	Name of personnel involved in pesticide residue analytical phase. GLP or ISO laboratory certificate.
11. **Results and interpretation**	The analytical results of every sample should be clearly tabulated. This part should include the interpretation of the results and the justification for the proposals on MRL and PHI
12 **Studies on livestock**	data must show the level of residues that will result in the meat (muscle, liver, kidney and fat), poultry (muscle, liver and fat), eggs and milk.
13 **Processing studies**	information on the reduction or concentration of residues due to post-harvest processing or household cooking

Reference :
Part 3, FAO Guideline of Producing Residues Data from Supervised Trials, 1990

INSECTICIDE RESIDUE TRIAL IN COCOA

1.	**Objective**	To determine whether residues of the insecticide pesticide and its major metabolite(s) (if applicable) are present in cocoa beans after several treatments with the pesticide per season.
2.	**Product used**	State trade name, % w/w concentration of active ingredients and formulation.
3.	**Location and number of trial**	Preferably more than one location At least three (3) trials must be conducted at different locations with differing soil conditions - state soil characteristics, pH, physical and chemical properties. 1 trial must be done in Malaysia.
4.	**Age of cocoa**	fruiting
5.	**Field design**	Number of plot. Plot size – number of cocoa per treatment (a minimum of 20 trees per treatment) stating how trees are spaced.
		Replication within the plot is not necessary if variation is not expected.
6.	**Treatment**	- control (no treatment with test pesticide)
		- maximum at recommended rate
7.	**Pesticide application**	- Equipment and method of application,
		- Date and number of applications,
		Number of applications
		Interval between applications,
		Spray volume,
		Stage of crop growth during the applications,
		Other pesticides used,
		Climatic conditions during and after application but preferably during whole period of trial.

8. **Sampling**	Random sampling
	Begin with control plot followed by plot with the recommended lowest rate to the highest rate in the trial. and then the plot with 2x the recommended rate
	Dates of sampling – sampling at several different days treatment for example:
	- at 0 day
	- 3 days, 7 days, 14 days and 30 days after last treatment
	Size of sample – sufficient cocoa pods to yield 1 kg of beans after processing to constitute a sample
9. **Treatment of samples**	The cocoa pods should be cut open to remove the beans. The cocoa beans should then undergo a process of fermentation and drying following accepted practices before being sent for laboratory analysis.
	Storage condition before shipment, date shipped and method of samples packaging –sampling to shipment period must be within 24-36 hours.
10. **Method of analysis**	Detailed method of sample preparation and method used to analyze the sample (or reference if already submitted previously), with laboratory evidence to support claims on the limits of detection, recovery at various concentrations, reproducibility of recovery and results obtained.
	State the reference method of analysis. Storage temperature and period of samples stored before the analysis. Storage stability study must be provided.
	Name of personnel involved in pesticide residue analytical phase. GLP or ISO laboratory certificate.
11. **Results and interpretation**	The analytical results of every sample should be clearly tabulated. This part should include the interpretation of the results and the justification for the proposals on MRL and PHI

12	**Studies on livestock**	data must show the level of residues that will result in the meat (muscle, liver, kidney and fat), poultry (muscle, liver and fat), eggs and milk.
13	**Processing studies**	information on the reduction or concentration of residues due to post-harvest processing or household cooking
14	**Processing studies**	information on the reduction or concentration of residues due to post-harvest processing or household cooking

Reference :
Part 3, FAO Guideline of Producing Residues Data from Supervised Trials, 1990

RESIDUE TRIAL IN PEPPER	
1. **Objective**	To determine whether residues of the pesticide and its major metabolite(s) (if applicable) are present in cocoa beans after several treatments with the pesticide per season.
2. **Product used**	State trade name, % w/w concentration of active ingredients and formulation.
3. **Location and number of trial**	At least three (3) trials must be conducted at different locations with differing soil conditions - state soil characteristics, pH, physical and chemical properties. 1 trial must be done in Malaysia.
4. **Age of pepper**	fruiting
5. **Field design**	Number of plot. Plot size – number of pepper per treatment (a minimum of 20 trees per treatment) stating how trees are spaced.
	Replication within the plot is not necessary if variation is not expected.
6. **Treatment**	- control (no treatment with test pesticide)
	- at recommended rate
7. **Pesticide application**	- Equipment and method of application,
	- Date and number of applications,
	Interval between applications,
	Spray volume,
	Stage of crop growth during the applications,
	Other pesticides used,
	Climatic conditions during and after application but preferably during whole period of trial.

8. **Sampling**	Random sampling
	Begin with control plot followed by plot with the lowest rate to the highest rate in the trial.
	Dates of sampling – sampling at several different days treatment for example:
	- at 0 day
	- 3 days, 7 days, 14 days and 30 days after last treatment
	Size of sample –2 kg of fruits after processing to constitute a sample
	Storage condition before shipment, date shipped and method of samples packaging –sampling to shipment period must be within 24-36 hours.
9. **Method of analysis**	Detailed method of sample preparation and method
	used to analyze the sample (or reference if already submitted previously), with laboratory evidence to support claims on the limits of detection, recovery at various concentrations, reproducibility of recovery and results obtained.
	State the reference method of analysis. Storage temperature and period of samples stored before the analysis. Storage stability study must be provided.
	Name of personnel involved in pesticide residue analytical phase. GLP or ISO laboratory certificate.
11. **Results and interpretation**	The analytical results of every sample should be
	clearly tabulated. This part should include the interpretation of the results and the justification for the proposals on MRL and PHI

12. **Studies on livestock**	data must show the level of residues that will result in the meat (muscle, liver, kidney and fat), poultry (muscle, liver and fat), eggs and milk.
13. **Processing studies**	information on the reduction or concentration of residues due to post-harvest processing or household cooking

Reference :

Part 3, FAO Guideline of Producing Residues Data from Supervised Trials, 1990

APPENDIX III

LIST OF RESIDUE DATA EXEMPTION

Pesticide registration for the purpose of industry, public health, household, technical concentration, veterinary and agriculture commodity which is not food crop ex: ornamental do not require residue data.

Generally, the registrant/applicant has to submit residue data for the registration of a proprietary pesticide, or commodity pesticide with new recommendations intended to be used on an agricultural food commodity. Below are some cases where the submission of residue data is exempted for registration purposes.

1. The pesticide is applied for/at:
    - Seed treatment
    - Seedling stage
    - Preplanting stage
2. Any application of pesticide on oil palm plant below 2 years
3. Any application of pesticide on crop before flowering stage, except for systemic pesticide – evidence must be submitted to show that the application of the pesticide is required only before the flowering stage of the crop proposed
4. Any application of rodenticide in bait formulation

Application for residue data exemption other than cases listed above, full explanation/ justification on why the pesticide residue data should be exempted for registration purpose need to be submitted to the Pesticide Board.

*If the Pesticide Board is of the opinion that the residue data is exempted for registration purposes, then the submission of residue data will be required although it is listed as above.

CHECKLIST ON RESIDUE DATA REQUIREMENT

- ☐ Definitions of the residue relevant to Maximum Residue Limits (MRLs).

  _____
  _____
  _____

- ☐ Detailed reports on supervised residue trial on recommended crops based on accepted protocols. At least **three** field experiments done at different sites must be submitted.

  _____
  _____
  _____

- ☐ Residue analytical method with chromatograms for standard, control, sample and recovery test.

  _____
  _____
  _____

- ☐ Information on metabolism or degradation of the active ingredient in crops or plants.

  _____
  _____
  _____

- ☐ Acceptable Daily Intake (ADI) of the pesticide in mg/kg body weight.

  _____
  _____
  _____

- ☐ Proposed Pre-harvest Interval (PHI) or Pre-slaughter Interval (PSI).

  _____
  _____
  _____

☐ Proposed Maximum Residue Limits (MRLs) calculated based on Dietary Risk assessment of the pesticide.

_____

_____

_____

☐ Maximum Residue Limits (MRLs) from other countries that have registered the pesticide.

_____

_____

_____

REPORT ON PESTICIDE TRIAL. PART A FIELD REPORT

1. Please type or use block capitals

1. RESPONSIBILITY

1.	Year		3.	Company or Organisation Name and Address	
2.	Trial identity or number				
4.	Person (s) responsible for (include signature)		a. b. c. d.	Trial design ..... Application ..... Sampling ..... Analysis	

2. IDENTITY OF TRIAL

5.	Active ingredient (s) (common name)	6.	Class of pesticide of agricultural use	7.	Trade name (s) or Code number (s)	8.	Formulation		
							Type	Conc'n in SI units	Comm/ exper'l

Crop / commodity

9.	Type	
10.	Variety / cultivar	
11.	Codex commodity classification	

Location

12.	Country / region	
13.	Site or Map ref. (include address)	

14.	Pets / diseases	

3.	GENERAL INFORMATION ON THE TRIAL	Trial Identity or Number	
15.	Crop Production System or lay out e.g commercial orchard glasshouse; crop planting date; age of cro; guard rows; SOIL TYPE		

Plot data

16.	Plot dimension in international units		19.	Crop spacing	
17.	Number of plots per treatment (replicates)		20.	Number of plants per plot (if relevant)	
18.	Number of control plots		21.	Number of rows per plot (if relevant)	

22.	Previous year's pesticide treatment	
23.	Other pesticides applied to the plot (rates and times) during trial	
24.	Cultural treatment e.g irrigation, fertilizers	
25.	Summary of climatic conditions e.g temperature (^{0}C) rainfall wind sunlight (attach details if available)	

REPORT ON PESTICIDE RESIDUE TRIAL. PART A. FIELD REPORT

4. APPLICATION DATA

		Trial identity or Number	
26.	Method/equipment Type of application e.g spray to run-off, band, overall. Volume applied		
27.	Dose rate a.i g/ha		
28.	Dilution or spray Conc'n in SI units		
29.	Numbers of applications		
31	Growth state at last treatment*		

*Internationally recognized scales if available

5. SAMPLING

32.	Samples part of crop		36.	Growth stage at sampling	
33.	Method of sampling				
34.	No of samples per plot		37.	Sample Weight and treatment	
35.	No of units in Primary sample				

38. dates

sampling				
freezing				
Receipt in laboratory				

39. intervals (days)

Last treatments/ sampling				
Sampling/freezing				
Sampling/receipt in laboratory				

REPORT ON PESTICIDES RESIDUE TRIALS. PART B. ANALYTICAL REPORT

Person (s) responsible for the analysis .....

IDENTITY OF SAMPLE

(Please Type Or Use BLOCK Capitals)

Crop commodity		Sample identity or number	
Pesticides (s) on samples			

CONDITION AND TREATMENT OF SAMPLE (S)

Date(s) of receipt in laboratory	Date (s) analysis	
Method of storage and condition of sample(s)		
Portion of sample(s) to be analysed		

ANALYSIS

Method of analysis (or reference) and/or modifications	
Extraction: clean-up	
Method of determination and expression of residue	
Recoveries	
Limit of determination	

RESULT

Dosage rate	
Interval (Treatment to sampling)	
Residue* (Not corrected for recovery or control)	
Control (including standard deviation)	

nd.=<LOQ = mg/kg

Other information e.g. stability of residues under storage conditions :

*give mean values range and number of analysis

RESIDUES DATA SUMMARY FROM SUPERVISED TRIALS

Active ingredient :
Responsible body for reporting (name, address) :

Country :
Content of ai (g/kg or g/l) :
Formulation (e.g WP) :

Crop/crop :
Indoor/outdoor :
Residues calculated as :

Trial No./ Year	Trial dose rate (g ai/ha)	GAP dose rate (g ai/ha)	Commodity, Portion analysed	Residues (mg/kg)	PHI (days)	Remarks
			Recommended MRL			

Explanatory notes :

a. According to Codex Classification / Guide (Codex Alimentarius Volume 2A, Part 1, Second Edition, FAO and WHO 2000)
b. Days after last application (Label pre-harvest interval, PHI,underline)
c. Reference to method of residues analysis.....(to be provided).....