Australian Government
Australian Pesticides and Veterinary Medicines Authority

INFORMATION SHEET

RESIDUES AND MINOR CROPS

Introduction

One of the major objectives of the APVMA's Minor Use Program is to consider ways of assisting in the development of residue data to support minor use applications. In horticulture, one of the current difficulties is the lack of registered products for use specifically on minor crops. In general, minor crops are those where the costs involved in generating data for registration of a minor use (residues, efficacy, environmental and worker safety data) are not recouped from the market. This can, therefore, result in a disincentive for the manufacturer, resulting in an impediment to growers who require access to alternative products.

The lack of access to alternative chemicals is partly alleviated by dealing with minor uses as off-label permits, which are issued for a finite period. Off-label permit approvals are generally restricted to products which are already registered and for which the toxicological and environmental data packages have been assessed.

Residues in treated crops must be assessed to establish appropriate Maximum Residue Limits (MRLs) and withholding periods as part of the permit approval for off-label use. There are certain data extrapolations that can be made to establish MRLs in a range of situations. This document explains the use of these extrapolations to set MRLs as part of the permit approval. Most of the concepts have been adopted from the CODEX Alimentarius Commission (CODEX) guidelines and from other regulatory agencies such as the USEPA and the UK Pesticides Safety Directorate.

Some of the important considerations which determine, from a residues perspective, that the use of a pesticide is minor are:

- The intake or consumption of the crop is low, e.g. herbs
- The crop is not a significant export commodity, hence the impact on trade is negligible.
- The crop is not a major animal feed item.
- Area or percentage of crop treated

A minor use is defined in the APVMA Guidelines for Determining Minor Uses.

Using data to set MRLs

The APVMA requires residue data in order to assess a permit application relating to the use of any chemical product which is used in a food producing situation.

The data should reflect the use of the product under normal commercial practice or field conditions. On the basis of the submitted data, the APVMA may establish an MRL. It is the legal limit which defines the maximum level of residue which is permitted by law on agricultural commodities.

Monitoring of commodities for compliance with the MRL indicates whether a product has been used according to Good Agricultural Practice (GAP), i.e. the product is used in accordance with an approved label and use pattern. The MRL allows the treated commodity to be legally sold in Australia and it is also a tool which allows State Departments of Agriculture to detect misuse of chemical products through compliance monitoring. The MRL may also be important in highlighting any resulting trade implications when treated commodities are destined for export markets.

The APVMA uses data extrapolations to justify the establishment of appropriate MRLs. The numbers of trials required for a residues assessment may also be minimised on the basis of such extrapolations, where they are considered valid. The underlying assumptions leading to these extrapolations are described below, together with some of the processes involved in establishing a permanent MRL.

Temporary MRLs

The APVMA may grant an off-label permit for a finite period. Associated with the permit approval is an MRL which is established for the corresponding period or longer to allow sale of the treated commodity. The MRL is established on the basis that the permitted use is not long term and the APVMA is satisfied that on the basis of available information, the short term use can be supported. This MRL is known as a "Temporary MRL" and is only approved for the duration of the permit, which is generally a period of 1–2 years.

A temporary MRL can be established on the basis of supporting data such as:

- relevant overseas trial data held by the chemical company or manufacturer of the product
- monitoring data held by the State Department, National Residues Survey (NRS) or grower group.

- any available published material
- other data available to the APVMA

To establish an MRL for a registered use or for use longer than that indicated on the permit, the APVMA requires additional data to be generated in Australia. Guidelines which indicate the data required to set an MRL for registration or for long term permit use are available. Applicants and researchers are encouraged to discuss their intended residue trial with the APVMA.

Group MRLs and Commodity Groupings

Where there are similar registered use patterns and MRLs, or residues data for more than one member of a crop group, then an MRL can be established that applies to each member of the crop group. These are known as "Group MRLs".

Crop groups, as defined by CODEX[1], are groups of closely related commodities which are classified by similar characteristics and residue potential. CODEX crop groupings are shown in Table 1 and as the listing is large, not all crops are included. For further information, please contact the Pesticide Residues Section of the APVMA or refer to the CODEX document. Important members of each group, which are considered to be representative of the major crops grown in Australia, are listed.

There are advantages in setting group MRLs for minor uses. A group MRL allows the use of a product to be approved on any member of the crop group, where similarity in use pattern can be adequately demonstrated and residues data are provided for representative members of the group.

The crop groups are further classified into subgroups. These are primarily indicative of form and growth habit. For example in the brassica vegetables group, cabbage, cauliflower and/or broccoli and Brussels sprouts are included in three different subgroups. The subgroups are based on differences in the size of the commodity whether there are any covering leaves to protect the edible part of the crop and the nature of the commodity. For example, Brussels sprouts are smaller in size than cabbages or cauliflower, hence it is in one subgroup. Cauliflower and broccoli are flowerhead brassicas, hence they are in a different subgroup. Cabbage is a tight-leafed commodity, described as head cabbage, hence it is in another subgroup. The subgroups are intended to reflect factors which may contribute to varying residue levels across the whole crop group. Other criteria which may contribute to the subgroups include the surface of the crop, i.e. curly leaf vs straight leaf or hairy surface vs wrinkled surface vs smooth surface.

When deciding on how many trials are required for a permanent group MRL, a factor which must be considered is which members of the group are major commercial crops grown in Australia. This determines the numbers of trials which are required for each member of the crop group.

Table 2 contains information on numbers of trials which would be required for establishment of either a single commodity MRL or group MRL.

The States, which are considered to be the representative growing areas for the crop, are also indicated in this table.

It is important to note that Table 2 is only intended to be a guide and the actual numbers of trials required should be discussed with the APVMA's Pesticide Residues Section.

The numbers of trials are intended as total number of residue trials and may also include supporting data from overseas studies.

In minor use situations, the number of trials required may be reduced and will be determined on a case-by-case basis. The ultimate intention is that only relevant and necessary data are generated, thereby optimising the resources of applicants where possible.

To set a group MRL, data are required for one major crop in each subgroup. For example, to establish a brassica vegetables MRL, residues data would be required for cabbages, cauliflowers and/or broccoli and Brussels sprouts. As cabbages, cauliflower and broccoli are the crops of major commercial importance in the brassica vegetables group, more trials would be required for these crops compared to Brussels sprouts.

A group MRL can only be established when the use pattern of a particular product is similar for all members of the group. There must also be no significant differences in residue levels from one member of the group to another. For example, if residues in Brussels sprouts were 10× the magnitude of residues in cabbages, then it may not be possible to set a group MRL for brassica vegetables. Again, such instances would need to be considered on a case-by-case basis.

Data Extrapolations

Possible extrapolations which can be made from one commodity to another, i.e. from a major crop to a minor crop situation, are also included in Table 1.

These extrapolations are not comprehensive and are intended to alert the applicant to situations where it may be possible to obtain an off-label permit with a temporary MRL, without generating any residues data. Again it is important to note that this would only apply in situations where there were no significant differences in the use pattern of a product from one crop to another. The APVMA would make such determinations.

For example, if there was an existing MRL for raspberries, this could be extrapolated to other berries in the same subgroup, such as blackberries, boysenberries or

[1] CODEX Alimentarius Commission; CODEX Classification of Foods and Animal Feeds, Food and Agriculture Organisation of the United Nations, World Health Organisation.

cranberries. This would only apply when the use patterns were similar for all of the crops concerned.

There are some instances when extrapolations may not be possible. For example, an existing MRL for bulb onions may not apply to leeks and spring onions due to the respective crop habits, growing periods and the part of the commodity that is consumed. This is evident in the subgroups under which onions, spring onions and leeks are listed. There may be circumstances however, when a leek MRL is applicable to onions and spring onions, e.g. early pre- or post-emergent treatment. Each extrapolation would be judged on a case-by-case basis.

In Table 3, the crop groupings are listed with relevant information such as:

- collection of sample sizes for residue analysis;
- how the harvested commodity should be prepared at sampling and before analysis; and
- other comments relating to the crop group.

This table is included as a guide to analysts as well as growers. It shows which portion of the crop should be sampled and analysed and what portion of the commodity the MRL relates to. The information in Table 3 has been sourced from published documents[2].

Supporting Data

1. If there are minimal or no Australian data for a particular crop/use, supporting overseas data may be used to set a temporary MRL.

For example, if a product was proposed to be used on raspberries and there were no registered uses or MRLs for other berry fruits, then a temporary MRL may be established on the basis of supporting data. Such supporting data may be taken from JMPR[3] reviews, for example. Supporting data may also include:

- any published studies;
- monitoring data held by State Departments or the National Residues Survey;
- data held by the chemical company for any uses registered overseas; and
- data available to the APVMA from other sources (see section 2.1 above).

In all instances, similarity of use pattern would have to be determined.

2. In situations where there may be inadequate Australian data for a permanent MRL to be set, overseas studies may be used in support.

The number of studies required for a permanent MRL to be established may be similar to those indicated in Table 2. However, the actual number of Australian trials included should be discussed with the APVMA's Pesticide Residues Section at the time of permit application. Each situation would be assessed on a case-by-case basis, in relation to the product concerned and the use pattern proposed.

"Nil Residue" Situations

There may be situations where detectable residues in the harvested crop are unlikely. Such situations may be:

1. Where the product is applied at an early stage of crop growth, which is several months from harvest of the crop and the depletion profile of the chemical is known. Examples would include a pre-emergent or immediate post-emergent herbicide spray on a crop which is growing for several months before harvest, or a pre-flowering or flowering application to fruit.

2. Where the product is nonsystemic and is applied in a manner such that the commodity is not directly treated, e.g. herbicide treatments to orchard floors or around the base of trees.

3. Where the product is applied as a seed treatment, soil application either pre-planting/at planting, or is used at transplanting, i.e. the crop is not harvested for several months.

4. There is a dormant use or off-season use.

In most of the situations described above, MRLs may be set 'at or about' the limit of quantitation of the analytical method used to measure the residues. However, the applicant would have to provide some form of argument to establish that the use will result in a 'nil residues' situation. If there is a possibility that a 'nil residue' situation may apply, it is advisable for the applicant to discuss the proposed use with the APVMA before applying for a Permit.

---

[2] Reference 1 above and FAO Manual On The Submission And Evaluation Of Pesticide Residues Data For The Estimation Of Maximum Residue Levels in Food And Feed, Food and Agriculture Organisation of the United Nations, Rome 1997.

[3] Joint Expert Meeting of Pesticide Residues in Food and the Environment

(Cont'd)

Minor Use In A Major Crop

There may be situations where there is a minor use of a chemical in a major crop, e.g. a stop-drop spray for fruit. In such situations, the data requirements for an off-label permit, as described above for minor crops, would apply. The number of trials required for the establishment of a permanent MRL would not be as many as indicated for a major use in Table 2, but would be determined on an individual case-by-case basis.

Further Information

The APVMA's Residue Guideline No. 24 Crop Residue Trials complements this document. Although the information provided in that guideline is relevant to registration of products, the same issues apply for obtaining an MRL for minor use purposes.

Further information relevant to conducting residue trials may also be found in the following guidelines published in the Manual of Requirements and Guidelines (MORAG) which is available on the APVMA website at http://www.apvma.gov.au

Guideline Number	Title
10	Withholding Periods
11	Reporting of Residue Trials
19	Residue Analytical Method

CONTACTING THE APVMA

Want more information?

If you would like to know more about the APVMA or any of its services please contact us.

Postal address:

PO Box 6182

KINGSTON ACT 2604 AUSTRALIA

T: +61 2 6210 4700

F: +61 2 6210 4813

W: www.apvma.gov.au

Relevant contact officers and their telephone numbers are listed below:

Permit/Minor Use Program

Alan Norden

Tel 02 6210 4769

Residues (Guidelines)

Contact Officer (Residues)

Tel 02 6210 4837

(Cont'd)

Table 1: CODEX Commodity Crop Groupings And Crop Extrapolations

Group Name	Important members of Group grown in Australia	Possible Extrapolation	
		From	**To**
001 Citrus fruit	**Subgroup 1** Lemons Limes Mandarins **Subgroup 2** Grapefruit Oranges Tangelos	Oranges + Lemons or Oranges + Limes or Oranges + Mandarins	Whole group
002 Pome fruit	Apple Crab apple Loquat Nashi Pear Quince	Apples + Pears	Whole group
003 Stone fruit	**Subgroup 1** Apricot Nectarine Peach **Subgroup 2** Cherries Plums Prune	Peaches + Nectarines + Cherries or Peaches + Plums + Cherries Peaches	Whole group Nectarines, plums
004 Berries and other small fruit	**Subgroup 1** Blackberry Boysenberry Cranberry Raspberry **Subgroup 2** Blueberry Currants Gooseberry **Other** Grapes Strawberry	Grapes + strawberry and one other from subgroups 1 or 2 Raspberry Currants	Whole group Subgroup 1 Subgroup 2
005 Assorted tropical and sub-tropical fruit (edible peel)	Dates Figs Olives Persimmon Tamarillo Carambola Grumichan Jaboticaba	Olives + tamarillo (no extrapolation from one crop to another is possible although if data from these crops are consistent a group MRL may be possible)	Whole group

(Cont'd)

Group Name	Important members of Group grown in Australia	Possible Extrapolation	
		From	**To**
006 Assorted tropical and sub-tropical fruit (inedible peel)	Avocado Babaco Banana Custard apple Feijoa Guava Jackfruit Kiwifruit Litchi Longans Mango Mangosteen Pawpaw Passionfruit Persimmon Pineapple Rambutan Sapodilla Sapote	Banana Avocado Kiwifruit Mango Papaw Pineapple (no extrapolation from one crop to another is possible although if data from these crops are consistent a group MRL may be possible)	Whole group
009 Bulb vegetable	**Subgroup 1** Garlic Onions Shallots **Subgroup 2** Chives Spring onions **Subgroup 3** Leeks **Subgroup 4** Fennel bulb	Onions + Spring onions or Onions + shallots or Onions + Leeks Onions (green) or shallots	Whole group Subgroups 1, 2 and 3
010 Brassica vegetables	**Subgroup 1** Cauliflower Broccoli **Subgroup 2** Cabbage **Subgroup 3** Brussels sprouts	Cauliflower + Cabbage + Brussels sprouts or Broccoli + Cabbage + Brussels sprouts	Whole group

(Cont'd)

Group Name	Important members of Group grown in Australia	Possible Extrapolation	
		From	**To**
011 Fruiting vegetables —cucurbits	**Subgroup 1** Cucumber Chokos Bitter melon Zucchini **Subgroup 2** Melons Marrow Pumpkin Squash **Subgroup 3** Gherkin	Rock-melon + Cucumber + Zucchini Melons	Whole group Subgroup 2
012 Fruiting vegetables other than cucurbits	**Subgroup 1** Egg plant Tomato **Subgroup 2** Fungi Mushrooms **Other** Peppers Chillies Cape gooseberry Sweetcorn Okra Roselle (Rosella)	Tomato + Capsicum (note it may be more appropriate to generate data as growing patterns and size vary widely) Maize	Whole group Sweetcorn
013 Leafy vegetables (including brassica leafy vegetables)	**Subgroup 1** Lettuce Mustard Cress **Subgroup 2** Spinach Silverbeet **Subgroup 3** Fennel **Subgroup 4** Chinese cabbage Kale	Leafy lettuce + Spinach + Chinese cabbage Spinach Celery	Whole group Subgroup 2 Silverbeet
014 Legume vegetables (succulent seeds and immature pods)	Beans (green) Peas (green)	Beans (green) + Peas (green)	Whole group

(Cont'd)

Group Name	Important members of Group grown in Australia	Possible Extrapolation	
		From	**To**
015 Pulses dry	Peas Beans Chickpea Lentils Lupin Soybean	Field peas (dry) + faba beans (dry) + lupins or Field peas (dry) + chickpeas + lupins or Field peas (dry) + navy beans + lupins	Whole group
016 Root and tuber vegetables	**Subgroup 1** Carrot Parsnip **Subgroup 2** Beetroot Swede Turnip **Subgroup 3** Sweet potato Potato Yam **Subgroup 4** Radish Horseradish **Subgroup 5** Chicory	Potato + carrot + beetroot or Potato + carrot + swede or Potato + carrot + radish	Whole group
017 Stalk and stem vegetables	Artichoke Asparagus Celery Witloof Rhubarb	Celery, asparagus, artichoke Celery	Whole group Rhubarb
020 Cereal grains	**Subgroup 1** Wheat Triticale Cereal rye **Subgroup 2** Barley Oats **Subgroup 3** Maize Sorghum Millet **Subgroup 4** Rice	Wheat+ barley + oats Maize + sorghum Rice Wheat or barley Wheat	Subgroups 1 and 2 Subgroup 3 Subgroup 4 Oats, rye, triticale, durum wheat (treatments applied before GS32 only) Whole group except rice for post-harvest treatment only

(Cont'd)

Group Name	Important members of Group grown in Australia	Possible Extrapolation	
		From	To
021 Grasses for sugar or syrup production	Sugar cane		
022 Tree nuts	Almonds Cashew Chestnuts Hazelnuts Macadamia Pecan Pistachios Walnuts	Almonds + Macadamia	Whole group
023 Oilseeds	**Subgroup 1** Mustard seed Linseed Rape seed **Subgroup 2** Poppy seed Safflower seed Sesame seed Sunflower seed **Subgroup 3** Peanut **Subgroup 4** Soybean **Subgroup 5** Olive **Subgroup 6** Maize **Subgroup 7** Cottonseed	Canola (safflower, linseed or linola may replace canola in case of winter crops depending on use-pattern), cottonseed, peanut (summer crops sunflower, soybean may replace peanuts depending on use-pattern) Rape seed	Whole group Mustard seed, poppy seed, sesame seed, linseed
024 Seed for beverages and sweets	Coffee		
027 Herbs	Many	Parsley, mint (extrapolations to a group on a case by case basis)	Whole group
028 Spices	Many	Ginger (extrapolations to a group on a case by case basis)	Whole group

(Cont'd)

Table 2: Suggested Total Number of Crop Trials (Total Australian and Overseas Data)

The following table is intended as a guide for registration of a pesticide. The numbers of trials may be reduced depending on factors such as:

- Timing of application, i.e. how close is application of the product to harvest of the crop
- Method of application
- Total number of applications and re-treatment intervals
- Persistency of the product applied and resulting residues in the crop
- Physico-chemical characteristics of the active and product formulation

All uses will be considered on a case-by-case basis and the reader is advised to contact the APVMA before considering the generation of any residues data.

Major crops: 8–12 trials; major-minor crops: 6 trials; minor-major crops: 4–6 trials; minor crops: 2 trials. The figures in parentheses indicate the numbers of trials required to set a group MRL; refer to Table 1 to see which commodities are required for the particular crop group.

Reductions in trials numbers will be given where experience shows that agronomic practises and growth habit lower the risk of finite residues being present in the edible part of the crop.

NOTE: CODEX requires a minimum of 8 trials conducted at GAP before an MRL can be considered.

CODEX	Crop Group	Commodity	Trials*	Ranked Growing regions						
				NSW	NT	QLD	SA	TAS	VIC	WA
001	Citrus fruit	Orange Mandarin Lemon/lime Other	8 (6) 8 (4) 6 (4) 4	✓ ✓		✓ ✓ ✓	✓ ✓ ✓		✓ ✓	
002	Pome fruit	Apples Pears Other	8 (6) 8 (4) 4	✓			 ✓	✓	✓ ✓	 ✓
003	Stone fruit	Peaches Nectarines Plums/prunes Apricots Cherries Other	8 (6) 8 (4) 8 (4) 6 (4) 6 (4) 4	✓ ✓ ✓ ✓ ✓			✓ ✓ ✓ ✓		✓ ✓ ✓ ✓ ✓	 ✓
004	Berries and other small fruit	Grapes (wine) Grapes (table) Strawberries Blueberries Others	8 (6) 8 (6) 8 (4) 4 (2) 4 (2)	✓ ✓		✓ ✓ ✓	✓ ✓		✓ ✓ ✓	✓ ✓
005	Assorted tropical and sub tropical fruit (edible peel)	Others	4			✓				

(Cont'd)

CODEX	Crop Group	Commodity	Trials*	Ranked Growing regions						
				NSW	NT	QLD	SA	TAS	VIC	WA
006	Assorted tropical and sub tropical fruit (inedible peel)	Bananas	8	✓		✓				✓
		Mangoes	8		✓	✓				✓
		Pineapples	6			✓				
		Avocado	6	✓		✓				
		Litchi	2	✓		✓				
		Other	2-4							
009	Bulb vegetables	Onion	8 (6)	✓			✓	✓		
		Leeks	4 (4)			✓	✓		✓	
		Spring onions	4 (4)	✓		✓				✓
		Other	2							
010	Brassica vegetables	Broccoli	8 (4)			✓		✓	✓	
		Cauliflower	8 (4)	✓					✓	✓
		Cabbage	8 (6)	✓		✓			✓	
		Brussel sprouts	4 (2)				✓	✓	✓	
		Other	2-4 (2)							
011	Fruiting vegetables cucurbits	Rockmelon (cantaloupe)	8 (6)	✓		✓				✓
		Pumpkin	4	✓		✓				✓
		Watermelon	4	✓		✓				✓
		Cucumber	4 (3)	✓		✓				✓
		Zucchini	4 (3)							
		Other	2-4							
012	Fruiting vegetables other than cucurbits	Tomato	8 (6)	✓		✓			✓	
		Mushroom	6							
		Capsicum	8 (6)			✓			✓	✓
		Sweet corn	6	✓		✓			✓	
		Other	4							
013	Leafy vegetables (including brassica leafy vegetables)	Lettuce (head)	8 (6)	✓		✓			✓	
		Lettuce (leaf)	8 (6)	✓		✓			✓	
		Other	4 (2)							
014	Legume vegetables (succulent seeds and immature pods)	Green beans	8 (4)			✓		✓	✓	
		Green peas	6 (4)							
		Other	4							
015	Pulses dry	Lupins	8 (4)	✓					✓	✓
		Field peas	8 (4)	✓			✓		✓	
		Soya beans	8 (4)	✓		✓				✓
		Chickpeas	4 (2)			✓			✓	✓
		Faba beans	4 (2)				✓		✓	✓
		Other	4							
016	Root and tuber vegetables	Potato	8 (6)				✓	✓	✓	
		Carrot	8 (6)				✓		✓	✓
		Other	4 (2)							

(Cont'd)

CODEX	Crop Group	Commodity	Trials*	Ranked Growing regions						
				NSW	NT	QLD	SA	TAS	VIC	WA
017	Stalk and stem vegetables	Asparagus Celery Other	4 (2-4) 4 (2-4) 4	 ✓		 ✓ ✓			 ✓ ✓	 ✓
020	Cereal grains	Wheat Barley Oats Rice Sorghum Triticale Other	12 (8) 8 (4) 6 (4) 6 (4) 6 (4) 4 4	✓ ✓ ✓ ✓ ✓ ✓	 ✓	 ✓ ✓	 ✓		✓ ✓ ✓ ✓	✓ ✓ ✓ ✓
021	Grasses for sugar or syrup production	Sugar cane	8			✓				
022	Tree nuts	Macadamia Almond Pecan Chestnut Other	6 (4) 6 (4) 4 4 2	✓ ✓ ✓ ✓		✓ ✓	 ✓		 ✓ ✓	 ✓
023	Oilseeds	Cottonseed Sunflower Peanut Rapeseed (canola) Other	8 (6) 8 (4) 8 (4) 8 (6) 4 (2-4)	✓ ✓ ✓ ✓		✓ ✓ ✓	 ✓		 ✓ ✓	✓ ✓
024	Seed for beverages and sweets	Coffee	4							
027	Herbs	Parsley Other	2 2							
028	Spices	Other	2							

(Cont'd)

Table 3: Commodity to be analysed, sample sizes and portion of the commodity to which the MRL applies

CODEX Group	Commodity	Sample	Portion of commodity to which MRL applies (and is analysed)	Comment
001 Citrus fruit	Orange, Mandarin, Lemon, lime, etc	12 fruits from several places on 4 individual trees (more fruit may have to be collected to obtain 2 kg fruit)	Whole commodity	Citrus fruits are produced by trees of the *Rutaceae* family and are characterised by aromatic oily peel, globular form and interior segments of juice filled vesicles. The fruit is fully exposed during the growing season. The fruit pulp may be consumed in succulent form and as a beverage. The entire fruit may be used for preserving
002 Pome fruit	Apples, pears, quinces, etc	12 fruits from several places on 4 individual trees (more fruit may have to be collected to obtain 2 kg fruit)	Whole commodity after removal of stems	Pome fruits are produced by trees related to the genus Pyrnus of the rose family (Rosaceae) characterised by fleshy tissue surrounding a core consisting of parchment-like carpels enclosing the seed. The entire fruit, except the core, may be consumed in the succulent form or after processing
003 Stone fruit	Large stone fruit: peaches, nectarines, plums/prunes, apricots	12 fruits from several places on 4 individual trees (more fruit may have to be collected to obtain 2 kg fruit)	Whole commodity after removal of stems and stones but the residue calculated and expressed on the whole commodity without stem	Stone fruits are produced by trees related to the genus Prunus of the rose family (Rosaceae) characterised by fleshy tissue surrounding a single hard-shelled seed. The entire fruit, except the seed, may be consumed in the succulent form or after processing
	Small stone fruit: cherries	1 kg from several places on 4 trees		
004 Berries and other small fruit	Grapes	12 bunches, or parts of 12 bunches from separate vines to give at least 1 kg	Whole commodity after removal of caps and stems. Currants: fruit with stems	Small fruits and berries are derived from a variety of plants whose fruit is characterised by a high surfaceweight ratio. The entire fruit, often including seed, may be consumed in succulent or processed form
	Currants, raspberries and other small berries	0.5 kg from 12 separate areas or bushes		
	Strawberries, gooseberries	1 kg from 12 separate areas or bushes		

(Cont'd)

CODEX Group	Commodity	Sample	Portion of commodity to which MRL applies (and is analysed)	Comment
005 Assorted tropical and sub-tropical fruit (edible peel)	Dates, olives, figs	1 kg from several places on 4 trees	Dates and olives: whole commodity after removal of stems and stones but residue calculated and expressed on the whole fruit. Figs: whole commodity	Assorted fruits—edible peel are derived from immature or mature fruits of a variety of plants, usually shrubs or trees from tropical or subtropical regions. The whole fruit may be consumed in succulent or processed form
006 Assorted tropical and sub-tropical fruit (inedible peel)	Bananas, Mangoes, Pineapples, Avocado, Litchi	Bananas: 24 fruit (take 2 fingers each from top, middle and lowest hand of 4 harvestable bunches) Pineapple: 12 fruit	Whole commodity unless qualified. Pineapples: after removal of crown. Avocado and mangoes: whole commodity after removal of stone but calculated on whole fruit. Bananas: after removal of crown tissue and stalks	Assorted fruits—inedible peel are derived from immature or mature fruits of a variety of plants, usually shrubs or trees from tropical or subtropical regions. Edible portion is protected by skin, peel or husk. Fruit may be consumed in a fresh or processed form
009 Bulb vegetable	Onion, Leeks, Spring onions	Leeks, bulb onions: 12 plants Spring onions: 24 plants (the sample should weigh at least 2 kg) Garlic, shallots: 12 bulbs from 12 plants (the sample should weigh at least 2 kg)	Remove adhering soil (eg by rinsing in running water or by gentle brushing of the dry commodity) Bulb/dry onions and garlic: whole commodity after removal of roots and whatever parchment skin is easily detached. Leeks and spring onions: whole vegetable after removal of roots and adhering soil	Bulb vegetables are pungent, flavourful foods derived from the fleshy scale bulbs or growth buds of alliums of the lily family (Liliaceae). The entire bulb may be consumed following the removal of the parchment-like skin
010 Brassica vegetables	Broccoli, Brussels sprouts, cabbage, cauliflower, etc	Large brassica crops: 12 plants Broccoli: 1 kg from 12 plants Brussels sprouts: 1 kg from 12 plants. Buttons to be taken from at least 2 levels on each plant	Whole commodity after removal of obviously decomposed or withered leaves. For cauliflower and headed broccoli analyse flower head and stems, discarding leaves; for Brussels sprouts analyse "buttons" only.	Brassica (cole) leafy vegetables are foods derived from the leafy parts, stems and immature infloresences of plants commonly known and botanically classified as brassicas and also known as cole vegetables. The entire vegetable may be consumed.

(Cont'd)

CODEX Group	Commodity	Sample	Portion of commodity to which MRL applies (and is analysed)	Comment
011 Fruiting vegetables — cucurbits	Rockmelon (canteloupe) Pumpkin Watermelon Cucumber Zucchini Other	Cucumbers: 12 fruits from separate plants Gherkins, courgettes (Zucchini), squash: 12 or more fruits from 12 plants to make 2 kg Melons, gourds, pumpkins, watermelons: 12 fruits from 12 separate plants	Whole commodity after removal of stems	
012 Fruiting vegetables other than cucurbits	Tomato, Mushroom, Capsicum, Sweet corn etc	Egg plants: 12 fruits from 12 separate plants Sweet corn: 12 or more ears weighing 2 kg Mushrooms: 12 or more items to make 0.5 kg Tomatoes, peppers: >24 fruits for small or >12 from large fruiting varieties from 12 plants to make 2 kg	Whole commodity after removal of stems	
013 Leafy vegetables (including brassica leafy vegetables)	Lettuce (head) Lettuce (leaf) Other	Endive, lettuce: 12 plants Spinach, chicory: 1 kg from >12 plants Kale: 2 kg from 12 plants sampled from 2 levels per plant Small leafed salad crops: 0.5 kg from 12 plants or sites in plot	Whole commodity after removal of obviously decomposed or withered leaves	Leafy vegetables are derived from the leaves of a wide variety of edible plants including leafy plants. The entire leaf may be consumed.
014 Legume vegetables (succulent seeds and immature pods)	Green beans Green peas Other Peas,	Phaseolus beans: 1 kg fresh green or dry seed as appropriate	Whole commodity	Legume vegetables are derived from the succulent seeds and immature pods of leguminous plants commonly known as beans and peas. Succulent forms may be consumed as whole pods or as the shelled product
015 Pulses dry	Lupins, Field peas, Faba beans Soybeans, Chickpeas, etc	Pulses: dried broad beans, field peas, lentils etc, 1 kg	Whole commodity	Pulses dry are derived from the dried seeds and immature pods of leguminous plants commonly known as beans and peas.

(Cont'd)

CODEX Group	Commodity	Sample	Portion of commodity to which MRL applies (and is analysed)	Comment
016 Root and tuber vegetables	Potato, carrot, etc	Fodder/sugar beet: 12 plants Potatoes: 12 tubers to give >2 kg Other root crops: 12 roots to give > 2 kg	Whole commodity after removing tops. Wash roots or tubers in cold running water, brushing gently with a soft brush to remove loose soil and debris, if necessary, and then dab lightly with clean tissue paper to dry. For carrots after drying the tops are carefully cut off with a knife by cutting through the bottom of the stem at the lowest point of attachment of the outer petioles. If an annulus of root tissue is thereby severed from hollow-crown roots, the material should be recombined with the roots.	Root and tuber vegetables are starchy foods derived from the enlarged solid roots, tubers and corms or rhizomes, mostly subterranean, of various species of plants. The entire vegetable may be consumed.
017 Stalk and stem vegetables	Asparagus Celery Rhubarb, chicory, artichoke	Celery: 12 plants Asparagus, rhubarb: 12 sticks from 12 separate plants to give >2 kg Globe artichoke: 12 heads	Whole commodity after removal of obviously decomposed or withered leaves. Rhubarb and asparagus: stems only Celery and asparagus: remove adhering soil (eg by rinsing in running water or by gentle brushing of the dry commodity)	Stem vegetables are foods derived from the edible stems or shoots of a variety of plants
020 Cereal grains	Wheat, Barley, Oats, Rice, Sorghum, Triticale, etc	1 kg	Whole commodity.	Fresh corn and sweet corn: kernels plus cob without husk Cereal grains are derived from the clusters of starchy seeds produced by a variety of plants primarily of the grass family (Gramineae). Husks are removed before consumption.
021 Grasses for sugar or syrup production	Sugar cane	1 kg of cane stems	Cane stems	
022 Tree nuts	Macadamia,	1 kg coconut: 12 nuts	Whole commodity after	Tree nuts are the seeds of a

(Cont'd)

CODEX Group	Commodity	Sample	Portion of commodity to which MRL applies (and is analysed)	Comment
	Almond, Pecan, Chestnut, etc		removal of the shell. Chestnuts: whole in skin	variety of trees and shrubs which are characterised by a hard, inedible shell enclosing an oil seed. The edible portion of the nut is consumed in succulent, dried or processed form.
023 Oilseeds	Cottonseed, Sunflower, Peanut, Rapeseed (canola), etc	2 kg from 12 separate areas of plot (crops harvested mechanically can be sampled from the harvester as it proceeds through the crop) cottonseed: 1 kg with or without fibre peanuts, sunflower, safflower: 1 kg sesame, rape seed: 0.5 kg	Whole commodity Peanut: whole kernel after removal of shell	Oilseed consists of the seed from a variety of plants used in the production of edible vegetable oils. Some important vegetable oilseeds are by-products of fibre or fruit crops
024 Seed for beverages and sweets	Coffee, cacao beans		Whole commodity	Tropical seed consist of the seeds from several tropical and sub-tropical trees and shrubs mostly used in the production of beverages and confections. Tropical seeds are consumed after processing
027 Herbs	Parsley Other	0.5 kg fresh 0.2 kg dry	Whole commodity	Herbs consist of leaves, stems and roots from a variety of herbaceous plants used in relatively small amounts flavour other foods. They are consumed in succulent or dried form as components of other foods
028 Spices		0.5 kg fresh 0.2 kg dry	Whole commodity	Spices consist of aromatic seeds, roots, fruits and berries from a variety of plants used in relatively small amounts to flavour other foods. They are consumed primarily in dried form as components of other foods