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PEST CONTROL PRODUCTS BOARD

Guidelines for Residue data extrapolation and crop grouping:

Fruits And Tree Nuts

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GUIDELINES FOR RESIDUES DATA EXTRAPOLATION AND CROP GROUPING

Introduction

Residue extrapolation is the process by which the residue levels on representative commodities are utilized to estimate residue levels on related commodities within the same commodity group or subgroup for which residue trials have not been conducted. Based on existing information and findings it can be assumed that, taking the least favourable trial conditions, the behaviour of residues in/on plants or plant products is comparable, under certain conditions. Under such scenarios, existing knowledge about the residue behaviour in one situation can be transferred to another, and the scale of the residue trials for the comparable situation can be reduced, or need for trials may be waived completely. Residue extrapolation is a common consideration utilized by regulators internationally for ensuring that data requirements are only at a level that is scientifically justified in conducting risk assessment and to ensure the regulatory process does not become unnecessarily burdensome for various crop uses.

Food safety standards have different effects on consumption and trade flows. Primarily they aim to maintain consumer safety through defined sets of limits and regulations, but these regulations could have a trade deterring effect when exporters cannot comply with the standards. As one of the food safety standards, maximum residue limits (MRLs) set maximum levels of pesticide residue that can be traced in food and food products to ensure food safety. CODEX Alimentarius defines CODEX maximum limit for pesticide residues as “the maximum concentration of a pesticide residue recommended by the CODEX Alimentarius Commission to be legally permitted in or on food commodities and animal feeds”. MRLs are based on good agriculture practice (GAP) data generated through supervised residue trials. Foods derived from commodities that comply with the respective MRLs are intended to be toxicologically acceptable.

This document provides criteria for crop grouping for purposes of residue data generation, selection of representative commodities; and proposes suitable representative commodities in Kenya. The document describes the principles of extrapolation regarding residues of plant protection products intended for residue extrapolations. Guidelines on extrapolation for pesticide residues in food and raw agricultural commodities are provided. The document aims at providing guidance to the Pest Control Products Board, agrochemical industry and accredited institutions in the context of the registration of plant protection products. It provides detailed lists of acceptable extrapolations organized by crop groups for use in Kenya.

In these guidelines, residue situations that are assumed to be comparable on the basis of currently available information are described, and recommendations are made as to the type and scale of the residue trial results which must be submitted. However, new findings may result in a change of assessment of comparability and extrapolations.

Rationale of Extrapolation

The use of pest control products primarily aims at enhancing agricultural productivity. The international markets access for Kenyan agricultural produce require adherence to strict food safety standards thus demanding increased pesticide regulatory data and residue trials on many crops. There is increasing awareness of food safety by consumers in international trade hence increasing demand for reassurance of the quality and safety of various food commodities. Private standards such as GlobalGAP (EUREPGAP), British Retail Consortium (BRC) have introduced more stringent requirements, limiting the variety of pest control products available to the growers for use on edible crops. Notifications due to residues have raised concerns on the safety of fresh produce from Kenya. Some cases of non-compliance to MRL requirements for some of the export crops e.g. passion fruits, have been notified through the EU Rapid Alert System for Food and Feeds (RASFF). In many cases, non-conformance due to exceedance of set MRLs is contributed by inappropriate use patterns (GAPs) for plant protection products. This is particularly important in minor crops, where few or no plant protection products are approved for use on that crop. Registration in minor crops is often hindered by lack of mandatory data, such as residue studies. Crop grouping and data extrapolation will partly address the minor use challenges

The current PCPB registration procedures require that residue data must be provided for all edible crops or indicator crops in the vegetable, cereal, and spices groups prior to registration. However, for fruits, tree nuts and industrial crops, data must be provided for the individual commodities. The agrochemical companies find it difficult to justify the registration costs of products based on this requirement. The need to generate considerable amount of data makes the authorization process very expensive. It is therefore preferable to explore other possibilities for determining the residues in various groups of crop commodities rather than those based on specific crops and pesticide combinations using some guiding principles.

These guidelines are provided for data extrapolation and crop grouping for fruits and tree nuts.

General Principles

Properties of active substances

In certain cases, the residue behaviour of different active ingredients such as stability, persistence, volatility, mode of action, uptake and distribution are comparable. This presupposes that sufficient information (i.e. metabolism, physical-chemical properties, and residue results) already exists for these active ingredients. If comparability is assumed, then this must be carefully substantiated with the existing information.

Good Agricultural Practices

Number of applications

Trials must be carried out as a matter of principle using the maximum number of applications

provided for in the registered GAP. The last application prior to harvest is crucial to residue behaviour in the harvested crop. The number of applications prior to flowering, on the other hand, is generally of lesser importance. The results can be assumed to be comparable if the number of applications is increased or reduced by not more than 25 %.

Application method
Different application methods and rates do not produce comparable residue results and must therefore be documented separately. The results from normal spraying and low-volume spraying may be comparable for a comparable rate of application for the active substance per ha. However, where both low-volume and normal spray applications are the usual methods, both methods of application ought to be documented according to standard application practice in the basic data set submitted.

Product dose
Proportionality means that when increasing or decreasing the application rate the residue level increases or decreases in the same ratio. In an ideal situation it means that doubling the application rate results in doubling the residue. Proportionality implies that the relationship between application rates and residues is linear.

Timing and interval of application
The stage of development of the crop at the time of application and the time intervals between applications, especially between the last two applications are important factors influencing the level of residues. Because the least favourable residue situation is the determining factor when establishing maximum residue limits (MRLs), then applications at later stages of development are more critical than applications made at earlier stages of development, just as applications at shorter intervals before harvesting are more critical than applications at longer intervals before harvesting.

In the case of changes in pre-harvest interval of not more than 25 %, experience has shown that the residue results can be assumed to be comparable.

Situation of use

The results of outdoor trials are not normally comparable with the results of trials carried out under other conditions of application (e.g. in greenhouses). The climatic conditions, above all, under glass, under plastic, or in climate-controlled chambers or in stores, but also the other parameters that differ from those in outdoor trials, generally create markedly different residue situation than that found in outdoor testing. Therefore, separate studies are necessary for each area of application even when applied on the same crop species unless a 'worst case' can be clearly identified.

Number of data sets

For residue data generated locally, three sets of data or supervised residue trials for representative commodities shall be submitted. In certain occasions data from FAO/WHO Joint meeting for pesticides residues (JMPR), European food safety authority (EFSA), United states

Environmental protection agency (US EPA) or any other source recognized by the regulatory authority (PCPB) may be acceptable.

Comparable residue behaviour in different crops

It is essential to know the metabolism, uptake, distribution, and expression of residues in plants for the active substance in question. It is also desirable to know the mode of action to help explain the possible behaviour of the active substance in the plants. If this is not known, then nothing can be stated about the possibility of extrapolation in advance.

Extrapolation of residue data for different crops presumes that the following are comparable:

1. Conditions of use with regard to the amount of active substance applied, the time of application, the number of applications, and the interval between applications;
2. Application methods (e.g. by-hand, type of machines, seeding rate);
3. Formulation used and presence of synergists/adjuvants;
4. Climatic conditions.
5. Soil characteristics (acid, basic) and its texture (particularly for herbicides)

The applicant must substantiate with documentary evidence that all variables including Good Agricultural Practice (GAP) are comparable. In all cases, all the available facts must be considered by the regulatory authority in order to make the evaluation.

Seed treatment

For perennial crops, such as fruit trees, it is likely that the level of residues of crop protection products applied as seed treatment prior to planting will be below the limit of quantification at the time of harvesting the commodities. However, for annual crops residues for products applied on seed can occur on the harvestable commodities.

When a systemic active substance is applied to seeds the levels of residues in the harvested product would probably be below the limit of quantification, but this needs to be demonstrated. Data may not necessarily be needed for all crops. If studies for 2 major crops representative of the crop groups treated, e.g. strawberry, cape gooseberry, melon show no quantifiable residues, then no further studies are necessary for the other crops or groups of crops. The trials should preferably be carried out on crops with a short vegetation period. However, when contrary to expectations, quantifiable residues are found, results must be obtained on all potential crops.

When a non-systemic active substance is applied to seeds, no residues should normally be found in plants or plant products and therefore normally no residue trials are necessary. However, a special consideration should be given to unique scenarios where the fruits could ordinarily touch the ground (e.g. strawberry), and a possibility of contamination from the treated seed could occur. In this case, a no-residue situation cannot be granted only on the fact that the active substance is a non-systemic one.

Post-harvest pesticides applications

In the case of post-harvest treatments there exists a broad range of different uses. In the case of post-harvest uses, not only plant products, but also processed (including dried) products, are treated. If the active substances are shown to be stable and if it can be demonstrated that the plant protection product could be distributed uniformly, no residue trials may be necessary, since in such a case the application rate determines the residue.

Crop grouping for pesticide residues and principles of conducting supervised residue trials

To address consumer safety concerns, trade issues, minor crops, minor use, and the data sets required for registration of pest control products for use in edible crops, the concept of crop grouping was considered and adopted. Reference was made to a number of guidelines on crop grouping when developing these guidelines. The main reference documents were European Union guidelines and Codex guidelines. It was observed that Kenya has been participating in Codex committee meetings on pesticides residues (CCPR) and the Codex Alimentarius commission regularly and given inputs in the development of the guidelines. It was proposed that the current version and future revisions of the Codex crop grouping would suffice for purposes of guiding in data generation on respective groups of fruit and tree nut crops.

It is important to ensure that the trials are carried out in accordance with the principles of Good Laboratory Practices (GLP) and the data generated meets the requirements as stipulated in the Codex Alimentarius Commission procedural manual, Principles and Guidance for Application of The Proportionality Concept For Estimation of Maximum Residue Limits For Pesticides, such as observing the threshold variations in the application rates in supervised residues trials.

The setup of trials and data generation for minor crops should follow the guidance provided in the Codex Alimentarius Commission procedural manual, Guidance to Facilitate the Establishment of MRLs for Pesticides for Minor Crops e.g. in terms of the number of trials, Global data sets for residue trials from different regions of the world

While adopting the tables for crop grouping the following key principles were considered critical in crop grouping.

1) Crop morphology e.g. height, leaf sizes
2) Growth habit (spreading, upright)
3) Edible/consumed part, nature, open or closed, underground, above ground, edible peels or non-edible peels, residue potential
4) Length of growth period
5) Taxonomic relationship
6) Habitat of growth i.e. flooded vs dry areas
7) Processing-consumed raw, fresh, ripening, method of processing
8) GAP: Dose, timing, no. of application and PHI, method of application e.g. seed treatment. Foliar spray, fumigation
9) Size of grains
10) Product characteristics e.g. mode of action, distribution in the plant
11) Stage of harvest e.g. succulent pods, dry grains

12) Protected or non-protected areas e.g. field or greenhouse

GUIDELINES FOR RESIDUE DATA EXTRAPOLATION AND CROP GROUPING: FRUIT COMMODITY GROUPS

Guiding principles used in fruits and tree nuts

Representative commodities within each group of fruits were selected based on principles of data extrapolation in the Codex guidelines. The fruit groups and subgroups were adopted from the Codex classification of food and feeds. The selected representative crops that are commonly grown in Kenya were preferred as representative crops, thus there are some minor variations from the Codex representative commodities for the fruits group. The proposed representative commodities for the fruits groups in Kenya are summarized the **Table 1** below.

The fruit groups, subgroups and commodities for extrapolation contain some commodities grown in Kenya and also outside of the country. It is hoped that fruit trees that are not currently grown in Kenya may be introduced in the future, and the guideline will be useful to address the new crops. The representative commodities within each commodity group and subgroup were selected based on principles for the selection of representative commodities as guided in the Codex guidelines, with more emphasis on the commodities grown locally. However, other representative commodities as guided in the Codex guidelines that are not grown in Kenya were retained in this document with the understanding that some applicants may generate residue data in other countries and may submit the same for purposes of registration.

This section also includes tree nuts, classified under group 022 in the Codex guidelines (nuts, seeds, and saps; **Table 2** below) in order to make a comprehensive list of fruits and tree nuts grown in Kenya.

It is important to note that the tables below only cover fruit trees and nuts, and excludes fruiting vegetables such as melons, thorn melons, and pepino which are already covered under Group 11 and 12, respectively, in the extrapolation guidelines for vegetables.

Note: In the residue extrapolation tables below;

1. where the word "**and**" is used in column 2 for representative commodities, residue data must be provided for all listed commodities for extrapolation to the fruits or nuts group in column 3. Where the word "**or**" is used, data from any of the mentioned representative commodities may be provided.
2. Coconut may not be used as a representative commodity for nuts. However, residues from young coconut may be used for extrapolation to tropical and sub-tropical fruits with inedible peel (Group 006).

3. For any other commodities not included in the table, refer to the Codex guidelines on crop grouping.

TABLE 1. Representative commodities Type 01 - Fruit commodity groups

Codex Group / Subgroup	Representative Commodities	Extrapolation to the following commodities
Group 001 Citrus Fruits	Lemon or Lime; and Mandarin; and Orange; and Grapefruit	Citrus Fruit (FC 0001): Australian blood lime; Australian desert lime; Australian round lime; Brown River finger-lime; Calamondin; Citron; Clementine; Grapefruit; Kaffir Lime; Kumquats; Lemon; Lime; Lime, Sweet; Limequats; Mandarin; Mount White-lime; New guinea wild lime; Orange Sour; Orange, Sweet; Pummelo; Russell River- lime; Tahiti Lime; Trifoliate orange; Unshu orange; Yuzu.
Subgroup 001A, Lemons and Limes	Lemon or Lime	Lemons and Limes (FC 0002): Australian blood lime; Australian desert lime; Australian round lime; Brown River finger-lime; Citron; Kaffir Lime; Kumquats; Lemon; Lime; Lime, Sweet; Limequats; Mount White-lime; New guinea wild lime; Russell River-lime; Tahiti Lime; Yuzu.
Subgroup 001B, Mandarin	Mandarin (Tangerine)	Mandarins (FC 003): Calamondin; Clementine; Mandarin; Unshu orange.
Subgroup 001C, Oranges, Sweet, Sour	Orange	Oranges, Sweet, Sour (FC 004): Orange Sour; Orange, Sweet; Trifoliate orange.
Subgroup 001D, Pummelos	Grapefruit	Pummelos and Grapefruit (FC 005): Grapefruit; Pummelo.
Group 002 Pome Fruits	Pear or Apple	Pome Fruit (FP 0009): Apple; Azarole; Chinese quince; Crab-apple; Loquat; Mayhaw; Medlar; Nashi pear; Pear; Persimmon, Japanese; Quince; Tejocote; Wild pear.

Codex Group / Subgroup	Representative Commodities	Extrapolation to the following commodities
Group 003 Stone Fruits	Cherry, Sweet or Cherry, Sour; and Plum; and Peach or Apricot	Stone fruits (FS 0012): Apricot; Bullace; Cherry, black; Cherry, Nanking; Cherry plum; Cherry, Sour; Cherry, Sweet; Choke cherry; Japanese apricot; Jujube, Chinese; Klamath plum; Nectarine; Peach; Plum; Plum, beach; Plum, Chickasaw; Plumcot; Sloe.
Subgroup 003A, Cherries	Cherry, Sweet or Cherry, Sour	Cherries (FS 0013): Cherry, black; Cherry, Nanking; Cherry Sour; Cherry, Sweet; Choke cherry
Subgroup 003B, Plums	Plum	Plums (FS 0014): Bullace; Cherry plum; Jujube, Chinese; Klamath plum; Plum, Plum, beach; Plum, Chickasaw; Plumcot; Sloe.
Subgroup 003C, Peaches	Peach or Apricot	Peaches (FS 2001): Apricot; Japanese apricot; Nectarine; Peach.
Group 004 Berries and other small fruits	Blackberry or Raspberry; Blueberry or Currants, black, red or white or Gooseberry; and Elderberry or Mulberries; and Grape; and Strawberry	Berries and other small fruits (FB 0018): Agritos; Amur river grape; Arguta kiwifruit; Aronia berries; Bayberries; Bearberry; Bilberry; Bilberry, Bog; Bilberry, Red; Blackberries; Blueberries; Buffaloberry; Buffalo currant; Che; Chilean guava; Cloudberry; Cranberry; Currants, Black, Red, White; Dewberries; Elderberries; European barberry; Guelder rose; Gooseberry; Grapes; Huckleberries; Jostaberries; Juneberries; Mulberries; Muntries; Native currant; Partridge berry; Phalsa; Raspberries, Red, Black; Riberries; Rose hips; Salal; Schisandraberry; Sea buckthorn; Service berries; Silverberry, Russian; Strawberry; Strawberries, Wild; Table grapes; Vaccinium berries; Wine grapes.
Subgroup 004A, Cane berries	Blackberry or Raspberry	Cane berries (FB 2005): Blackberries; Dewberries; Raspberries, Red, Black.

Codex Group / Subgroup	Representative Commodities	Extrapolation to the following commodities
Subgroup 004B, Bush berries	Blueberry or Currants, black, red or white or Gooseberry	Bush berries (FB 2006): Vaccinium berries; Blueberries; Agritos; Aronia berries; Bearberry; Bilberry; Bilberry, Bog; Bilberry, Red; Buffalo currant; Chilean guava; Currants, Black, Red, White; Gooseberry; European barberry; Huckleberries; Jostaberries; Juneberries; Native currant; Riberries; Rose hips; Salal; Sea buckthorn.
Subgroup 004C, Large shrub/tree berries	Mulberries or Elderberry	Large shrub/tree berries (FB 2007): Bayberries; Buffaloberry; Che; Elderberries; Guelder rose; Mulberries; Phalsa; Service berries; Silverberry, Russian.
Subgroup 004D, Small fruit vine climbing	Grapes	Small fruit vine climbing (FB 2008): Arguta kiwifruit; Amur river grape; Grapes; Schisandraberry; Table grapes; Wine grapes.
Subgroup 004E, Low growing berries	Strawberry	Low growing berries (FB 2009): Cranberry; Cloudberry; Muntries; Partridge berry; Strawberry; Strawberries, Wild.
Group 005 Assorted tropical and sub-tropical fruits – edible peel	Olive; Fig or Guava and Date	Assorted tropical and sub-tropical fruits – edible peel (FT 0026): Açaí; African plum; Almondette; Ambarella; Apak palm; Apple berry; Arazá; Arbutus berry; Babaco; Bacaba palm; Bacaba-de- leque; Barbados cherry; Bayberry, Red; Bignay; Bilimbi; Breadnut; Cabeluda; Cajou (pseudofruit); Cambucá; Carambola; Carandas-plum; Carob; Cashew apple; Ceylon iron wood; Ceylon olive; Cherry-of-the-Rio-Grande; Chinese olive, Black, White; Chirauli-nut; Ciruela verde; Coco plum; Date; Davidson's plum; Desert date; Doum or Dum palm; False sandalwood; Fig; Fragant Manjack; Gooseberry, Abyssinian; Gooseberry, Ceylon; Gooseberry, Indian; Governor's plum; Grumichama; Guabiroba; Guava; Guava, Brazilian; Guava, Cattley, Guava, Costa Rican; Guava, Para; Guava berry; Guayabillo; Hog plum; Illawarra plum; Imbé; Imbu; Jaboticaba; Jamaica cherry; Jambolan; Java apple; Jelly palm; Jujube, Indian; Kaffir plum; Kakadu plum; Kapundung; Karanda; Kwai muk; Lemon aspen; Mangaba; Marian plum; Mombin, Malayan; Mombin, purple; Monkeyfruit; Monos plum; Mountain cherry; Nance; Natal plum; Noni; Otaheite gooseberry; Papaya, Mountain;

Codex Group / Subgroup	Representative Commodities	Extrapolation to the following commodities
		Patauá; Peach Palm; Persimmon, Black; Pitomba; Pomerac; Rambai; Rose apple; Rumberry; Sea grape; Sentul; Sete- capotes; Silver aspen; Surinam cherry; Table olives; Uvalha; Water apple; Water berry; Water pear.
Subgroup 005A, Assorted tropical and sub-tropical, Edible Peel – Small	Olives	Edible Peel - Small (FT 2011): African plum; Almondette; Apple berry; Arbutus berry; Barbados cherry; Bayberry, Red; Bignay; Breadnut; Cabeluda; Carandas-plum; Ceylon iron wood; Ceylon olive; Cherry-of-the-Rio-Grande; Chinese olive, Black, White; Chirauli-nut; Coco plum; Desert date; False sandalwood; Fragant Manjack; Gooseberry, Abyssinian; Ceylon; Governor's plum; Grumichama; Guabiroba; Guava berry; Hog plum; Illawarra plum; Jamaica cherry; Jambolan; Java apple; Kaffir plum; Kakadu plum; Karanda; Kapundung; Lemon aspen; Monos plum; Mountain cherry; Otaheite gooseberry; Persimmon, Black; Pitomba; Rumberry; Sea grape; Sete-capotes; Silver aspen; Table olives; Water apple; Water berry; Water pear.
Subgroup 005B, Assorted tropical and sub-tropical, Edible Peel – Large	Guava or Fig	Edible Peel - Large (FT 2012): Ambarella; Arazá; Babaco; Bilimbi; Cajou (pseudofruit); Cambucá; Carambola; Carob; Cashew apple; Ciruela verde; Davidson's plum; Fig; Gooseberry, Indian; Guava; Guava, Brazilian; Guava, Cattley, Guava, Costa Rican; Guava, Para; Guayabillo; Imbé; Imbu; Jaboticaba; Jujube, Indian; Kwai muk; Mangaba; Marian plum; Mombin, Malayan; Mombin, purple; Monkeyfruit; Nance; Natal plum; Noni; Papaya, Mountain; Pomerac; Rambai; Rose apple; Sentul; Surinam cherry; Uvalha.
Subgroup 005C, Assorted tropical and sub-tropical, Edible Peel – Palms	Date	Edible Peel - Palms (FT 2013): Açaí; Apak palm; Bacaba palm; Bacaba-de-leque; Date; Doum or Dum palm; Jelly palm; Patauá; Peach Palm.

Codex Group / Subgroup	Representative Commodities	Extrapolation to the following commodities
Group 006 Assorted tropical and sub-tropical fruits – inedible peel	Litchi (lychee) or Longans or Spanish Lime; and Avocado; Pomegranate or Mango; and Banana and Papaya; Atemoya; and Pineapple; Prickly pear and Pitaya; Kiwifruit or Passionfruit; Coconut or Muriti or Palmyra Palm	Assorted tropical and sub-tropical fruits – inedible peel (FI 0030): Abiu; Aisen; Akee apple; Atemoya; Avocado; Bacuri; Bael fruit; Banana; Binjai; Biriba; Breadfruit; Burmese grape; Cacao (pulp); Canistel; Capuacú; Champedak; Cherimoya; Coconut, young; Custard apple; Durian; Elephant apple; Etambe; Feijoa; Granadilla; Granadilla, Giant; Guriri; Ilama; Ingá; Jackfruit; Jatobá; Kei apple; Kiwifruit; Kokam; Langsat; Lanjut; Longan; Lucuma; Litchi (lychee); Mabolo; Madras-thorn; Mammy apple; Manduro; Mango; Mango, horse; Mango, Saipan; Mangosteen; Marang; Marmalade-box; Matisia; Mesquite; Mongongo; Monkey-bread tree; Monstera; Muriti; Naranjilla; Paho; Palmyra palm; Papaya; Passionflower, Winged-stem; Passion fruit; Passion fruit, banana; Pawpaw; Pawpaw, small flower; Pelipisan; Pequi; Persimmon, American; Pineapple; Pitaya; Pomegranate; Poshte; Prickly pear, Pulasan; Quandong; Rambutan; Saguaro; Salak; Sapodilla; Sapote, black; Sapote, green; Sapote, Mammey; Sapote, white; Sataw; Satinleaf; Screwpine; Sierra Leone-tamarind; Soncoya; Soursop; Spanish lime; Star apple; Sugar apple; Sun sapote; Tamarillo; Tamarind (sweet varieties); Tamarind-of-the-Indies; Velvet tamarind; Wampi; White star apple; Wild loquat.
Subgroup 006A, Assorted tropical and sub-tropical, Inedible Peel, Small	Litchi (lychee) or Longans or Spanish Lime	Inedible Peel - Small (FI 2021): Aisen; Bael fruit; Burmese grape; Ingá; Litchi; Longan: Madras- thorn; Manduro; Matisia; Mesquite; Mongongo; Pawpaw, small flower; Satinleaf; Sierra Leone- tamarind; Spanish lime; Tamarind (sweet varieties); Velvet tamarind; Wampi; White star apple.
Subgroup 006B, Assorted tropical and sub-tropical, Inedible Smooth Peel - Large	Avocado; Pomegranate or Mango; and Banana; and Papaya	Inedible Smooth Peel - Large (FI 2022): Abiu; Akee apple; Avocado; Bacuri; Banana; Binjai; Cacao (pulp); Canistel; Capuacú; Etambe; Feijoa; Jatobá; Kei apple; Kokam; Langsat; Lanjut; Lucuma; Mabolo; Mango; Mango, horse; Mango, Saipan; Mangosteen; Naranjilla; Paho; Papaya; Pawpaw; Pelipisan; Pequi; Persimmon, American; Pomegranate; Quandong; Sapote, black; Sapote, green; Sapote, white; Custard apple; Sataw; Star apple; Tamarillo; Tamarind-of-the-Indies; Wild loquat.

Codex Group / Subgroup	Representative Commodities	Extrapolation to the following commodities
Subgroup 006C, Assorted tropical and sub-tropical, Inedible, Rough or Hairy Peel - Large	Pineapple and Atemoya	Inedible rough or hairy peel - Large (FI 2023): Atemoya; Biriba; Breadfruit; Champedak; Cherimoya; Durian; Elephant apple; Ilama; Jackfruit; Mammy apple; Marang; Marmalade-box; Monkey-bread tree; Pineapple; Poshte; Pulasan; Rambutan; Sapodilla; Sapote, Mammey; Screwpine; Soncoya; Soursop; Sugar apple; Sun sapote.
Subgroup 006D, Assorted tropical and sub-tropical, Inedible Peel - Cactus	Prickly pear and Pitaya	Inedible Peel - Cactus (FI 2024): Pitaya; Prickly pear; Saguaro.
Subgroup 006E, Assorted tropical and sub-tropical, Inedible Peel - Vines	Passion fruit or Kiwifruit	Inedible Peel - Vines (FI 2025): Granadilla; Granadilla, Giant; Kiwifruit; Monstera; Passionflower, Winged-stem; Passionfruit; Passionfruit, banana.
Subgroup 006F, Assorted tropical and sub-tropical, Inedible Peel - Palms	Coconut (young) or Muriti or Palmyra Palm	Inedible Peel - Palms (FI 2026): Coconut, young; Guriri; Muriti; Palmyra Palm; Salak.

TABLE 2. Representative commodities Type 04 - Tree nuts

Codex Group / Subgroup	Representative Commodities	Extrapolation to the following commodities
Group 022 Tree nuts	Macadamia nut and Cashew nut; or Two commodities from This group except coconut	Tree nuts (TN 0085): African nut; Almond; Araucaria nut; Beech nut; Betel nut; Brazil nut; Butter nut; Canarium nut, Candle nut; Cashew nut; Chestnut; Chilean hazelnut; Coconut; Dika nut; Ginkgo; Hazelnut; Hickory nut; Japanese horse chestnut; Macadamia nut; Mongongo; Oak nut; Okari nut; Pachira nut; Pecan; Pequi seed; Pili nut; Pine nut; Pistachio nut; Sapucaia nut; Tropical almond; Walnut; Yellow-Horn;

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