

CODEX ALIMENTARIUS COMMISSION



Food and Agriculture
Organization of the
United Nations



World Health
Organization

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Agenda Item 12

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ORIGINAL LANGUAGE ONLY

JOINT FAO/WHO FOOD STANDARDS PROGRAMME

Codex Committee on Contaminants in Foods

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CODE OF PRACTICE FOR PREVENTION AND REDUCTION OF MYCOTOXIN CONTAMINATION IN CASSAVA AND CASSAVA-BASED PRODUCTS (At Step 4)

Comments in reply to CL 2022/21-CF

*Comments of Brazil, Canada, Chile, Egypt, European Union (EU), Iraq, Kenya,
Peru, Republic of Korea, Uganda, United States of America (USA),
International Atomic Energy Agency (IAEA) and
International Commission for Uniform Methods of Sugar Analysis (ICUMSA)*

Background

1. This document compiles comments received through the Codex Online Commenting System (OCS) in response to CL 2022/21-CF¹ issued in March 2022. Under the OCS, comments are compiled in the following order: general comments are listed first, followed by comments on specific sections.

Explanatory notes on the appendix

2. The comments submitted through the OCS are hereby attached in the **Annex** and are presented in table format.

¹ Codex circular letter, including CL 2021/87-CF, are available on the Codex webpage/Circular Letters: <http://www.fao.org/fao-who-codexalimentarius/resources/circular-letters/en/> or on the dedicated Codex webpage/CCCF/Circular Letters: <http://www.fao.org/fao-who-codexalimentarius/committees/committee/related-circular-letters/en/?committee=CCCF>

Annex**GENERAL COMMENTS**

COMMENT	MEMBER/ OBSERVER
<p>Canada supports the development of a CoP for the prevention and reduction of mycotoxin contamination in cassava and cassava-based products. The format and organization of the CoP is consistent and logical. It covers a wide range of topics and appears reasonably comprehensive. Canada is not a cassava producer and therefore has only identified a few topics that could be expanded upon in this CoP. Canada has, however, identified certain areas of the CoP that could benefit from editorial corrections to improve clarity. Canada supports the decision of CCCF15 on whether this CoP is ready for advancement in the Step Procedure.</p>	Canada
<p>Chile agradece la oportunidad de presentar observaciones sobre el código de prácticas para la prevenir y reducir la contaminación por micotoxinas en la yuca (mandioca) y los productos a base de yuca: A modo general, Chile quisiera apoyar el avance de este Código de Prácticas en el procedimiento respectivo.</p>	Chile
<p>Egypt appreciates the work and efforts done by the EWG in drafting of this circulated document; and in this regard, Egypt agrees to develop the COP .</p>	Egypt
<p>The European Union and its Member States (EUMS) welcome and appreciate the work done by Nigeria as chair and Ghana as co-chair of the Electronic Working India to prepare the document CX/CF 22/15/12 related to the draft Code of Practice for prevention and reduction of mycotoxin contamination in cassava and cassava-based products. The EUMS have not identified key issues which would need further consideration and can therefore agree to advancement in the Step Procedure of this draft Code of Practice, after having taken into account our comments.</p>	EU
<p>Agree with proposal</p>	Iraq
<p><u>General comment:</u> The document should focus more on aflatoxin reduction: <u>Justification:</u> 1. Document has general information on cassava home use, cassava production that do not focus on how to prevent or reduce mycotoxin contamination. 2. Kenya does not recommend for its advancement to the next stage.</p>	Kenya
<p>Solicitud de observaciones en el trámite 3 sobre el Código de prácticas para prevenir y reducir la contaminación por micotoxinas en la yuca (mandioca) y los productos a base de yuca (mandioca). El Perú desea agradecer a Nigeria y Ghana por el trabajo realizado respecto al Código de prácticas para prevenir y reducir la contaminación por micotoxinas en la yuca (mandioca) y los productos a base de yuca (mandioca). En esta ocasión, el Perú considera que este código cuenta con información actualizada sobre las prácticas para prevenir y reducir la contaminación por micotoxinas de la yuca y los productos fermentados a base de yuca, por lo que es necesario avanzar al trámite siguiente.</p>	Peru
<p>Uganda appreciates work-done by the EWG on development of the Code of practice for prevention and reduction of mycotoxin contamination in cassava and cassava products. Uganda notes that the code is implementable. Uganda has some input in the code as follows under different paragraphs.</p>	Uganda
<ul style="list-style-type: none"> • The U.S. supports work in an EWG for CCCF16. • The COP should identify practices that are specific for mycotoxin control. Measures that are good farming practices but unrelated to mycotoxins should be identified as unrelated to mycotoxins. 	USA

SPECIFIC COMMENTS**INTRODUCTION**

COMMENT	MEMBER/ OBSERVER
<p>Para 1 Mycotoxins are fungi toxins that pose health and economic consequences. The most occurring mycotoxins are aflatoxins ochratoxins and ochratoxins fumonisins. ...</p>	Brazil
<p>Para 1 Mycotoxins are fungi-fungal toxins that can pose health and economic consequences. The most frequently occurring mycotoxins in cassava and cassava-based products are aflatoxins and ochratoxins ochratoxin A. ...</p> <p>The presence of mycotoxins themselves do not pose health and economic consequences, it is the concentrations of mycotoxins and consumption amounts of affected products that determine whether there will be an impact on health or trade.</p> <p>The aflatoxins (B1, B2, G1, G2) and ochratoxin A themselves are not in general the most prevalent mycotoxins. Rather, we believe the intent of the sentence is to indicate that they are the most prevalent mycotoxins in cassava and cassava-based products. A recommended alternative sentence is “The most frequently occurring mycotoxins in cassava and cassava-based products are aflatoxins and ochratoxin A.</p> <p>Canada notes that the same level of detail (e.g., agricultural products that may be contaminated, implicated fungal species, and toxicology) contained in this paragraph for aflatoxins is not provided for ochratoxin A.</p> <p>While there are indeed more than one type of ochratoxin (e.g. Ochratoxin A, Ochratoxin B, Ochratoxin C and Ochratoxin TA) and any measures that are taken to reduce Ochratoxin A would also reduce the other ochratoxins since they are produced by the same Aspergillus and Penicillium sp., both the Project Document proposing new work for the development of this CoP (Appendix VII of REP21/CF) and the Code of Practice for the Prevention and Reduction of Mycotoxin Contamination in Cereals (CXC 51-2003) specify Ochratoxin A.</p> <p>Para 3 The severity of pre-harvest fungi-fungal infection and propagation largely depends on the prevailing environmental and climatic factors-factors, which may differ from year to year and from region to region. It also depends on the presence of inoculums, and the farming practicepractice utilized. The degree of damage of the crop by rodents, insects and other organisms also influences the severity of contamination-contamination severity. Good agricultural practices (GAP) and good manufacturing practices (GMP) could play a major role in reducing the reduction-severity of severitycontamination. Risk of postharvest fungal infection and production of mycotoxins in stored grain increases with the duration of storage-storage duration, as indicated in the <i>Code of practice for the prevention and reduction of mycotoxin contamination in cereals</i> (CXC 51-2003).</p> <p>Para 4 There are many cultivars and species of cassava-cassava; however, they fall under one or-of two categories, bitter and sweet varieties-varieties, depending on the cyanogenic glucoside levels. The bitter and sweet varieties have high (≥ 100 mg/kg) and low (≤ 50 mg/kg) HCN content-content, respectively. Cassava is usually processed and consumed in various forms-forms, which may differ across countries. Generally, one target-objective of cassava processing is to reduce its cyanogenic glucoside content to the lowest level possible. The intermittent presence of certain mycotoxins in cassava and cassava-based products destined for human food and animal feed use is to be expected. Therefore, it is important to diligently monitor products and processes for indications of the various conditions that promote fungal contamination and mycotoxin accumulation as indicated in the <i>Code of practice for the prevention and reduction of mycotoxin contamination in cereals</i> (CXC 51-2003).</p> <p>Para 6 ... Other-As well, other local crops, climate, and agronomic practices as well should be examined to facilitate implementation of these practices where applicable. This Code of Practice is expected to apply to all cassava and cassava-based products relevant to human dietary intake and health-health, as well as international trade.</p> <p>Para 7 This Code of Practice provides information on general principles for the reduction of various mycotoxins in cassava and cassava-based-cassava-based products; training and education of farmers, agricultural workers, processors, maufacturers-manufacturers, and distributors.</p>	Canada

COMMENT	MEMBER/ OBSERVER
<p>Para 1 ...Depending on the region, tThey are mainly produced by <i>Aspergillus flavus</i>, <i>Aspergillus parasiticus</i> and <i>Aspergillus nomius</i>, and <i>Aspergillus minisclerotigenes</i>. Aflatoxins are among the most potent carcinogenic, teratogenic, and mutagenic compounds known. The major aflatoxins commonly found in agricultural commodities are aflatoxin B1, B2, G1, and G2, of which aflatoxin B1 is the most potent. Depending on the host species, these mycotoxins can act as nephrotoxins, hepatotoxins, immunotoxins, neurotoxins, teratogens, or carcinogen, however, the <u>kidney-liver</u> is the primary target for toxicity.</p> <p>The prevalence of fungi is dependent on the region and <i>Aspergillus minisclerotigene</i> should be added.</p> <p>§1, last sentence: it is proposed to replace kidney by liver as the liver is the target organ for aflatoxin toxicity.</p>	EU
<p>Para 4 Need to rephrase the rates of medium varieties in terms of taste for example to consider; ' ≤ 50 mg/kg as sweet cassava and ≥ 50 mg/kg as bitter cassava'.</p> <p><u>Justification:</u> The range between 51 mg/kg to 99 mg/kg is not classified yet is supposed to be bitter and cassava under this category needs to be detoxified prior to consumption.</p>	Uganda
Para 1 Strange alignment/format	ICUMSA

SCOPE

COMMENT	MEMBER/ OBSERVER
<p>Para 8 This Code of Practice intends to provide national and local authorities, farmers, producers, manufacturers, distributors and other relevant bodies with information and guidance to <u>aid in the</u> prevention and reduction of mycotoxin <u>mycotoxins</u> in cassava and cassava-based <u>cassava-based</u> products. This guidance covers: (+) Good agricultural practices, (#) Good manufacturing practices, Good storage Practices and Good distribution practices.</p>	Canada
<p><u>General</u> - This seems to be not connected to the rest of the text. Either it should be left-justified and have a number (indicating it is part of section 1 or a new section) or be removed. There is no SCOPE shown in the French or Spanish versions.</p> <p>Para 8 Alignment/justification of this point is different to the ones above and after. Alignment/justification of this point is different to the previous and subsequent points.</p>	ICUMSA

RECOMMENDED PRACTICES APPLICABLE TO PRE-PLANTING STAGE

COMMENT	MEMBER/ OBSERVER
<p>Para 12 cassava cuttings that are free of toxigenic free fungi should be planted. Toxigenic fungi will be identified? How this would be evaluated?</p> <p>Para 14 Avoid planting cassava on land where groundnut, maize, sugarcane or other highly susceptible crops were cultivated the previous year because such soils are likely contaminated with <i>Aspergillus flavus</i>, <i>Aspergillus parasiticus</i> and related species and toxigenic Fusarium species. The farmers should plant during the right month, based on geographical location.</p>	Brazil
<p>Para 9. A fertile soil should be selected and this is considered critical. Most The most preferred soil is a loamy soil with good drainage. The farmer should avoid planting in valleys, to avoid flooding. Flood water could transport fungi-fungal inoculum from an infected farm. Where possible, ensuring ensure a proper planning for for crop rotation for in successive seasons is vital seasons. This will help in the reduction of the reducing inoculum in the farm farm, which may be present from post-harvest waste after harvest that harbours toxigenic fungal spores. ...</p> <p>Para 10. After the land selection, it should be cleared and waste properly disposed of to avoid contamination of the cassava roots with inocula from infected weed or other crops. The soil should be loosened by tilling with clean and suitable farm tools and equipment, to reduce stress to cassava roots particularly during enlarging the enlargement period and also to encourage healthy root development. Farmers should promote Good Agricultural-Agricultural Practices(GAP) to avoid soil erosion. Soil tests where possible should be determine conducted and, where possible, to determine whether if there is a need to apply fertilizer and/or soil conditioners-conditioners, in order to assure ensure adequate soil pH and plant nutrition to avoid plant stress. This should be done with the guidance of agricultural-agricultural advisors.</p> <p>Para 11. They <u>Organic fertilizers</u> should be added during tilling to increase soil fertility or to address specific soil nutrient deficiencies. Ridges or mounds should be up to 0.75 m - 1 m apart. This should also be determined by the farming practice either with cassava alone or planted along with other crops. Healthy organic waste, such as pruning debris, peels and any other organic material, material that are free from fungi-fungal infestation and disease-free, at the farm(s) should be used. Where needed, farmers should have access to homologated fertilizer fertilizer.</p> <p>Para 12 ability - These items could also be separate bullet points, as was done for other items in the list. longer shelf life and high starch content - These items could also be separate bullet points, as was done for other items in the list.</p>	Canada
<p>Para 9. Regarding the part 'particular crops' of fourth paragraph, it is necessary to specify the susceptible crops species(or list) to toxigenic fungi.</p> <p>Para 11. Regarding the part 'that are free~~used.' of third paragraph, it's necessary to add a method to identify cassavas that are not contaminated with fungi.</p> <p>Para 12 Also In this part, it's necessary to add a method to identify cassavas that are not contaminated with fungi.</p>	Republic of Korea
<p>Para 11 Need to insert 'use of inorganic fertilizers' as well since they are applied in cassava farming.</p> <p>Para 12 ability - Need to include the issue of responding to eating market, we have a huge market for both processed and unprocessed cassava. The market faces a challenge on which variety is good for making snacks or other foods thus need to include a bullet under the paragraph on;</p> <ul style="list-style-type: none"> 'Eating quality traits for both the processed and unprocessed food market for cassava'. <p>Need to rephrase bullet one and change the word 'germinate' to 'sprout' in the document. Justification; Cassava is not propagated by seed</p>	Uganda

RECOMMENDED PRACTICES APPLICABLE TO PLANTING AND PRE-HARVEST STAGE

COMMENT	MEMBER/ OBSERVER
<p>Para 14 Avoid planting cassava on land where groundnut, maize, sugarcane or other highly susceptible crops were cultivated the previous year because such soils are likely contaminated with <i>Aspergillus flavus</i>, <i>Aspergillus parasiticus</i> and related species and toxigenic Fusarium species. The farmers should plant during the right month, based on geographical location.</p>	Brazil
<p>Para 13. To achieve maximum yield, the stem cuttings of 25 cm in length is-are recommended for planting at space-a spacing of 1m x 1m; no dead stem should be planted. However, different producers may adopt slightly modified practices depending on cassava variety and the region. When cassava cuttings are to be planted, the method used depends on the climatic and rainfall conditions. Planting methods include:</p> <p>Horizontal Planting involves placing the plants 5 – 10 cm deep into the soil in <i>dry climates</i>.</p> <p>Vertical Planting involves placing the cuttings vertically to avoid rot, especially <i>during the rainy season</i>, while.</p> <p>Inclined Planting involves placing the cuttings at 45 degrees and leaving 2 - 3 nodes above the ground. This is recommended in areas with the least rainfall. Planting should be done when heat from the sun heat is minimal or absent-absent, such as early morning or in the evening.</p> <p>Para 15. The use of post emergence herbicide could be recommended immediately once weeds are spotted on the field. In some cases, pre-emergence herbicides could be used before planting to minimize weed growth. Small-scale farms could use hoes and cutlasses to remove weeds but care should be taken not to induce-prevent mechanical injury on-of the plant. While-Large-scale farms could use mechanised equipment could be used in large-scale farms for weed removal. Note that, land preparation needs to be done properly to control the weeds at least for the first 3 months in order to achieve optimum yield.</p> <p>Para 16. Certain weeds can harbour toxigenic fungi. The weeds can, and also increase plant stress when they are in competition for nutrients-nutrients, during the plant development. Either manual or mechanical approaches can be used for weed control; approved herbicides could also be used.</p> <p>Para 17. The type and quantity of fertilizer to be use-used are based on the cassava variety and nature of the soil. Fertilizers could be applied at around 4 - 8 weeks after planting and 16 weeks after planting, and be applied 6 cm in width and 10 cm from the stems or leaves of the cassava plant. Also, it is advisable to conduct a soil test to determine the type of fertilizer to apply.</p>	Canada
<p>3.1 Planting It is necessary to explain how this part(Planting) can affect the reduction of Mycotoxins contamination. In other words, it is required to explain the relationship between Planting part and mycotoxins reduction.</p> <p>3.3 Fertilizer application It is also necessary to explain how this part(Fertilizer application) can affect the reduction of Mycotoxins contamination. It means that it is required to explain the relationship between this part and mycotoxins reduction like planting part above.</p>	Republic of Korea
<p>Para 13 Need to consider recent research on plant spacing and include other spacing, for example use of 0.8 m x 1m in addition to 1m x 1m</p>	Uganda
<p>Para 18 Suggest adding after "Ensure safe use of spraying equipment...." and observe the application instructions for the pesticide formulation used to avoid potential harmful residues in the crop.</p>	IAEA

RECOMMENDED PRACTICES APPLICABLE TO HARVEST STAGE

COMMENT	MEMBER/ OBSERVER
<p>Para 20 The mechanized harvesting method generally causes more mechanical damage to the product and the plants. It is not necessary to mention the cost effective comparison as this depends on the size of the production and the cost of labor.</p> <p>Para 24. ... A continuous flow from harvest to final product should be planned, in order that the roots will not be stored for a long period. The period the ideal time is 2 to 3 days and the excess should be taken to a suitable raw material storage room.days).</p> <p>Brazil suggests the following wording:</p> <p>Prior to the processing step, cassava roots should not be exposed to the sun, high temperatures, mechanical damage, etc., since the roots still have high water activity suitable for microbial development. The water activity at this stage varies from 0.922 to 0,996. A continuous flow from harvest to final product should be planned, in order that the roots will not be stored for a long period (the ideal time is 2 to 3 days).</p> <p>Para 25. Excess material should be taken to a suitable raw material storage room. Enhanced storage methods for roots help to extend shelf life of fresh roots by Two (2) – Six (6) weeks. Other storage methods such as using low temperatures can be combined with fungicide treatment or waxing and is suitable for export of large amount of roots. Food handlers that can afford the needed specialized equipment with the necessary technical skills may use improved storage methods to store fresh roots thereby protecting.</p> <p>Para 25 Brazil suggests the following wording:</p> <p>Excess material should be taken to a suitable raw material storage room. Enhanced storage methods for roots help to extend shelf life of fresh roots by Two (2) – Six (6) weeks. Other storage methods such as using low temperatures can be combined with fungicide treatment or waxing and is suitable for export of large amount of roots. Food handlers that can afford the needed specialized equipment with the necessary technical skills may use improved storage methods to store fresh roots thereby protecting.</p>	Brazil
<p>Para 20. Harvesting should involve adequate planning in the areas of timing, age of products and methods to be used. Manual harvesting usually is labor intensive and expensive. For cost effectiveness in commercial operation, farmers are informed-encouraged to consider using mechanical methods. In the prevention of loss of order to maintain quality and quantity prevent crop wastage, the amount of roots to be harvested should also be determined depending on market needs and demand.</p> <p>Para 21. If mechanized processing materials are available, it is advisable to harvest cassava immediately after the roots mature. Harvesting manually by hand is done by raising the lower portion of the cassava plant stem and cutting off a part of the stem, leaving a small portion at the base of the plant to serve as a handle to pull the cassava root out of the ground. Here, the cut portions of the stems are kept for reuse in the next planting season or sold to other cassava farmers. The leaves can also serve as animal feed.</p> <p>Para 22. Cassava should be harvested when the soil is slightly soft but has no excessive water-water, in order to easily remove soil from the roots and avoid contamination during peeling.</p> <p>Para 23. Containers and conveyances (e.g. trucks) to be used for collecting and transporting the harvested roots from the field to the further processing facilities, and to storage facilities, should be clean, dry and free of crop residues, insects and visible fungal growth before use and re-use.</p> <p>Para 24. Prior to the processing step, cassava roots should not be exposed to the sun, high temperatures, mechanical damage, etc-or other conditions which could promote fungal contamination, since the roots still have high water activity suitable for microbial development. The water activity at this stage varies from 0.922 to 0,996. A continuous flow-progression from harvest to final product should be planned, in order that the roots will not be stored for a long period. The ideal time is 2 to 3 days and the excess-remaining product should be taken to a suitable raw material storage room.</p>	Canada

COMMENT	MEMBER/ OBSERVER
<p>Para 25. Enhanced storage methods for roots help to extend shelf life of fresh roots by Two (2) 2 – Six (6) 6 weeks. Other storage methods such as using low temperatures can be combined with fungicide treatment or waxing and is <u>are</u> suitable for export of storing or exporting large amount <u>amounts</u> of roots. Food handlers that can afford the needed specialized equipment with the necessary technical skills may use improved storage methods to store fresh roots thereby protecting <u>inferring protection</u>.</p> <p>For consistency throughout document use “2 and 6 weeks” format, as was done in other paragraphs in this document when referring to durations in weeks.</p> <p>What are “enhanced storage methods”? Perhaps examples could be provided to help clarify.</p> <p>Are "improved storage methods" the same as "enhanced storage methods"? If so, can only one of these terms be used and a description of what they are, be included in the paragraph?</p> <p>The words "the needed" was removed because specialized equipment could help reduce fungal contamination but is only one option to do so and since it is only available to those producers/processors who can afford it. Its inclusion in the sentence could suggest that those who cannot afford it would have product that is unacceptable for trade or consumption, which would not necessarily be the case. Basically, its inclusion could suggest unfair treatment of smaller processors and should therefore be stricken from the paragraph.</p>	
<p>4.1 Mechanical / Manual Harvesting It is also necessary to explain how this part(Mechanical/Manual harvesting) can affect the reduction of Mycotoxins contamination. So, it is required to explain the relationship between this part and mycotoxins reduction.</p> <p>Para 25 As to the last word 'protecting', it is required to specify sentences to explain what protection is needed from.</p> <p>Para 25 In the first paragpah, the word, 'by Two-six week', is need to be modified more clearly, 'from two weeks to six weeks'.</p>	Republic of Korea
<p>Para 22 The harvesting situations in Uganda, where cassava is harvested during different seasons when the soil is soft or hard. Uganda hence proposes the EWG to consider including the sentences below under this paragraph;</p> <ul style="list-style-type: none"> -Cassava roots should be harvested all through the different seasons to meet the market demand, however use of practices/ mechanisms that prevent damage or injury to the roots during the dry season when the soils are hard. -Cassava roots should be harvested with minimum amount of soil remaining on the roots to prevent contamination during processing stage. <p>Para 25 Need for clarity on the storage time in reference to cassava varieties and shorten time between harvesting and processing since after harvesting, the deterioration process immediately starts.</p>	Uganda

RECOMMENDED PRACTICES APPLICABLE TO POST-HARVEST STAGES

COMMENT	MEMBER/ OBSERVER
<p>Para 26 [It is recommended to discard visible mould cassava roots to avoid them to be processed.] Selection to discard visible mould roots should be done before washing and also after peeling</p> <p>Para 27. After harvest, if cassava root is to be processed immediately, it should be washed to remove the surface dirt and soil acquired microbes. The source of water is an important factor not to be ignored. Potable water <u>fit for its intended purpose</u> should be used or treat other sources of water for washing to avoid contamination. Proper washing is vital to ensure sand or mud is removed from all parts especially the contours of the root.</p> <p>To align with hygiene COP</p> <p>Para 28 immediately after washing...</p> <p>It is recommended to discard visible mould cassava roots to avoid them to be processed.</p> <p>5.2 Size reduction: Grating, pulping and slicing or chipping how the size reduction affect mycotoxin reduction?</p> <p>30. Depending on the size of the roots to be processed, varieties of cassava, as well as available equipment, grating of cassava roots can be done manually using a grater or mechanically to produce pulp. In many parts of Africa, a perforated metal sheet is used for manual grating. During grating, the cyanogenic glycosides are hydrolyzed by the enzyme, linamarase. Bitter cassava variety, which contain high amount of cyanogens must be grated. High cyanide cassava should not be chipped to produce cassava flour meant for human consumption.</p> <p>It seems to be a good practice for hydrocyanic acid (HCN) control so it should not be in this COP for mycotoxin control.</p> <p>Para 31. Chipping or slicing is done by cutting cassava into chips, which is dried and milled into flour. Usually low cyanide (sweet) cassava variety is used, while other variety may be used for making animal feed.</p> <p>Chipping or slicing are a good process practice to control mycotoxins in cassava?</p>	Brazil
<p>Para 26. Cassava roots can be processed into fermented or unfermented cassa-based <u>cassava-based</u> products. These products, which depend on the region, have a wide range of applications including food for humans, animal feed, industrial uses such as fillers, and cloth starch among others. The processing steps by which these various products are arrived at differs and can be found in the <i>Code of practice for the reduction of HCN in cassava and cassava products</i> (CXC 73-2013). The approach here is to discuss the various steps individually but not under any specific product nametype. Processing of cassava should be initiated within 8-12 hours of harvest to avoid spoilage.</p> <p>Para 27. After harvest, if cassava root is to be processed immediately, it should be washed to remove the surface dirt and soil acquired microbes. The source of water is an important factor not to be ignored. Potable <u>Either potable water or water treated such that it is fit for the intended purpose</u> should be used or treat other sources of water for washing to avoid contamination. Proper washing is vital to ensure sand or mud is removed from all parts especially the contours of the root, <u>especially the contours</u>.</p> <p>In addition, the Code of Practice for the Prevention and Reduction of Mycotoxin Contamination in Cereals (CXC 51-2003) indicates “Soil and soil water are sources of inoculum (spores) of toxigenic fungal species” in the section on ‘Pre-Harvest’.</p> <p>Para 28. Peeled cassava roots should be processed immediately and should not be stored unprocessed. Peeling is either done manually using a knife or is done mechanically. It is done to remove the outer inedible portion of the cassava roots. Peeling should be carried out in a clean environment, and not in one where other crops have been stored <u>stored</u>, otherwise, they will it may <u>they will it may</u> serve as sources of spores <u>a source of contamination</u> for the cassava.</p> <p>Para 29. For <u>the roots of</u> sweet varieties cassava varieties <u>sweet varieties</u> roots that can be consumed after peeling or boiling, it is recommended to boil roots immediately after peeling and washing. This will expose any fungus to temperatures they cannot survive.</p>	Canada

COMMENT	MEMBER/ OBSERVER
<p>Para 30 This statement “High cyanide cassava should not be chipped to produce cassava flour meant for human consumption” may be better placed in paragraph 31 when chipping and slicing are discussed.</p> <p>Para 30 ... During grating, the cyanogenic glycosides are hydrolyzed by the enzyme, linamarase. Bitter cassava variety<u>varieties</u>, which contain high amount<u>higher amounts</u> of cyanogens<u>cyanogens</u>, must be grated. High cyanide cassava should not be chipped to produce cassava flour meant for human consumption.</p> <p>Paragraphs 30 and 31 reference cyanogenic glycosides. The Code of practice for the reduction of HCN in cassava and cassava products (CXC 73-2013) could be further referenced and any linkages, or lackthereof, between how treatments for cyanogenic glycoside reduction also impact potential mycotoxin management, be more clearly outlined.</p> <p>Para 32. Where cassava chips or slices are dried at farm level or in a processing facility, the chips or slices should be dried on raised platforms and at least 100 meters away from probable sources of contamination, such as refuse dump, dumps or filling station<u>stations</u>. where<u>Where</u> sun-drying is carried out, it should be done on drying mats such as raffia palm, bamboo, oil palm mat, banana leaves<u>leaves</u>, amongst others<u>others</u>, that would ensure good hygienic practice.</p> <p>Para 35. The. <u>Fermentation</u> is <u>used</u> for further cyanide elimination ...</p> <p>Para 36. ... Water removal should be optimal and care should be taken not to use contaminated processing materials such as sacs<u>sacks</u> as they may become sources of fungi inoculation<u>inoculum</u>. Food grade sacs<u>sacks</u> should be used. Adequate cleaning and sterilization of the sacs<u>sacks</u> should be done frequently.</p> <p>Para 37. The process involves feeding the cassava cake into a cassava grater that will break it into granules. wet<u>Wet</u> cakes can be sifted to remove lumps. Where <u>a</u> cassava grater is not available, a manual sifter is<u>are</u> most times used<u>often</u> used to break the cake and sift the granules at the same time. The grater should be clean and the sacks<u>sacks</u> containing cake or granules should not be placed on dirty surfaces (such as floors). ...</p> <p>Para 38. ...Granules or chips should be properly spread per square meter of drying surface and not loaded so much<u>overloaded</u>, to allow for air circulation. Platforms for drying should be raised to prevent contamination such as dust, animals, and pests. Batches of granules not adequately dried should be spread out in a ventilated room till<u>until</u> the product is dried. Drying surfaces and materials should be clean.</p> <p>39. This process involves milling the dried granules or chips to <u>a</u> fine flour of about particle size<u>size of approximately</u> 250 microns to 500 microns<u>microns</u>. Care should be taken to ensure the mill is not overloaded. The environment should be monitored to prevent cross contamination from dust<u>dust</u>. The dried flour should be stored in a clean moisture-proof container.</p> <p>Para 41. Frying of <u>gari-gari</u> among other fermented cassava products should be done at high temperatures and monitored. This, thus further discouraging fungi<u>fungi</u> proliferation.</p> <p>Spelled “gari” in the Code of Practice for the Reduction of Hydrocyanic Acid (HCN) in Cassava and Cassava Products”.</p> <p>While it is noted that “boiling” is discussed in paragraph 29, why is frying specifically singled out as a cooking method? What conditions of frying may potentially lend themselves to mycotoxin proliferation? Perhaps list those conditions for clarity.</p> <p>Perhaps the intent is that fungal contamination is not introduced at the frying stage, as in other stages of producing various cassava products, but perhaps this could be a general comment for all cooking methods?</p>	
<p>Para 29. For sweet varieties cassava roots that can be consumed after peeling or boiling, it is recommended to boil roots immediately after peeling and washing. This will expose any fungus to temperatures they cannot survive. <u>However as the boiling will not degrade already formed mycotoxins, it is of major importance that fungal infestation is avoided.</u></p>	EU

COMMENT	MEMBER/ OBSERVER
<p>It is mentioned "this will expose any fungi to temperatures they cannot survive." While this statement is correct, the mycotoxins formed are usually not degraded at boiling temperatures. Therefore it proposed to add the following sentence: "However as the boiling will not degrade already formed mycotoxins, it is of major importance that fungal infestation is avoided".</p>	
<p>Para 30 Regarding the second sentence, it is needed to be considered to delete this part(In many parts of Africa).</p> <p>Para 31. It is also necessary to explain how this sentence can affect the reduction of Mycotoxins contamination. So, it is required to explain the relationship between this sentence and mycotoxins reduction.</p> <p>Para 34 1. The word 'Innoculation' needs to be changed to "contamination or inocula."</p> <p>2. The last sentece 'the grater cleaned ~~ dry.' needs to be changed to "~all the tools used for grating, pupling, splicing, and chipping cleaned and washed after each use and adequately stored dry."</p> <p>Para 35 Regarding the second paragraph(Fermentation of cassava for ~~used.), it is also necessary to explain how this part can affect the reduction of Mycotoxins contamination. Or it is required to explain the relationship between this part and mycotoxins reduction.</p> <p>5.5 Milling it needs to add additional information on cleanliness(sanitation) of used machine just like 'Milling machine should be clean and washed after use.'</p> <p>Para 40 it is necessary to add the word(completely dried) in the last part → "portable water and completely dried before use"</p> <p>5.7 Frying Changing the word 'Frying' → "Frying of garri"</p> <p>Para 41</p> <p>1. It is necessary to add specific temperature range and monitoring target.</p> <p>2. Changing the word 'discouraging' → "discourages"</p>	<p>Republic of Korea</p>
<p>Para 26. Need to revise the processing period to 'within 24 hours' and not 8-12 hours.</p> <p><u>Justification:</u> 12 hours not achievable for some farmers in Uganda</p> <p>Para 32 Need to emphasize use of clean and dry surfaces when sun-drying cassava verses the listed examples of drying surfaces.</p> <p>Para 35 Editorial error at beginning of the sentence, need to rewrite the sentence starting with;</p> <p>'The fermentation of cassava is meant for further cyanide elimination, flavor development and product stability. Fermentation of cassava for traditional food processing is usually allowed to take a natural course, some optimization research has been carried out to the effect of using selected starter cultures. However this method is not widely used. The sack in which the grated pulp or the container in which the peeled root will be kept, allowing for 2-5 days fermentation should be kept clean at all times and especially well cleaned before use, to ensure it does not become a natural source of inoculum'.</p> <p>Para 33 Need to include the grated/mushed cassava</p>	<p>Uganda</p>

STORAGE

COMMENT	MEMBER/ OBSERVER
Para 42 ... Provide protection <u>Protection should be provided</u> from ground water, moisture condensation, rain, entry of rodents, and insects whose activity makes the commodities more susceptible to mould infection. Ideally, storage areas should be able to prevent wide temperature fluctuations. Temperature and humidity can be monitored and controlled where possible.	Canada
Para 43 Since this part(N.43) is similar to the contents of packaging part, it needs to be included in the packaging part(No. 7).	Republic of Korea

PACKAGING

COMMENT	MEMBER/ OBSERVER
<p>Para 45. Cassava-based products mainly in <u>the</u> form of flour or granules may be stored in sacks, sealed prior <u>to</u> distribution and sales in the market. Packaging materials should be made of materials which should not easily absorb moisture when packed and sealed.</p> <p>Para 46. Transport containers, <u>including</u> vehicles such as trucks and railway vessels (boats vessels, boats and ships) ships, should be dry and free of old crop dust, visible fungal growth, musty odour, insects and any contaminated material that could contribute to mycotoxin levels in lots and cargoes of cassava and cassava-based products. As necessary, transport containers should be cleaned and disinfected with appropriate substances (which should not cause off-odours, flavour or contaminate the cassava and cassava-based products) before use and re-use and be suitable for the intended cargo. The use of registered fumigants or insecticides may be useful. At unloading, the transport container should be emptied of all cargo and cleaned as appropriate.</p>	Canada

PERSONNEL HYGIENE

COMMENT	MEMBER/ OBSERVER
<p>Para 49. Farmers, The competence agricultural and hygiene of agricultural hired workers, hired workers and farmers should be trained on adequate measures from workplace and personal hygiene measures, at each process step such as planting, harvesting, packing and storage techniques should be techniques, to ensure quality cassava and cassava based cassava-based products. Training and re-training re-training should be done to ensure adherence with best practices. Keep a record of training dates. Processors should provide required training on employee hygiene workplace hygiene and keep a record of training dates. Personal protective clothing should be provided provided for the staff. Measures to monitor staff hygiene practices and health- status should be put in place. Keep records Records should be kept to track serious illnesses <u>and</u> to avoid cross contamination. Make washrooms Washrooms and hand washing facilities <u>should be made</u> available and easily accessible. Areas for Separate eating eating area, drinking and s, smoking, coffee and all forms drinking should be kept separate from processing and packaging areas to avoid any contamination.</p> <p>Replace current sentence with "Farmers, agricultural and hired workers, should be trained on workplace and personal hygiene measures, at each processes step such as planting, harvesting, packaging and storage techniques, to ensure quality cassava and cassava-based products."</p>	Canada

INSTRUCTION FOR STORAGE AND PRODUCT USE

COMMENT	MEMBER/ OBSERVER
<p>Para 50. Specific storage instructions for the cassava products should be provided on the packaging so as to ensure protection from unfavourable conditions which may promote fungal growth and contamination. The instructions for <u>product storage before (e.g. store in a cool, dry, well-ventilated area)</u> and when after the product is opened should be <u>legible and</u> in clear language and legible language, in order to maintain the product in a cool, dry, well-ventilated area <u>quality</u>. Educators should create awareness on product stacking in storage areas to avoid increased humidity and temperature temperatures which encourages fungi <u>encourage fungal</u> growth.</p> <p>Replace current sentence with “The instructions for product storage before (e.g. store in a cool, dry, well-ventilated area) and after the product is opened should be legible and in clear language, in order to maintain product quality.”</p>	Canada
<p>Para 50. 1. The first and second paragraph should be included in the Packaging part(no.7).</p> <p>2. The last senece 'Eucator should ~ growth' is recommended to be included in the Storage part(no.6).</p>	Republic of Korea