



Food and Agriculture  
Organization of  
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Agenda Item 10

CX/CF 14/8/10-Add.1

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## JOINT FAO/WHO FOOD STANDARDS PROGRAMME

### CODEX COMMITTEE ON CONTAMINANTS IN FOODS

#### Eighth Session

The Hague, The Netherlands, 31 March – 4 April 2014

### PROPOSED DRAFT ANNEX FOR THE PREVENTION AND REDUCTION OF AFLATOXINS AND OCHRATOXIN A CONTAMINATION IN SORGHUM (CODE OF PRACTICE FOR THE PREVENTION AND REDUCTION OF MYCOTOXIN CONTAMINATION IN CEREALS (CAC/RCP 51-2003))

*Comments at Step 3 received by Costa Rica, El Salvador, European Union, Japan, Republic of Korea and African Union*

#### **COSTA RICA**

Costa Rica suggests making the following changes for a better understanding of Appendix 1, Annex 5 in Spanish.

**Paragraph 7: delete the comma after the word irrigation.**

Use good agricultural practices including measures which will reduce plant stress. Such measures may include: nutrient management, pest control and irrigation, if necessary to combat heat and drought stress.

**Paragraph 9: at the beginning it states that the plant should be harvested when it reaches full maturity, followed by a comma, and the rest of the paragraph is not clear. It seems to contradict the first part of this paragraph. We therefore suggest improving the wording.**

Harvest crop at full maturity unless if allowing the crop to continue to full maturity would subject it to extreme heat, rainfall or drought conditions.

**Paragraph 10: this paragraph only states that damaged plants and/or infested by pests should be harvested separately, but it does not explain how to proceed in extensive sowing.**

Plants damaged and/or infested by pests should be harvested separately.

**Paragraph 16: in this paragraph the aspect of the use of disinfectants is generalized, however dry milling is also used in the document, therefore this paragraph should be clearer about the type of disinfectant or recommended cleaning and disinfecting processes.**

Clean processing equipment and environment thoroughly before and after grinding a batch of produce using approved disinfectant in order to reduce risk of cross contamination.

Finally, we suggest defining whether the recommendations made in the document apply to sorghum production and processing and to intensive industrial processes, because there are some paragraphs that seem to refer only to traditional processes.

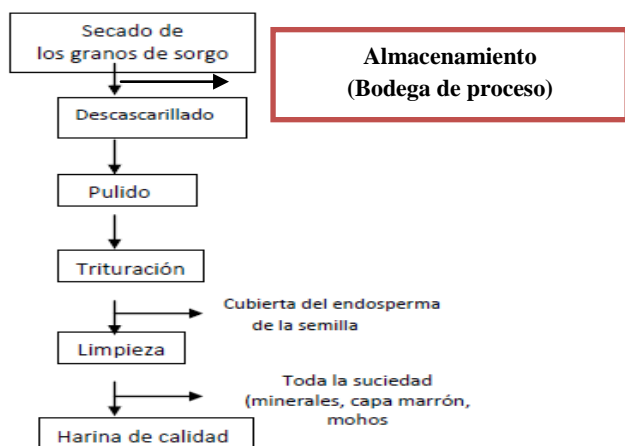
#### **EL SALVADOR**

We include the following comments in **bold**:

Paragraph 11:

**Sun-d**Drying in full sun should be done on clean and dry surfaces, for at least three days; grains should be protected from rain and dew during this process. Drying could also be done using mechanical dryers. Flat bed and re-circulating batch driers are adequate for small scale operations while using continuous flow-dryer will suffice for large scale drying for long storage period.

For figure 1:



Secado de los granos de sorgo = dry sorghum grain

Descascarillado = husking

Pulido = polishing

Trituración = grinding

Limpieza = scouring

Harina de calidad = quality flour

Almacenamiento = storage

We consider it necessary to include the storage phase in the diagram.

### EUROPEAN UNION

The EUMS have no comments on the proposed annex and would agree to forward the proposed annex for the prevention and reduction of aflatoxins and ochratoxin A contamination in sorghum to the Code of Practice for the Prevention and Reduction of Mycotoxin Contamination in Cereals (CAC/RCP 51-2003) to the 37<sup>th</sup> Session of the Codex Alimentarius Commission for adoption at Step 5/8 (with omission of Steps 6 and 7), if this would be found appropriate.

### JAPAN

#### General Comments

The proposed draft annex should be as concise as those of the *Code of practice for the prevention and reduction of mycotoxin contamination in cereals, including annexes on Ochratoxin A, Zearalenone, Fumonisin and Tricothecenes* (CAC/RCP 51-2003) (hereinafter referred to as “COP”). Japan believes that the structure of the proposed draft annex should be rearranged for consistency with the existing annexes of the COP.

#### Specific Comments

Japan proposes to relocate, delete or add some sections, sub-sections and paragraphs and delete a figure for consistency with the structure of existing annexes of the COP.

#### “Planting”

The section of “Planting” in the section on “Practices for prevention and reduction of ochratoxin A in sorghum and sorghum products” should be moved to and integrated into the first section of “Planting” for applying to prevention and reduction of both aflatoxins and ochratoxin A. As a result of combining the two sections on “Planting”, paras. 1 and 3 in “Introduction” and the explanation of practices on planting in “Practices for prevention and reduction of ochratoxin A in sorghum and sorghum products” would not be needed. Therefore, these paragraphs and section should be deleted.

#### “Processing”

The section on “Processing” should be divided into two sub-sections on flour and beer. Paras. 13-18 should be in a new sub-section named “Flour” and paras. 19 and 20 should be in another new section named “Beer”.

Figure 1 titled “Sorghum flour production” should be deleted because the process has been described in the main text.

Figure 2 titled "Mycotoxin risk assessment during the process production of African traditional beer" shows a common and well-known process of producing beer from cereals. As the process is not specific to sorghums, it may not be needed in the proposed draft annex. On the other hand, if the information on risk levels in the figure is felt useful for annex users, the committee should consider whether Fig. 2 should be deleted from the proposed draft annex or figures of process of producing beer from other cereals similar to Fig. 2 should be at the end of the relevant existing annexes of the COP.

Japan provides more detailed comments including editorial changes paragraph by paragraph. Please find the following specific comments of which proposed insertion is underlined, and proposed deletion is ~~struck out~~:

### Introduction

The title of the section, paras. 1 and 3 should be deleted and para.2 should become the 1<sup>st</sup> paragraph of the proposed draft annex as follows:

#### Introduction

~~1. This Annex is in two parts. The first part (paragraphs 4-22) applies to both aflatoxins and ochratoxin A whereas the second part (paragraph 23) specifically refers to practice applicable only to ochratoxin A reduction.~~

2. 1. Good Agricultural Practices include methods to reduce the development of aflatoxin- and ochratoxin A- producing fungi and their toxins contamination consequently of sorghum in the field during planting, harvest, storage and transport; and processing.

~~3. The following practices are recommended for different segments of sorghum production.~~

### Planting

2. Refer to paragraphs 4-9 of in the General Code of Practice, for Prevention and Reduction of Mycotoxin in Cereals (CAC/RCP 51-2003)

#### Para. 4

As the soils in lands where highly susceptible crop were cultivated in the previous year probably are contaminated with not only aflatoxin-producing fungi but also ochratoxin A - producing fungi, the names of ochratoxin A - producing fungi should be added to the end of the sentence. The current paragraph 22 should be modified slightly and placed after the current para. 4.

4. 3. Avoid planting sorghum on the land where groundnut or other highly susceptible crop was cultivated in the previous year because such soils are likely to be contaminated with Aspergillus flavus, and Aspergillus parasiticus, A. ochraceus and Penicillium verrucosum.

(New paragraph)

22. Do not grow sorghum in or close to cocoa trees, coffee bean plants or grape vines as these crops are highly susceptible to ochratoxigenic fungi and ochratoxin A contamination and thus will inoculate the soil with A. ochraceus or P. verrucosum in tropical and temperate climates respectively with consequent carryover to the sorghum grains.

#### Paras. 6 and 7

The paragraphs should be deleted because the similar texts have been already included in paras. 6,8,10 and 13 in the COP.

A new section and paragraph on "Preharvest" should be inserted between the sections on "Planting" and "Harvest".

(New section and paragraph)

#### Preharvest

Refer to paragraphs 10-15 in the General Code of Practice.

### Harvest

A new paragraph on reference to the COP should be inserted at beginning of the sections.

(New paragraph)

Refer to paragraphs 16-21 in the General Code of Practice.

#### Para. 9

The paragraph should be deleted because the similar texts have been already included in para. 14 in the COP.

#### Para. 11

In general, cereal grains should be dried immediately after harvested. The proposed draft annex should describe control points of each drying method.

11. ~~Sorghum grains should be dried immediately after harvested. For sun drying, should be done spread sorghum grains on clean surfaces, turn upside-down them frequently for aeration, and grains should be protected them from rain and dew during this process. Drying could also be done using For mechanical dryers, make sure that the dryers are functional.~~ Flat bed and recirculating batch driers are adequate for small scale operations while using continuous flow-dryer will suffice for large scale drying for long storage period.

### Processing

Figure 1 titled "Sorghum flour production" should be deleted because the process has been described in the main text.

As Sorghum grains are used common as feed materials and fed to various kinds of food producing animals, the word "poultry" should be deleted.

Sorghum grains for human consumption are usually processed to sorghum flour (Fig 4), from which sorghum dough, meals and other foods are prepared. In general, the process consists of husking, polishing, grinding and scouring. Sorghum grains are also used as poultry feed and care must be taken to maintain proper isolation between good lots & bad lots so that mycotoxin contamination could be avoided.

### Paras. 13-20

Paras. 13-18 should be in a new sub-section named "Flour" and paras. 19 and 20 should be in another new section named "Beer".

(New sub-section)

#### **Flour**

Paras. 13-18

#### **Beer**

Paras. 19 and 20

### Practices for prevention and reduction of ochratoxin A in sorghum and sorghum products

The title of the section and the text should be deleted.

### Planting

The title of the section should be deleted and para. 22 should be modified slightly and moved to the end of current para. 4.

We are pleased to provide the amended proposed draft annex (clean version) as shown in the attachment.

#### ANNEX 5

#### PREVENTION AND REDUCTION OF AFLATOXINS AND OCHRATOXIN A IN SORGHUM AND SORGHUM PRODUCTS

1. Good Agricultural Practices include methods to reduce the development of aflatoxin- and ochratoxin A- producing fungi and their toxins contamination consequently of sorghum in the field during planting, harvest, storage and transport; and processing.

#### Planting

2. Refer to paragraphs 4-9 of General Code in the General Code of Practice.

3. Avoid planting sorghum on the land where groundnut or other highly susceptible crop

was cultivated in the previous year because such soils are likely to be contaminated with *Aspergillus flavus*, *A. parasiticus*, *A. ochraceus* and *Penicillium verrucosum*.

4. Do not grow sorghum in or close to cocoa trees, coffee bean plants or grape vines as these crops are highly susceptible to ochratoxigenic fungi and ochratoxin A contamination and thus will inoculate the soil with *Aspergillus ochraceus* or *Penicillium verrucosum* in tropical and temperate climates respectively with consequent carryover to the sorghum grains.

5. As far as practical, crop planting should be timed in such a manner to avoid high humidity during the period of pollination, flowering and/or fertilization. Fungi tend to produce mycotoxins (particularly ergot alkaloids) in such climate condition.

6. If available and cost effective, extension officers should assist the farmers in procuring and releasing atoxigenic *A. flavus* and *A. parasiticus* into the agricultural environment to suppress the natural occurrence of the aflatoxigenic fungi following the instructions of the manufacturer.

#### Preharvest

7. Refer to paragraphs 10-15 in the General Code of Practice.

#### Harvest

8. Refer to paragraphs 16-21 in the General Code of Practice.

9. Plants damaged and/or infested by pests should be harvested separately.

Avoid stacking the harvested produce including the panicle for unduly long periods to prevent fungal growth as spores from panicle will serve as inoculum.

10. Sorghum grains should be dried immediately after harvested. For sun drying, spread sorghum grains on clean surfaces, turn upside-down them frequently for aeration, and protect them from rain and dew during this process. For mechanical drying, make sure that the dryers are functional. Flat bed and re-circulating batch driers are adequate for small scale operations while using continuous flow-dryer will suffice for large scale drying for long storage period.

### **Storage**

11. Refer to paragraphs 22-31 in the General Code of Practice.
12. Packaging materials that allow aeration of their contents are preferable.

### **Transport from storage**

13. Refer to paragraphs 32-34 in the General Code of Practice.

### **Processing**

Sorghum grains for human consumption are usually processed to sorghum flour, from which sorghum dough, meals and other foods are prepared. In general, the process consists of husking, polishing, grinding and scouring. Sorghum grains are also used as feed and care must be taken to maintain proper isolation between good lots & bad lots so that mycotoxin contamination could be avoided.

#### **Flour**

14. Start with high quality, mature grains which are free from mechanical, insect or mould damage.
15. Precaution must be taken to reject grains with signs of pest damage or mould growth because of the risk of their bearing aflatoxins and ochratoxin A. Aflatoxins and ochratoxin A test results should be known before allowing lots of raw grains to be processed. Any lot showing raw grains with unacceptable levels of mycotoxins should not be accepted.
16. Mould infected and/or damaged kernels should be separated and discarded in order to prevent their entry into the food chain and feed manufacturing process.
17. Clean processing equipment and environment thoroughly before and after grinding a batch of produce using approved disinfectant in order to reduce risk of cross contamination.
18. Commence grain processing with at least one of the following food processing techniques that have been shown to reduce aflatoxin levels in grains: washing, wet and dry milling, grain cleaning, dehulling, roasting, baking and frying.
19. A major source of mycotoxin contamination in the sorghum traditional processing line is unwholesome household storage of sorghum flour before use. Therefore avoid keeping flour for long periods of time, but if it is unavoidable then it should be stored in proper storage containers and conditions at safe moisture level with minimum temperature changes. Such containers must deter insect and rodents infestation.

#### **Beer**

20. The steeping process (soaking and germination phases) raise the seed moisture level to about 45% which is favourable for fungal growth and mycotoxin production. The situation is problematic if the process is done under open, poor sanitary conditions. Therefore, steeping should be carried out in weatherproof containers under controlled atmosphere.
21. Poorly preserved starter cultures are significant sources of mycotoxin contamination in the traditional brewing system which underscores the need for starter cultures to be stored in clean, weatherproof jars, free from infestation, and sealed to prevent water, pest and mould from reaching them before use.

### **Packaging and Marketing**

22. Package sorghum grains and products in containers with qualities described in paragraphs 20-21 above. Such containers should allow for adequate aeration of the produce during transit and marketing.

### **REPUBLIC OF KOREA**

Republic of Korea supports the development of annex for aflatoxins. However, it needs to be clarified why the annex for aflatoxin is set only for sorghum and excludes other grains. Also, relating to the Agenda item 15 (Discussion paper on aflatoxins in cereals), we understand that sorghum is the staple meal for nations in Africa but rice is also the staple meal in Asian countries and it would be as useful to include practices that can be applied for the management of aflatoxins in rice. Therefore, Republic of Korea would like to recommend extending the annex for aflatoxins to include all grains.

**AFRICAN UNION**

At the 7<sup>th</sup> CCCF meeting in Moscow, the Committee generally supported the proposed draft Annex, but indicated that some issues needed to be addressed.

AU supports the document as the observations have been addressed by the EWG and the revised document is being submitted.

AU supports the adoption of the revised draft annex for the prevention and reduction of aflatoxins and ochratoxin A contamination in sorghum (Code of Practice for the prevention and reduction of mycotoxin contamination in cereals (CAC/RCP 51-2003)

Sorghum is a major staple for several African countries. This document is intended to provide member countries and the sorghum industry with guidance to prevent and reduce aflatoxin (AF) and ochratoxin A (OTA) contamination in sorghum during production, storage and distribution to the point of usage of the cereal.