



**Food and Agriculture  
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**Agenda Item 10**

**CX/CF 14/8/10  
February 2014**

**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))**

**(AT STEP 4)**

**(Prepared by the Electronic Working Group chaired by Nigeria and co-chaired by Sudan)**

Codex Members and Observers wishing to submit comments at Step 3 on the proposed draft *Annex for the Prevention and Reduction of Aflatoxins and Ochratoxin A Contamination in Sorghum* (see Appendix I), including possible implications for their economic interests, should do so in conformity with the *Uniform Procedure for the Elaboration of Codex Standards and Related Texts* (Codex Alimentarius Commission Procedural Manual) before **10 March 2014**. Comments should be directed:

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with a copy to:

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**BACKGROUND**

1. The 7<sup>th</sup> Session of the Codex Committee on Contaminants in Food (April 2013) considered the 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))* and agreed to return the Annex to Step 2/3 for further development by an electronic working group chaired by Nigeria and co-chaired by Sudan.
2. While considering the Annex, the Committee identified some measures which could be considered too restrictive and advised that they should be deleted. The Committee further advised that the recommended measures should be limited to those proven to be effective on a large scale.
3. The Committee agreed that the EWG will consider these issues and present a revised Annex for consideration at its the 8<sup>th</sup> session.<sup>1</sup>
4. Nigeria prepared the draft based on the comments submitted at the last session of the Committee and those provided by the members of the EWG. The revised Annex is attached as Appendix I. The list of participants of the EWG is attached as Appendix II.

**REQUEST FOR COMMENTS**

5. Codex Members and Observers are invited to provide comments on the proposed draft *Annex for the Prevention and Reduction of Aflatoxins and Ochratoxin A Contamination in Sorghum* (for inclusion in the *Code of Practice for the Prevention and Reduction of Mycotoxin Contamination in Cereals (CAC/RCP 51-2003))* as indicated in the box.

<sup>1</sup> REP13/CF, paras. 71-74.

6. In providing comments, Codex Members and Observers are invited to take into account the recommendation made at the 7<sup>th</sup> Session of the CCCF in relation to the identification of management measures that are in use and widely applied. In addition, Codex Members and Observers are invited to submit comments in the framework of the conclusions and recommendations of the discussion paper on the possible revision of the *Code of Practice for the Prevention and Reduction of Mycotoxin Contamination in Cereals* (CAC/RCP 51-2003) (see CX/CF 14/8/14) and the conclusions and recommendations of the discussion paper on aflatoxins in cereals (see CX/CF 14/8/15<sup>2</sup>).

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<sup>2</sup> Working documents for consideration by the 8<sup>th</sup> Session of the Codex Committee on Contaminants in Foods are available on the Codex website at: <http://www.codexalimentarius.org/meetings-reports/en/> or by accessing the ftp-link: <ftp://ftp.fao.org/codex/meetings/cccf/cccf8>

## APPENDIX I

## ANNEX 5

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

## 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. 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

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

4. 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*.
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. Avoid cultivating on light sandy soil, particularly under dry conditions, as these factors may introduce drought stress causing proliferation of fungi and toxin production.
7. 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.
8. 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.

## Harvest

9. 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.
10. 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.

11. Sun drying should be done on clean surfaces; 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.

## Transport

**Refer to paragraphs 16 in the General Code of Practices for transport to and from storage**

## Storage

**Refer to paragraphs 26 and 31 of the General Code of Practices for type of storage facility to use and documentation of harvesting and storage procedure.**

12. Packaging materials that allow aeration of their contents are preferable.

## Processing

Sorghum grains for human consumption are usually processed to sorghum flour (Fig 1), 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.

13. Start with high quality, mature grains which are free from mechanical, insect or mould damage.
14. 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.

15. 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.
16. 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.
17. 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.
18. 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.
19. 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.
20. 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**

21. Package sorghum grains and products in containers with qualities described in paragraphs 19-21 above. Such containers should allow for adequate aeration of the produce during transit and marketing.

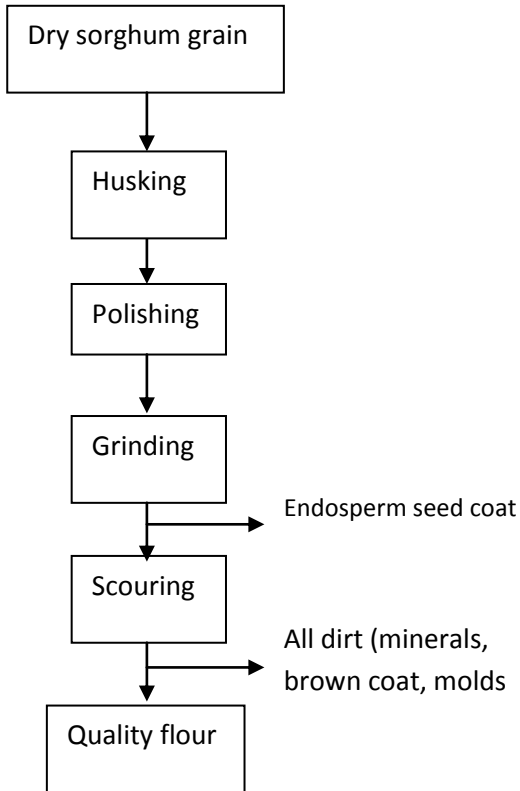
#### **Practices for prevention and reduction of ochratoxin A in sorghum and sorghum products**

The intervention strategies discussed previously are applicable for both aflatoxins and ochratoxin A reduction. However, the following step (para. 23) is specific only to ochratoxin A reduction.

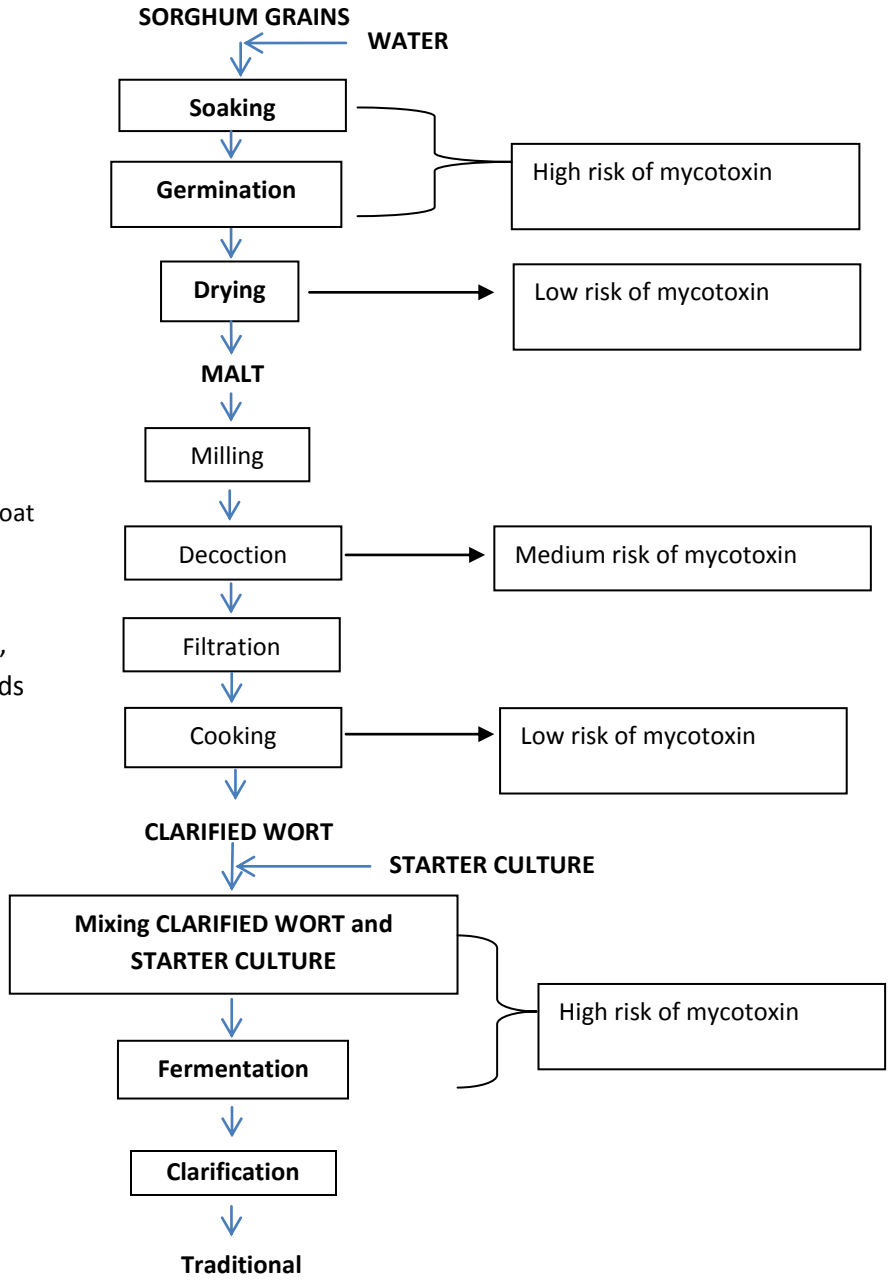
#### **Planting**

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 *Aspergillus ochraceus* or *Penicillium verrucosum* in tropical and temperate climates respectively with consequent carryover to the sorghum grains.

**1**



**2**



*Figure 1-Sorghum flour production, Fig 2-Mycotoxin risk assessment during the process production of African traditional beer*

**APPENDIX II**  
**LIST OF PARTICIPANTS**

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