

codex alimentarius commission

FOOD AND AGRICULTURE
ORGANIZATION
OF THE UNITED NATIONS

WORLD HEALTH
ORGANIZATION

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Agenda Item 15 D

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JOINT FAO/WHO FOOD STANDARDS PROGRAMME

CODEX COMMITTEE ON FOOD ADDITIVES AND CONTAMINANTS

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PROPOSED DRAFT CODE OF PRACTICE FOR THE PREVENTION OF MYCOTOXIN CONTAMINATION IN CEREALS, INCL. ANNEXES ON OCHRATOXIN A, ZEARALENONE, FUMONISIN AND TRICOTHECENES

The following comments have been received from Canada and Sweden.

CANADA

Canada continues to support, in principle, the prevention and/or reduction of mycotoxin contamination in cereals. Canada also offers the following more specific comments on the proposed draft:

Introduction

3. An important aspect that has not been addressed in this document is the presence of mycotoxins in straw, especially in the case of cereals infected by *Fusarium* head blight. The first sentence in section #3 should be changed similar to: Mycotoxins areduring storage and may affect not only the grain itself but also the straw. In addition, it is suggested that a statement be added similar to: "Furthermore, storage conditions of raw harvested grains can greatly impact mycotoxin levels."

4. In this section, it is suggested that the last sentence, i.e. "In many cases, the effects of mycotoxins on human health at the levels at which humans are often exposed, are not known," be removed. In this regard, the exposure to humans varies due to the differences in legislation in various countries and the variation in mycotoxins produced in different areas of the world. Therefore, it is difficult to discuss the potential chronic effects on human health at which humans are often exposed.

5. In the case of mycotoxins that develop in storage, the level of contamination is greatly influenced by storage both time and storage conditions. The second sentence should be changed to read: "Environmental factors.....and other commodities and for mycotoxins that develop in storage, the level of contamination is influenced by storage time and conditions."

6. For clarity, it is suggested that the last sentence be changed to: "...the need to control mycotoxin contamination to that level **OF CONCERN AS** determined by sound science."

7. The term PREHARVEST is not being used correctly in this document. It would be more appropriate to rearrange the points that are currently listed in Appendix 1 under the heading PREHARVEST under two headings - PLANTING and PREHARVEST. In agriculture, preharvest is generally interpreted as being the

period immediately prior to harvest e.g., preharvest herbicides which are applied only 1-2 weeks before harvest as opposed to other field herbicides used more than 30-60 days before harvest and which are not regarded as preharvest products. A section entitled PLANTING should be included in recognition of the importance of decisions made prior to planting. This would require changing the second sentence in section #7 to: "An integrated approach is needed that includes planting management, preharvest management, harvest management and postharvest management."

Fusarium Toxins

9. For the same reasons given above (**Introduction #3**), the first sentence should be changed to:

"Fusarium species may infect cereal crops during growth and have the potential to cause mycotoxin contamination in the kernels and straw, impair the quality, and reduce the yield."

10. Suggest the following be added:

"It is recommended that national strategies for prevention of mycotoxin growth in cereal crops be developed (such as development of resistant seeds appropriate for particular climatic areas)."

Trichothecenes

13. The first sentence may be made clearer and more concise by changing to:

"Deoxynivalenol, nivalenol, HT-2 toxin, and T-2 toxin all belong to a large family of mycotoxins called trichothecenes."

After the word "cereals" in the second sentence, add "(wheat, barley and maize are mainly affected)"; after "T-2 toxin," delete "...are the most toxic ones" and replace with "...occur less frequently but are more toxic." Last line should read:

"Common effects in animals and people may include vomiting, nausea, diarrhea, haemorrhaging, dermal lesions and immunomodulation."

Add as a new line:

"This group of toxins was recently reviewed for the first time by JECFA (Joint FAO/WHO Expert Committee on Food Additives), 56th meeting, Geneva, 6-15 February, 2001. A provisional maximum tolerable daily intake (PMTDI) of 1 microgram/kg bw was established for deoxynivalenol and a group PMTDI of 60 ng/kg bw was established for T-2 toxin and HT-2 toxin."

14. Line 2: change "*Fusarium*" to "*F.*" .

Next sentence:

"Rainfall and high humidity at the time of flowering (anthesis) particularly favour infection by these species.

Then insert:

"*F. graminearum* grows optimally at a temperature of 25° C, whereas *F. culmorum* grows optimally at 21° C."

Zearalenone

15. It is suggested that the following sentence be added to this paragraph:

"JECFA considered zearalenone at its 53rd meeting (1999); a PMTDI of 0.5 microgram/kg bw for the total intake of zearalenone and its metabolites."

Fumonisin

19. In the text, delete Reference #14 from its present location and move it to the end of the following new added sentence:

"This group of toxins was recently reviewed for the first time by JECFA (Joint FAO/WHO Expert Committee on Food Additives, 56th meeting, Geneva, 6-15 February, 2001. A provisional maximum tolerable daily intake (PMTDI) of 2 microgram/kg bw was established for fumonisin B1, B2, and B3, alone or in combination.¹⁴"

22/23. The first sentence in section #23 should be moved and combined with the last part of the sentence in section #22 to form a second sentence for section #22. The revised section #22 would read:

"The levels of fumonisin.....harvesting periods. Fumonisin level is not believed to increase during storage as long as proper conditions of grain moisture and temperature are maintained¹⁵ but additional accumulation can occur in maize stored under improper moisture conditions¹⁹."

23. The revised section # 23 would read:

"The control of fumonisin.....fumonisin-producing fungi."

Ochratoxin A

24. Sentence 2 should be changed to read as follows:

"It is nephrotoxic in all species tested^{20a} (Kuiper-Goodman, T. and Scott, P.M. (1989) Risk assessment of the mycotoxin ochratoxin. A. Biomed. Environm. Sci., **2**: 179-248.) and is classified as a human renal carcinogen.²⁰ It is also teratogenic and can affect the immune system."

We suggest that another the following be added to this Section (or another Paragraph be inserted) stating:

"This group of toxins was recently reviewed for the third time by JECFA (Joint FAO/WHO Expert Committee on Food Additives), 56th Meeting, Geneva, 6-15 February, 2001. The previously established provisional maximum tolerable weekly intake (PMTWI) of 100 ng/kg bw was maintained.¹⁴"

APPENDIX 1

PROPOSED DRAFT CODE OF PRACTICE FOR THE PREVENTION (REDUCTION) OF MYCOTOXIN CONTAMINATION IN CEREALS

1. Sentence #2 – add the words "and manage"to read:

"The elaborationin attempting to control and manage contamination by various mycotoxins."

3. Change the third sentence to read:

"Emphasis should be placed on the fact that the planting, preharvest and postharvest strategies for a particular crop willor region."

Change the fifth sentence to read:

"Procedures should be in place to properly handle, through segregation, reconditioning,animal health."

I. RECOMMENDED PRACTICES.....(GMP)

A new heading called **PLANTING** should be inserted at the start of this section. Paragraphs 4 - 9 should be listed under this heading. Paragraphs 10–15 should be listed under **PREHARVEST**.

HARVEST

The flow of this section would be more logical if the order of the paragraphs was changed to #17, #19, #18, #20, #21, #16

18. It is suggested that this be changed to " During the harvesting operation, the moisture content should be determined in several spots..."

22. This paragraph would fit better as the first point under the heading STORAGE.

STORAGE

Start this section with paragraph #22.

27. Reference to avoiding storage at temperatures near the freezing point should be deleted. Not only is this not a realistic possibility for Canadian producers, it is questionable why this is even mentioned, for fungi growth and associated mycotoxin production decrease as the temperature approaches the freezing point.

28. In the first sentence, the word "time" should be inserted before interval. Otherwise, interval could also be interpreted as different heights in a bin.

ANNEX 1

1. Add the word planting:

"Good Agriculturalduring planting, harvest, storage, transport and processing."

Add the heading "**PLANTING**" and follow this with the sentence:

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

PREHARVEST

2 Change to:

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

Re-number paragraphs 2-8.

ANNEX II

To be consistent with ANNEX I, the following sentence should be added to the start of this annex:

"Good Agricultural Practices includes methods to reduce Fusarium infection and fumonisin contamination of cereals during planting, harvest, storage, transport and processing."

Add the heading "**PLANTING**" and follow this with the sentence:

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

PREHARVEST

1. Change to:

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

Re-number paragraphs 1-6.

ANNEX 3

To be consistent with ANNEX I, the following sentence should be added to the start of this annex:

"Good Agricultural Practices includes methods to reduce fungal infection and ochratoxin contamination of cereals during harvest, storage, transport and processing."

PREHARVEST

1. Change to:

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

Re-number paragraphs 1-7.

ANNEX 4

To be consistent with ANNEX I, the following sentence should be added to the start of this annex:

"Good Agricultural Practices includes methods to reduce Fusarium infection and trichothecene contamination of cereals during planting, harvest, storage, transport and processing."

Add the heading "**PLANTING**" and follow this with the sentence:

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

PREHARVEST

1. Change to:

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

Re-number paragraphs 1-10.

STORAGE

8. Alter the last sentence to read: "Zearalenone, which is not a trichothecene, has been noted to regularly co-occur in cereals contaminated with DON."

SWEDEN

Page 9, foot note no. 30: The reference is now available - the text should be changed to:

30 FAO/IAEA training and reference centre for food and pesticide control, 2001. Manual on the application of the HACCP system in mycotoxin prevention and control. FAO Food and Nutrition Paper 73. Rome.