CODEX ALIMENTARIUS COMMISSION

Food and Agriculture Organization of the United Nations

World Health Organization

Viale delle Terme di Caracalla, 00153 Rome, Italy - Tel: (+39) 06 57051 - E-mail: codex@fao.org - www.codexalimentarius.org

Agenda Items 2, 5, 7, 10(a), 10(b), 11, 12, 13, 14 and 18 **CRD03**

ORIGINAL LANGUAGE

JOINT FAO/WHO FOOD STANDARDS PROGRAMME
CODEX COMMITTEE ON CONTAMINANTS IN FOODS
14th Session
(virtual)
3-7 and 13 May 2021

Comments of European Union

Agenda Item 2

Matters referred to the Committee by the Codex Alimentarius Commission and/or its subsidiary bodies (CX/CF 21/14/2)

Mixed Competence
European Union Vote

MATTERS FOR ACTION: Recommendations for endorsement by CCCF

Paragraph 22: Actions to consider in relation to the CCMAS request

The European Union and its Member States (EUMS) acknowledge that the General Standard for Methods of Analysis and Sampling (CXS 234-1999) should be the single reference point for methods of analysis and sampling and that therefore the General methods of Analysis for Contaminants (CXS 228-2001) should be transferred to CXS 234-1999.

The EUMS are of the opinion that prior to this transfer the provisions of CXS 234-1999 should be updated. The EUMS prefer to list performance requirements for the analytical methods, rather than listing approved methods. In case the approach would be continued to list approved methods for the analysis of heavy metals, 'Inductively Coupled Plasma Mass Spectrometry (ICP-MS)' should be added and 'anodic stripping voltametry' and 'colorimetry' should be deleted, because these are outdated techniques.

Agenda Item 5

Request for comments on work on maximum levels for cadmium in certain categories of chocolates and cocoa derived products (CL 2020/50/OCS-CF)

European Union Competence
European Union Vote

The European Union would like to reiterate its reservation as regards the proposed draft ML of 0.3 mg/kg for cadmium in chocolate containing or declaring <30% total cocoa solids on a dry matter basis. The EU cannot support the proposed maximum level (ML), as the EU argues for a stricter ML of 0.10 mg/kg to ensure sufficient protection of all consumers, in particular children.

The European Food Safety Authority established a tolerable weekly intake (TWI) 2.5 µg/kg bw/week, which is 50% lower than the toxicological reference value established by JECFA. It concluded that European children at the mean dietary exposure could exceed the TWI about 2-fold[1,2]. The EU dietary exposure assessment indicates that chocolate and cocoa products are significant contributors to the exposure, which clearly substantiates the need to restrict the exposure of consumers to cadmium from these products. This is confirmed by the 2021 JECFA exposure assessment of cadmium from all sources, which indicates that chocolate and cocoa products with high cadmium concentrations can contribute up to 9.4% of the exposure of European children of 3-9 years old and for Europeans consuming only cocoa products from the LAC region, cocoa products can even be the main contributors to the cadmium exposure (39.4% of the cadmium exposure). This justifies the need for a strict cadmium MLs for chocolate.

[1]Scientific Opinion of the Panel on Contaminants in the Food Chain on a request from the European Commission on cadmium in food. The EFSA Journal, 980, 1-139.
2 Statement on tolerable weekly intake for cadmium. The EFSA Journal, 9(2):1975, [19pp.].

The EU would also like to re-iterate its comment on the fact that the Codex Alimentarius Commission stated that the concept of proportionality (with Codex MLs of 0.8 mg/kg for 50-70% chocolate and 0.9 for >70% chocolate) agreed by CCCF should be respected. The EU believes that applying the concept of proportionality is not justified because milk chocolate is consumed by children, while dark chocolate usually is not.

Agenda Item 7

Request for comments at Step 3 on the Code of practice for the prevention and reduction of cadmium contamination in cocoa beans (CX/CF 20/14/7) (Codex Circular Letter CL 2021/12-CF)

Mixed Competence
Member States Vote

The European Union and its Member States (EUMS) welcome the work on the development of a code of practice for the prevention and reduction of cadmium contamination in cocoa by the electronic Working Group chaired by Peru and co-chaired by Ghana and Ecuador.

The EUMS support the development of the code of practice because sufficient information on mitigation measures is available for field production and post-harvest processes.

The EUMS would like to suggest the following amendments to the document:

As a general comment the EUMS propose to include via footnotes the scientific references of the studies, on which the recommended practices are based in the respective paragraphs.

- In paragraph 11 a wide range of soil parameters is listed, which need to be determined before sowing or before the establishment of a new planation. It is proposed to focus in the code of practice only on the parameters, which are relevant for cadmium contamination.
- Paragraph 12: In view of the fact that studies show that for a soil PH of 5.0 cadmium concentrations in soil should not exceed 0.4 mg/kg cadmium, in order to avoid concentrations of more than 1 mg/kg in the cocoa beans, the first sentence of the paragraph suggesting that a cadmium concentration in the soil of 1.4 mg/kg is suitable, should be deleted.
- Paragraph 14: As it is concluded in paragraph 13 that agroforestry, compared to monoculture doesn't significantly change the cadmium concentration in cocoa beans, paragraph 14 with further recommendations for agroforestry, should be deleted.
- Paragraph 28: For the recommendation 'Levels of 3 to 4 % of organic matter in cocoa plantations decrease cadmium in cocoa beans' it should be specified to what the 3 to 4% refers, e.g. to 3 to 4% organic matter by weight of the top 5 cm of soil? It might be clearer to state the mass of organic matter, which should be applied per area.
- Paragraph 29 states that it is vital to add phosphate fertilisers because tropical soils have a limited native phosphorous content. Because also by using organic fertilisers the phosphorous content of the soil can be improved, while these fertilisers typically contain less cadmium and they show a high phosphorous bioavailability, it is proposed to rephrase the paragraph:

  '*For a successful cocoa production it is vital to supplement the soil with phosphate, because tropical soils have a very limited natural phosphate content. This can be best done via the use of organic fertilisers, which have a high phosphorous bioavailability and a low cadmium content. As phosphate fertilisers or sedimentary phosphorous rock may contain high cadmium concentrations, they should only be used when they have a demonstrated low cadmium content and they should in any case comply with cadmium limits established by national or regional competent authorities.'*
- Paragraph 31 mentions under soil amendments $MgCO_3$ and $CaSO_4$, which should rather be mentioned under paragraphs 25, 26 and 27, which deal with liming/ salts. $ZnSO_4$ should be dealt with under paragraph 24 on Zn supplementation of the soil via the addition of salts to the soil.
- Paragraph 36 on genotypes does not belong under the section of strategies to immobilise cadmium in the soil. This could be included in the chapter on actions, which can be taken when creating new plantations. When planting new plantations, it should be recommended to plant varieties of cocoa trees, which are less prone to cadmium uptake.
- Paragraphs 42, 45 and 46 deal with the fermentation step, so they should be merged.
- Paragraph 43: The EUMS request to add the scientific references on which the statements in this paragraph are based. It is not necessary to explain all the details of the study.

- Paragraph 48: a reference could be added to a very recent publication by Vanderschueren *et al.* (2020)[3] that confirms the statement that the cadmium concentrations in the edible part of the cocoa beans decrease as the fermentation proceeds, because the cadmium can be redistributed from the nib (edible part) to the testa (inedible part) during this process.
- Paragraph 49: The EUMS request to add the scientific references on which the statement in this paragraph are based.

In addition to the above comments, please find as an Annex a track-changed version with additional editorial and other comments for your consideration.

The EUMS consider that, when taking into account the re-drafting suggestions, the document could be adopted at Step 5. If needed, the EUMS can agree to re-established the electronic working group to continue developing the code of practice.

APPENDIX I

CODE OF PRACTICE FOR THE PREVENTION AND REDUCTION OF CADMIUM CONTAMINATION IN COCOA BEANS (For comments at Step 3)

1. **INTRODUCTION**

1. The objective of this proposed draft Code of Practice (COP) is to provide guidance to member states and the cocoa production industry on the prevention and reduction of cadmium (Cd) contamination in cocoa beans during production and postharvest processing: fermentation, drying and storage; including during any transportation that might be involved.

2. Cd is a heavy metal that predominantly enters the environment through anthropogenic activities such as processing ores, burning fuels, and waste, and the application of phosphate and sewage-containing fertilizers. Cd can also enter the soil naturally by volcanic activity, from marine shale soils, erosion or by sea-salt aerosols.

3. Cd is toxic and persistent in soil (estimated half-life for Cd in soils varying between 15 to 1100 years). Cd is absorbed and bioaccumulated by cocoa trees (*Theobroma cacao* L), which in some cases results in unacceptably high levels in cocoa beans, so measures may be needed to prevent Cd presence in the soil and reduce Cd absorption **by cocoa trees**.

4. Cd is not found in nature in its pure state. Its most common oxidation state is +2 and it is usually found associated with iron (Fe), zinc (Zn), lead (Pb), phosphorus (P), magnesium (Mg), calcium (Ca), or copper (Cu) through its "cation exchange capacity". The concentrations of **soluble** Cd in soil ~~**solution**~~ depend mainly on **the** soil pH, which affects **the** Cd ~~**solubility and**~~ mobility. Most metals in the soil tend to be more available at acidic pH, which increases **their** ~~**the**~~ availability for plants.

5. **A g**~~**G**~~reater adsorption of Cd on the surface of soil particles is desirable, considering that this reduces the mobility of this contaminant in the soil ~~**profile**~~ and, consequently, its environmental impact. The concentration of **solubilised** heavy metals (Cd) in soil ~~**solution**~~ and, consequently, **their** ~~**its**~~ bioavailability and mobility are mainly controlled by adsorption and desorption reactions on the surface of the soil colloids. Soil factors that affect the accumulation and availability of heavy metals include pH, texture, organic material, **the concentrations of** Fe and manganese (Mn) oxides and hydroxides, Zn, carbonates, chlori**de**~~**nity**~~ and **other** cation exchange capacity.

6. **An e**~~**E**~~levated chloride content in soils tend**s** to enhance chloride complex formation, which decreases the adsorption of Cd on soil particles, thereby increasing Cd mobility and bioavailability.

7 ~~**. Over time, the development in our understanding of**~~ **Knowledge on** how various cropping systems contribute **to** or alleviate **the** cadmium contamination in cocoa beans**,** could be used to develop integrated systems for the management of cadmium levels in cocoa beans.

8. The grafting tool as a genetic strategy with low cadmium accumulation varieties is a viable option in various soil types ~~**and**~~ **with** different Cd levels, but **it** has only been tried experimentally for reducing Cd in cacao tre**e**s. ~~**Personal information obtained in field production areas of Peru showed that cocoa beans exported to Europe are crossed varieties with "Chuncho" Cacao".**~~ Leyva, C. 2019.

Comment: Only reference should be made to peer reviewed literature.

9. To mitigate Cd levels in cocoa beans it is crucial to identify cocoa-growing areas with high Cd and develop specific and general strategies to address this problem.

[3] Vanderschueren R, De Mesmaeker V, Mounicou S, Isaure MP, Doelsch E, et al., 2020. The impact of fermentation on the distribution of cadmium in cacao beans. Food Res Int 127:108743. Doi:101016/j.foodres.2019.108743.

2. **SCOPE**

10. The scope of this Code of Practice is to provide guidance on recommended practices to prevent and reduce Cd contamination in cocoa beans before planting or for new plantations and **for existing plantations** during ~~**the production stage through**~~ the harvest and post-harvest phase **of the production,** including during ~~**any**~~ transportation ~~**phase that might be involved or existing plantations of cocoa trees that can produce beans for up to 25 years.**~~.

3. **DEFINITIONS**

Biochar – biocarbon is a byproduct of the pyrolysis of residual biomass.

Cocoa bean: The seed of the cocoa fruit composed of episperm (integument), embryo and cotyledon.

Pulp or mucilage: Aqueous, mucilaginous and acidic substance in which the seeds are embedded.

Harvesting and opening the fruits: Fruits are manually harvested and opened using a sickle, machete or wooden baton.

Bioremediation: The use of living organisms, primarily microorganisms, to degrade environmental contaminants into less toxic forms.

Phytoremediation: A type of bioremediation process that uses plants to remove, transfer, stabilize, and/or destroy contaminants in the soil and groundwater.

Air emissions: They are defined as unwanted gaseous or particulate materials (Cadmium) released to the atmosphere as a direct result of production, accumulation or consumption activities in the economy.

Bioavailability: Bioavailability of a mineral in nutrition to plants and soils can be defined as its accessibility to normal metabolic and physiological processes as influenced by many factors including total concentration and speciation of metals, pH, redox potential, temperature, total organic content (both particulate and dissolved fractions), and suspended particulate content.

Adsorption, Absorption and Desorption: Physical, chemical or exchange adsorption of cadmium to soil particles is a concept that refers to the attraction and retention that a body makes on its surface of ions, atoms or molecules that belong to a different body. Absorption is a term that refers to the damping exerted by a body before a radiation that passes through it; to the attraction developed by a solid on a liquid with the intention that its molecules penetrate into its substance; to the ability of a tissue or a cell to receive a material that comes from its outside. Desorption is the process of removing an absorbed or adsorbed substance.

Cachaza: by-product of sugar cane.

Cation Exchange Capacity (CEC): A measure of the soil's ability to hold positively charged ions. It is a very important soil property influencing soil structure stability, nutrient availability, soil pH and the soil's reaction to fertilizers and other ameliorants. The clay mineral and organic matter components of soil have negatively charged sites on their surfaces which adsorb and hold positively charged ions (cations). This electrical charge is critical to the supply of nutrients to plants because many nutrients exist as Mg, K and Ca cations by electrostatic force.

Electrical conductivity: Electrical conductivity in metals is a result of the movement of electrically charged particles. The atoms of metal elements are characterized by the presence of valence electrons, which are electrons in the outer shell of an atom that are free to move about. In addition, it is denoted by the symbol σ and has SI units of siemens per meter (S/m). Electrical conductivity of water samples is used as an indicator of how salt-free, ion-free, or impurity-free the sample is; the purer the water, the lower the conductivity (the higher the resistivity). Conductivity measurements in water are often reported as specific conductance, relative to the conductivity of pure water at 25 °C.

Drying process: Drying of cocoa beans either under sunlight or in mechanical/solar dryers (or a combination of both) in order to reduce the moisture content (less than 8 %) to make them stable for storage.

Fermentation: process designed to degrade the pulp or mucilage and initiate biochemical changes in the cotyledon by enzymes and microorganisms inherent in the environment of the farm.

Humus: refers to compost that is obtained of artificial manner when organic waste is decomposed by organisms and beneficial microorganisms

Soil Amendments: Any material added to the soil to improve its physical and chemical properties. The application of amendment depends on the characteristics of the soils, and may include compost, magnesium carbonate, vinasse, zeolite (minerals that hydrate and dehydrate reversibly, adsorbents); charcoal or biochar; calcium sulphate, lime, cachaza , zinc sulphate, dolomite (calcium magnesium carbonate), vermicompost, sugar cane, palm kernel cake, phosphate rock, and other organic matter.

Validation: Obtaining evidence that a control measure or combination of control measures, if properly implemented, is capable of controlling the hazard to a specified outcome.

Sampling: Procedure used to draw or constitute a sample. Empirical or punctual sampling procedures are not statistically-based procedures that are used to make a decision on the inspected lot.

Pruning: annually removal from shade trees and cocoa plants of branches that are dry, diseased or un-balanced.

Shading: Growing cocoa plants with shade trees to reduce the amount of radiation and wind that reaches the crop. Shading is usually more or less 50% during the first 4 years of plant life after which percentage of shade can be reduced to 25 or 30%.

Vinasse: A by-product of the production of alcohol from sugarcane.

4. **RECOMMENDED PRACTICES TO PREVENT AND REDUCE Cd CONTAMINATION IN COCOA BEANS**

4.1 **Contamination before sowing – new plantations**

11. The prevention and reduction of Cd in cocoa should begin with the physic**oal** ~~oal~~-chemical analysis of the soil**, which should be** ~~and be~~ an integral part of the ~~practices before sowing or~~ **process for the** establishment of a new plantation. Physical analysis parameters are: Sand %, clay %, silt %, textural class. ~~Chemical analysis should consider~~ **Relevant chemical parameters**: pH, organic matter %,~~Total N %~~; Available **concentration (ppm)** of P, K~~Pb, Fe oxides and hydroxides~~, Mn carbonates, Cd and Zn; **cation exchange capacity (**~~C~~**c**hangeable (cmol (+) /kg) of Ca, Mg, K, Na, Al and, H; CEC, Bas. Camb %, Ac. Camb. %, and Sat. Al.

> **Comment:**
>
> Are all these parameters relevant for the cadmium uptake by cocoa tree? If yes, it should be explained to what extent. If not these parameters should not be mentioned.
>
> What are the desired % ranges for these parameters?
>
> Is this relevant and if yes, what is the link with cadmium bioavailability?

~~suitable for farmers, and it should be kept in mind as a control measure~~ **Also** CXC 49-2001: Code of practice concerning source directed measures to reduce contamination of foods with chemicals **should be followed**.

12. ~~No specific recommendation on Cd levels in cocoa growing areas has been identified, but 1.4 mg/kg8 has been identified as an upper level for Cd in soil for growth of other crops, and could be applied for new cocoa plantations. Water levels can be monitored to determine if they are a potential source of Cd, e.g. higher than background levels due to point source contamination; as an upper limit for Cd in water could be 0,005 mg/lt.~~ **On the basis of** ~~Nonetheless, a largest nationwide published~~ **a** survey in Ecuador **(add reference)** ~~of Cd in cacao in terms of number of trees collected (n=560) allows to estimate soil Cd concentrations, which correspond to specific concentrations in cocoa beans. The data show, that for example,~~ for ensuring that the mean Cd concentration in cocoa beans do**es** not significantly exceed 1 mg Cd/kg, the soil Cd should not exceed 0.4 mg Cd/kg if the soil pH=5.0. If the soil pH = 7, the Cd concentration in the soil should not exceed 1.0 mg Cd/kg. **In addition the concentration of cadmium in the locally available irrigation water should be monitored, to determine if it is a potential source of Cd, e.g. higher than background levels due to point source contamination; preferably the Cd concentration in water should be below 0,005 mg/liter.**

13. When planting new plantations, it should be recommended to plant varieties of cocoa trees, which are less prone to cadmium uptake.

Although there are known benefits to agroforestry, ~~data~~ **studies** on the impact of agroforestry vs. monoculture on Cd levels **in cocoa beans**, ~~they are preliminary. Studies that have systematically or statistically compared agroforestry with monoculture~~ found no statistically significant difference in Cd uptake in cacao beans.

~~14. The most commonly used species are musaceae (bananas, moles and cambures) for temporary shadows and legumes such as the pore or bucare (Erythrina sp.) and guabas (Ingas) for permanent shades. Other shading species are being used that provide greater economic benefits such as timber species (laurel, cedar, Colombian mahogany (*Cariniana pyriformis*), cenizaro or rain tree and terminalia) and / or fruit trees (citrus, avocado, sapote, breadfruit, date palm etc.). It is advisable to sow short trees and use citrus or fruit trees for the borders of cocoa plantations.~~

15. Install plantations in areas far from roads or take measures to reduce the exposure of the cacao plantations to gases, emitted by the combustion of vehicles because they may contain Cd. **Furthermore plantations** ~~Likewise, they~~ should be located in areas separated from dumps in cities, mining areas, smelting areas, industrial wastes, sewage and household waste water, because these could be a source of Cd.

16. Avoid flooded soils if the water sources are an increased source of Cd.

17. In new plantations, the use of cover crops of perennial legumes should be considered. Cover crops improve **the** soil organic matter ~~**and**~~ they can protect **the** soil from erosion, ~~**and**~~ reduce the loss of nutrients, improv**e**~~**ing**~~ **the** soil productivity through greater availability of essential nutrients and reduc**e**~~**ing**~~ the bioavailability of **heavy** metals.

4.2 **From production to the harvesting phase**

18. Knowledge of the sources and the distribution of Cd in the soil is important. In general, it should be noted that any organic or inorganic amendment applied to the crop should be previously ~~**Cd analysed**~~ **analyzed for its cadmium concentration,** ~~**because depending on its source may contain levels of Cd and**~~ **in order to avoid that it** become**s** a source ~~**to for the entry into the crop**~~ **of cadmium, which can be taken up by the crop.** Sewage sludges **and** fly ashes have high concentrations of Cd **and are therefore better not used.** ~~**The fertilizers**~~ **If they are** applied **anyway, they** should meet the ~~**specified**~~**national or regional** criteria in relation to **the** Cd levels.

19. Data suggest that there is a positive correlation between higher levels of Cd in soil (as measured by soil tests) and elevated levels of Cd in plant tissues and cocoa beans. Furthermore, multivariate regression analysis showed that **the** ~~**bean**~~ Cd concentrations **in cocoa beans** increased with increasing total soil Cd **concentrations.**

20. Soil characterization analysis ~~**laboratories**~~ for cocoa plantations should be conducted by laboratories that are accredited with the worldwide recognized ISO/IEC 17025:2017 standard **and that use**~~**; using**~~ validated methods ~~**which include the use of**~~ **and appropriate** certified reference materials **and** ~~**standards and associated uncertainties. In addition, it is very important to carry out soil analyses with**~~ **Soil analyses should be carried out with** internationally recognized methods (e.g. endorsed by Codex Alimentarius) such as Flame Atomic Absorption Spectrometry (F-AAS), Inductively Coupled Plasma Optical Emission Spectrometry (ICP-OES), Graphite Furnace with Atomic Absorption Spectrometry (GF-AAS) and Inductively Coupled Plasma Mass Spectrometry (ICP-MS). ~~**These methods include appropriate ones for local farmers trying to export cocoa.**~~ These analyses ~~**not only include Cd but**~~ **allow to analyse besides cadmium also various** ~~**other**~~ nutrients~~**too**~~. ~~**It is important to clearly state here that**~~**This is interesting information, because** soils well supplied with nutrients are less likely to bioaccumulate Cd.

21. The soil sampling protocol should consider obtaining samples representative of each farm, because the Cd content could be variable ~~**in**~~ **within** the same production area~~**of cocoa**~~. The protocol should take into account international standards for taking samples in soils specifically contaminated with metals.

22. In areas where cocoa beans have relatively higher levels of Cd it is important to determine **the** soil and irrigation water salinity (~~**Cd chloride salts**~~ **chloride ions**), since the absorption of Cd by plants increases with **increased** chloride **concentrations**. Therefore, it is important to determine the electrical conductivity of **the** soil and **the** water**,** which should be less than 2mS/cm. ~~**It seems that these measures would not be needed if there are no concerns regarding Cd levels in cocoa beans.**~~

4.2.1 ***Strategies to immobilize cadmium in the soil***

4.2.1.1 Salts

23. When there is a deficiency of Zn in the soil, soil Zn levels should be increased. Cd competes with Zn, and Cd is more likely to enter the plant and accumulate in cocoa beans when Zn soil concentration is low. ~~**Moreover, it is recommended to specify critical levels of Zn for cocoa, taking as a reference various methods of sample analysis, for example: DTPA, Olsen modified; with the aim of making the strategy more applicable.**~~

Comment: It is not clear what is meant by this sentence.

24. The application of zinc sulphate is carried out ~~**with the balanced fertilization that is conducted**~~ **at the same stage as the annual fertilisation** at the cocoa plantation, according to the requirements of the crop and the soil. ~~**However, with**~~ **As** the addition of zinc sulfate **causes** soil acidification ~~**occurs, requiring**~~ **also the** addition of limestone **is required**.

25. Liming is an agronomic management practice that reduces **the** Cd uptake by cocoa trees cultivated on highly acidic soils, and its addition ~~**also might**~~ **it also** improve**s** **the** nutrition and production of cocoa trees. However, ~~**it is important to know the**~~ **attention has to be paid to the** content of Cd in these limes**,** as ~~**they come from mines and are highly variable so everything depends on the origin of the raw materials used**~~ **some of them might also contain cadmium**.

26. The most effective method developed to date to decrease Cd bioavailability is through liming the soil when **the** soil pH is below 5.5. When the pH is higher than 5.5 it should be known how to be managed.

Comment: Is no liming needed if the pH is above 5.5?

27. Apply liming levels in low doses (3 t/ha/year) and preferably **apply** dolomite CaMg(CO3)2 to gradually increase the pH and incorporate Ca and Mg that are essential for the growth of cocoa and can precipitate Cd**, thereby** decreasing its bioavailability. Over liming should be avoided.

The application of calcium sulfate (CaSO4) and zinc sulfate (ZnSO4) can also help to decrease Cd concentrations in cocoa beans. Also, apatite (rock calcium phosphate) could be considered to raise the pH and to reduce the soil Cd Phyto availability, but it would be very expensive compared to use of limestone

4.2.1.2Organic matter

28. A greater amount of soil organic matter causes a lower absorption of Cd and may help decrease **the** Cd **concentration** in cocoa beans**, based on experimental studies**. The use of organic fertilizers such as treated manure from stabled livestock, compost, etc. increases the organic matter content of the soil and improves its microbiological activity. Levels of 3 to 4 % of organic matter in cocoa plantations decrease**s the** cadmium **concentration** in cocoa beans.

29. **For a successful cocoa production it is vital to supplement the soil with phosphate, because tropical soils have a very limited natural phosphate content. This can be best done via the use of organic fertilisers, which have a high phosphorous bioavailability and a low cadmium content. As phosphate fertilisers or sedimentary phosphorous rock may contain high cadmium concentrations, they should only be used, when they have a demonstrated low cadmium content and they should in any case comply with cadmium limits established by national or regional competent authorities. Phosphate fertilizers and sedimentary phosphoric rock may contain Cd as an impurity. Nonetheless, for successful cocoa production it is vital to add phosphate fertilizers because tropical soils have very limited native phosphorus content. However, producers should control the amount of Cd in phosphate fertilizers they use or comply with any national limits given by governments. In addition, by using organic fertilizers the phosphorus content of the soil can be improved, while these fertilizers show a high phosphorus bioavailability.**

30. In general, the formula for the doses of nitrogen, phosphorus and potassium (NPK) in fertilizers to be applied to cocoa crops vary according to the age of the plant and the characteristics of the soil**Verify the heavy metal analysis prior of application to ensure that Cd content is low**.

Comment: This is a repetition of paragraph 29.

Soils well supplied with nutrients are less likely to bioaccumulate Cd. 31. The application of **soil amendments (magnesium carbonate (MgCO3), plant based materials such as** vinasse**, zeolite,** humus **charcoal, calcium sulfate (CaSO4), and** cachaza **and zinc sulfate (ZnSO4), which vary depending on the characteristics of the soils,** can **also** help decrease Cd concentrations in cocoa beans.

32. Vinasse is a source of K that promotes the installation of fungi that form mycorrhizas in the roots of the cacao tree, **thereby** increasing the efficiency of P nutrition and immobilizing Cd.

33. **Lime and S**ugarcane cake can reduce the flow of Cd in the soil profile.

Zeolite is another option in soils with high sand content in clay textured soils. Also, Apatite (rock phosphate) would be very expensive compared to use of dolomitic limestone to raise pH and reduce soil Cd Phyto availability.

34. Biochar has been shown to reduce the bioavailability of Cd in cocoa beans. The reduction rates are comparable to liming and have an additive influence on liming. However, biochar is an expensive soil amendment and may not be cost effective for farmers, who grow cocoa.

35. Biochar, compost and their combinations have significant effects on soil physicochemical features, metals (Cd) availability and enzyme activities in heavy metal-polluted soil. Therefore, they mitigate the Cd concentration in soil.

4.2.1.3 Adsorbents

The application to the soil of adsorbents such as zeolite and charcoal can help to reduce the cadmium concentration in cocoa beans. Zeolite is a good option for soils with high sand content and for clay-textured soils.

4.2.2 Grafting

36. The genotypes **of cocoa plants, which have been** identified with low **Cd** bioaccumulation **of Cd properties,** have the potential to be used as rootstocks in the production of propagation material **in order** to reduce the absorption of Cd from **the** soil**.** Moreover, Cd mitigation could be done by grafting plants with rootstocks with low cadmium **content bioaccumulation properties and obtaining in order to obtain** new varieties that are not as prone to the absorption of Cd **and modify soils to reduce Cd absorption by plants. Eleven cultivars of the "Chuncho" Cacao variety from Cusco – Peru had a range concentration of Cd (mg/kg) from <0.05 to 0.11, so t For example t**he "Chuncho" Cacao variety could be used for grafting**Furthermore, when planting new plantations, it should be recommended to plant varieties of cocoa trees, which are less prone to cadmium uptake.**

Comment: This should be moved to the chapter on new plantations.

4.2.3 Microbiological remediation

37. The Streptomyces sp. strain has bioremediation activity as it reduces **the** Cd uptake in cocoa plants. ~~**This has been demonstrated on an experimental basis.**~~

~~**38.**~~ **Phytoremediation of cadmium-contaminated soils by using legumes inoculated by cadmium-resistant plant growth-promoting bacteria** ~~**The legumes coinoculated with plant growth promoting bacteria Cd resistant such Streptomyces of the family Streptomycetaceae could be useful in phytoremediation of**~~ **could help to reduce the cadmium uptake by plants and** ~~**Cd contaminated soils and**~~ **should function at the same time as** biofertiliz**er**~~**ation**~~.

4.2.~~**42**~~. ***Avoiding further cadmium contamination of the soil***

~~**39**~~. 38. In areas where soil levels of Cd are high, remove pruned material from the ground as they could contain Cd, which will be released into the top layers of the soil after decay. The practice should be to remove pruned material from the crop field.

~~**40.**~~ 39. To avoid the application of sewage sludge

~~**41.**~~ 40. To avoid burial or incineration of household waste, as approximately 10% of garbage is made up of metals, including Cd. Their burial can contaminate the groundwater, while incineration can contaminate the atmosphere by releasing volatile metals and consequently polluting soils.

41. To take action at the level of national or regional authorities to limit **the** main polluting industrial activities near cocoa plantations, such as non-ferrous mining and smelting, metal using industry, coal combustion and phosphate fertilizer manufactures.

4.3 **Post-harvest phase**

42. **Mucilage draining** improves the sensorial quality of cocoa beans in the process of fermentation reducing its acidity. **Studies have shown that mucilage draining times up to 12, 24 or 36 hours reduces the cadmium concentrations, without affecting the organoleptic quality of the cocoa**[4] ~~**The time bean draining effect in a thesis of 0, 2, 4 and 6 hours of creole cocoa from Peru, concluded that the best one with fermentation above 80 % was 4 hours of drainage, while another thesis studying the effect of draining time in the clon CCN51 (cocoa beans which contain more water) including 0, 12, 24, 36 hours concluded that 36 hours was the best one with 86.00 ± 9.63 of fermentation and the draining of 12 hours had a fermentation percentage of 83.83 ± 1.48. An experimental study demonstrated that the draining of pulp or mucilage for 12 hours (longer time than normal) significantly reduced the content of Cd in cocoa beans in one variety without affecting the physical or organoleptic quality of the cocoa at the time of the evaluation. An experimental study demonstrated that the draining of the pulp or mucilage for 12 hours (longer time than normal) significantly reduced the content of Cd in cocoa beans of the clonal hybrid (cultivar) CCN-51 without affecting physical or organoleptic quality of the cocoa at the time of the evaluation.**~~

43. The process of **fermentation** of cocoa beans **may be useful to reduce the levels of Cd of the edible part of the cocoa beans. Cd can be redistributed from the nib (edible part) to the testa (inedible part).**[5] **The Cd concentrations in the nibs can be reduced by a factor of 1.3 if the pH is sufficiently acidified during fermentation. In an experiment the migration of Cd from the nibs to the testa was only observed if the nib pH dropped below 5. This acidic pH resulted from longer fermentation times. Pre-drying and short fermentation times may reduce the extent of outward Cd migration.**~~**should be an important practice that any export organization should carry out to reduce the levels of Cd of their cocoa beans.**~~

44. The strain of Saccharomyces cerevisiae ~~**is one of the strains that**~~ **is a yeast strain**, ~~**intervenes in cocoa fermentation, therefore by increasing its population in such process could**~~ **which absorbes Cd** ~~**improve**~~ **during the fermentation**. ~~**the absorption of Cd and the safety of cocoa.**~~**Therefore, increasing the content of Saccharomyces cerevisiae during the fermentation process, can help to reduce the cadmium content in the beans.**

45. It is a recommended practice to make sure that during the fermentation of cocoa beans, they are not contaminated with smoke or with gases coming from dryers or vehicles.

46. **After fermentation**, cocoa beans should be dried on clean solid surfaces to avoid contamination by soil.

~~**45. It is a recommended practice to make sure that during the fermentation of cocoa beans they are not contaminated with smoke, or with gases coming from dryers or vehicles.**~~

47. During **storage**, contamination of cocoa beans due to spills of fuels, exhaust gases or fumes should be prevented.

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[4] ***Vanderschueren R, Mesmaeker V De, Mounicou S, Marie-Pierre I, Doelsch E, et al., 2020. The impact of fermentation on the distribution of cadmium in cacao beans. Food Res Int 127:108743 . doi: 10.1016/j.foodres.2019.108743***

[5] ***Vanderschueren R, De Mesmaeker V, Mounicou S, Isaure MP, Doelsch E, et al., 2020. The impact of fermentation on the distribution of cadmium in cacao beans. Food Res Int 127:108743. Doi:101016/j.foodres.2019.108743***

~~**48. The longer the fermentation process (80 %), the less Cd in cocoa beans. This statement is confirmed by a reliable cited scientific publication which indicates that Cd concentrations decrease as the fermentation proceeds. Cd beans can be reduced if pH is sufficiently acidified during fermentation.**~~

4.4 **Transport phase**

Protect cocoa from becoming wet and contaminated from other materials:

48. Cover loading/unloading areas to protect from rain.

49. Ensure **that** vehicles are well maintained and thoroughly cleaned.

50. Ensure **that** tarpaulins/covers are clean and free from damage.

51. Ensure **that** containers have not been used for chemicals or noxious substances **and that they** are well-maintained and clean.

52. Ensure **that the** humidity levels are as low as possible by using ventilated containers, if available, and cardboard/kraft paper lining, with silica gel bags.

53. For bagged cocoa: load bags carefully and cover with materials to absorb condensation.

54. For cocoa in bulk: use a sealable plastic liner if possible and ensure **that** it is kept clear of the roof of the container.

55. Ensure **that the** ventilation holes in containers are free from clogging.

56. Try to ensure **that the** cocoa is not exposed to temperature fluctuations **and that it is not** ~~**or**~~ stored near **to** noxious materials

Agenda Item 10 (a)

CL 2021/15/OCS-CF

Request for comments at Step 3 on maximum levels for total aflatoxins in certain cereals and cereal-based foods including foods for infants and young children (CX/CF 21/14/10 – Part I)

European Union Competence
European Union Vote

The European Union (EU) welcomes and appreciates the work done on the setting of maximum levels (MLs) for aflatoxins total by the electronic Working Group chaired by Brazil and co-chaired by India.

BACKGROUND

Aflatoxins are genotoxic and carcinogenic substances. The Joint FAO/WHO Expert Committee on Food Additives (JECFA) updated the aflatoxin risk assessment at its 83rd meeting in November 2016[6].

JECFA reaffirmed the conclusions of previous assessment that aflatoxins are among the most potent mutagenic and carcinogenic substances known and that the reduction of dietary total aflatoxin exposure is an important public health goal. Five food commodities (maize, peanuts, rice, sorghum and wheat) were identified to contribute each more than 10% to international dietary exposure estimates for more than one GEMS/Food cluster diet, for either AFT or AFB1. The Committee recommends that efforts continue to reduce aflatoxin exposure using valid intervention strategies, including the development of effective, sustainable and universally applicable pre-harvest prevention strategies. Maize and groundnuts are a traditional focus for aflatoxin management. Based on their contribution to dietary aflatoxin exposure in some areas of the world, JECFA recommended that rice, wheat and sorghum would need to be considered in future risk management activities for aflatoxins.

The European Food Safety Authority (EFSA) has recently performed a risk assessment of aflatoxins in food[7]. The CONTAM Panel noted that the calculated Margins of Exposure MOEs are less than 10,000, which raises a health concern. The estimated cancer risks in humans following exposure to AFB1 are in-line with the conclusion drawn from the animal data. This conclusion also applies to AFM1 and AFT + AFM1.

[6] Eighty-third meeting of the Joint FAO/WHO Expert Committee on Food Additives Rome, 8–17 November 2016. WHO Food Additives Series: 74 – Safety evaluation of certain contaminants in food. http://apps.who.int/iris/bitstream/handle/10665/276868/9789241660747-eng.pdf?ua=1

[7] EFSA CONTAM Panel (EFSA Panel on Contaminants in the Food Chain), Schrenk D, Bignami M, Bodin L, Chipman JK, del Mazo J, Grasl-Kraupp B, Hogstrand C, Hoogenboom LR, Leblanc J-C, Nebbia CS, Nielsen E, Ntzani E, Petersen A, Sand S, Schwerdtle T, Vleminckx C, Marko D, Oswald IP, Piersma A, Routledge M, Schlatter J, Baert K, Gergelova P and Wallace H, 2020. Scientific opinion – Risk assessment of aflatoxins in food. EFSA Journal 2020;18(3):6040, 112 pp. https://doi.org/10.2903/j.efsa.2020.6040

REPLY TO THE QUESTIONS RAISED IN CX/CF 21/14/10 – Part I, paragraph 11.1

In reply to the questions raised in CX/CF 21/14/10-Part I, paragraph 11.1, the EU has following comments:

a. Should the rejection rates adopted be the same for grains and for processed products? (Grains may have another destination, such as animal feed). What is the more appropriate rejection rate, considering the different types of products and contaminants?

The EU is of the opinion that the maximum levels for total aflatoxins in cereal grains can be set taking into account higher rejection rates than for processed products, considering that cereal grains can be used for other purposes than for (direct) human consumption, such as for animal feed.

This is particularly relevant for those cereals such as maize, barley of which large part of the production is already destined for uses other than for human consumption, regardless the contamination level. Use of these cereals for purposes other than human consumption will not necessarily result in economic loss.

For other cereals, such as durum wheat, this has to be handled with caution as a very large part of the whole production of these cereals is used for human consumption. Use of such cereals for purposes other than for human consumption might in these cases result in economic loss.

Even if for processed cereal products, the use for purposes other than human consumption might result in an economic loss, this does not mean that automatically (very) low rejection rates should be taken into account for the setting of maximum levels for total aflatoxins. No aflatoxins are formed during the processing of cereals, so with the application of good practices, i.e. a careful selection of raw materials with low levels of aflatoxins after appropriate cleaning and sorting, will result in low levels of aflatoxins in the processed product.

Proposing a concrete figure for a rejection rate considering the types of products and contaminants than the usually applied rejection rate of 5 % is not straightforward as it depend also on the data under consideration and how outliers are handled. But taking into account the considerations above, it can be considered that for raw materials for which use for other purposes would not necessarily result in economic loss, maximum levels can be set at rejection rates higher than 5 % and for processed products, for which use for other purposes would result in economic loss, maximum levels can be set at rejection rates lower than 5 %.

b. How the outliers should be treated, since there is no harmonized procedure available in the Committee?

Outliers are data which fall outside the normal range of variation in levels in a certain food produced following good practices.

As maximum levels should be set as low as reasonably achievable, maximum levels should be set at a level which is (slightly) higher than the normal range of variation in levels in food and feed that are produced with current adequate technological methods, in order to avoid undue disruptions of food and feed production and trade (Criteria for the establishment of maximum levels in food and feed, Annex I to the General Standard for Contaminants and Toxins in Food and Feed, CXS 193-1995).

The EU is of the opinion that it would be appropriate to present the frequency distribution curves of the occurrence data as outlined above in order to be able to identify possible clear outliers. The EU is of the opinion that it is appropriate to investigate the reasons for these outliers to verify if these outliers are related to e.g. specific climatic conditions, specific regions and if they are to be considered as unavoidable despite the application of good practices. In that case outliers should not be excluded. In case no or no acceptable explanation can be provided for these unusual high levels, the EU is of the opinion that it should be considered not to take into account these outliers for the setting of the maximum levels as these outliers, clearly not reflecting the application of good practices to prevent aflatoxin contamination[8], should be excluded from further consideration.

c. How should the maize data be evaluated, since the available data are related to the marketing of the products and there is no guarantee that they are intended exclusively for human consumption and not for animal feed?

It is correct that the occurrence data for maize in the GEMS/Food database are related to the marketing of the products and there is not necessarily a guarantee that they are intended for human consumption. Taking into account the reply given to questions a) and b), the occurrence data for total aflatoxins in maize could be evaluated by applying a higher rejection rate and excluding the outliers.

[8] Code of Practice for the prevention and reduction of mycotoxin contamination in cereals (CXC 51-2003).

d. Are there any methods available that have already been validated in collaborative assays that meet the limits proposed in this document?

	Matrix	Mycotoxin(-s)	Method / link	Description
1	Cereals, shell fruits & derived products	**Aflatoxin B1** **Aflatoxin B2** **Aflatoxin G1** **Aflatoxin G2**	EN 12955:1999	Foodstuffs - Determination of aflatoxin B1, and the sum of aflatoxins B1, B2, G1 and G2 in cereals, shell-fruits and derived products - High performance liquid chromatographic method with post column derivatisation and immunoaffinity column clean up
2	Cereals, nuts & derived products	**Aflatoxin B1** **Aflatoxin B2** **Aflatoxin G1** **Aflatoxin G2**	ISO 16050:2003	Foodstuffs - Determination of aflatoxin B1, and the total content of aflatoxins B1, B2, G1 and G2 in cereals, nuts and derived products. High-performance liquid chromatographic method
3	Cereals, nuts & derived products	**Aflatoxin B1** **Aflatoxin B2** **Aflatoxin G1** **Aflatoxin G2**	EN ISO 16050:2011	Foodstuffs - Determination of aflatoxin B1, and the total content of aflatoxins B1, B2, G1 and G2 in cereals, nuts and derived products - High-performance liquid chromatographic method (ISO 16050:2003)
4	Food	**Aflatoxins** Deoxynivalenol Fumonisins Ochratoxin A T-2 toxin HT-2 toxin Zearalenone	prEN 7641	Foodstuffs - Multimethod for the determination of aflatoxins, deoxynivalenol, fumonisins, ochratoxin A, T-2 toxin, HT-2 toxin and zearalenone by LC-MS/MS The results of the study are also published by: Bessaire T, Mujahid C, Mottier P, Desmarchelier A. 2019. Multiple mycotoxins determination in food by LC-MS/MS: An international collaborative study. Toxins 11. doi:10.3390/toxins11110658

Yes, there are validated methods of analysis available that can quantitatively determine the proposed and lower levels

e. Should CCCF request JECFA to carry out a dietary exposure assessment considering the MLs proposed in this document?

The EU does not object to request JECFA to carry out a dietary exposure assessment. It is however noted that JECFA updated the aflatoxin risk assessment at its 83rd meeting in November 2016[9] and reaffirmed the conclusions of previous assessment that aflatoxins are among the most potent mutagenic and carcinogenic substances known and that the reduction of dietary total aflatoxin exposure is an important public health goal. Therefore it is of major importance for the protection of public health that the maximum levels for total aflatoxins are set at a level as low as reasonably achievable taking into account the application of good practices.

f. What limits does CCCF consider that can move forward in this meeting?

The EU agrees with the setting of maximum levels for total aflatoxins in the food products currently under consideration. However the EU does not agree with most of the levels as proposed (proposal 1 and proposal 2) and can therefore not agree to move forward in the Step procedure most of these levels with the exception of the proposed level of 4 µg/kg for polished rice and of 8 µg/kg for sorghum grain, destined for further processing.

SPECIFIC COMMENTS ON PROPOSED MAXIMUM LEVELS

In order to ensure a high level of human protection, the EU is of the opinion that it is of major importance that maximum levels for aflatoxin total are established as low as reasonably achievable (ALARA) by applying good practices to prevent contamination.

The maximum levels as proposed in Appendix I of CX/CF 20/14/10, proposal 1 as well proposal 2, are in the view of the EU in most cases not established according to the ALARA principle and therefore to a large extent not acceptable for the EU. More details are hereby provided.

[9] Eighty-third meeting of the Joint FAO/WHO Expert Committee on Food Additives Rome, 8–17 November 2016. WHO Food Additives Series: 74 – Safety evaluation of certain contaminants in food.
http://apps.who.int/iris/bitstream/handle/10665/276868/9789241660747-eng.pdf?ua=1

Maximum level proposed for maize grain, destined for further processing

- The data for the years 2011, 2012 and 2013 show an unusual high contamination level compared to the data for the other years in the period 2007-2019 (table 2).
- The EU is of the opinion that it would be appropriate to present the frequency distribution curve of the occurrence data in order to be able to identify possible clear outliers. These outliers, in case no or no acceptable explanation can be provided for these unusual high levels, the EU is of the opinion that it should be considered not to take into account these outliers for the setting of the maximum levels (see reply to point b above).
- The EU notes, according to table 4, the same rejection rate of 5.4 % for a hypothetical ML of total aflatoxins of 10 µg/kg and 15 µg/kg.
- Given that the EU considers it of major importance to establish maximum levels for total aflatoxins as low as reasonably achievable (ALARA), the EU proposes to establish the ML of 10 µg/kg for total aflatoxins in maize grain destined for further processing.

Maximum level proposed for flour, meal, semolina and flakes derived from maize

- The EU is of the opinion that it would be appropriate to present the frequency distribution curve of the occurrence data as outlined above in order to be able to identify possible clear outliers. These outliers, in case no or no acceptable explanation can be provided for these unusual high levels, the EU is of the opinion that it should be considered not to take into account these outliers for the setting of the maximum levels (see reply to point b above).
- The EU proposes to recalculate the effect on exposure and rejection rate of hypothetical MLs on total aflatoxins through the consumption of flour, meal, semolina and flakes derived from maize (table 8) after the exclusion of the outliers, for which no or no acceptable explanation can be provided.
- The EU does not agree to establish a maximum level resulting in a very low rejection rate while setting a lower maximum level with still an acceptable rejection rate (< 5%) would result in a significant reduction of the human exposure to aflatoxins.
- The EU proposes therefore to establish a maximum level of 4 µg/kg for aflatoxin total in flour, meal, semolina and flakes derived from maize resulting in an acceptable rejection rate of 3.3 % and with significant reduction of the human exposure to aflatoxins (table 8).

Maximum level proposed for husked rice

- The EU is of the opinion that it would be appropriate to present the frequency distribution curve of the occurrence data as outlined above in order to be able to identify possible clear outliers. These outliers, in case no or no acceptable explanation can be provided for these unusual high levels, the EU is of the opinion that it should be considered not to take into account these outliers for the setting of the maximum levels (see reply to point b above).
- The EU furthermore proposes to recalculate the effect of hypothetical MLs on aflatoxins through the consumption of husked rice (table 12) after the exclusion of the outliers, for which no or no acceptable explanation can be provided
- The EU does not agree to establish a maximum level resulting in a low rejection rate while setting a lower maximum level with still an acceptable rejection rate (< 5%) would result in a significant reduction of the human exposure to aflatoxins.
- The EU proposes therefore to establish a maximum level of lower than 8 µg/kg for aflatoxin total in husked rice following the above mentioned recalculation after exclusion of the outliers. On the basis of the current calculation, a maximum level of 8 µg/kg results in an acceptable rejection rate of 4.9 % and with significant reduction of the human exposure to aflatoxins compared to the proposed maximum levels of 20 or 15 µg/kg (table 12). It is expected that after exclusion of the outliers, a lower maximum level can be proposed with an acceptable rejection rate and resulting in a significant reduction of the human exposure to aflatoxins

Maximum level proposed for polished rice

- The EU is of the opinion that it would be appropriate to present the frequency distribution curve of the occurrence data as outlined above in order to be able to identify possible clear outliers. These outliers, in case no or no acceptable explanation can be provided for these unusual high levels, the EU is of the opinion that it should be considered not to take into account these outliers for the setting of the maximum levels (see reply to point b above).
- The EU furthermore proposes to recalculate the effect on exposure and rejection rate of hypothetical MLs of total aflatoxins through the consumption of polished rice (table 16) after the exclusion of the outliers for which no or no acceptable explanation can be provided.
- The EU can agree with establishment of 4 µg/kg for aflatoxins total in polished rice (proposal 2) resulting in an acceptable rejection rate of 1.2 % with a reduction of the human exposure to aflatoxins (table 16).

Maximum level proposed for sorghum grain destined for further processing

- The EU is of the opinion that it would be appropriate to present the frequency distribution curve of the occurrence data as outlined above in order to be able to identify possible clear outliers. These outliers, in case no or no acceptable explanation can be provided for these unusual high levels, the EU is of the opinion that it should be considered not to take into account these outliers for the setting of the maximum levels (see reply to point b above).
- The EU furthermore proposes to recalculate the effect on exposure and rejection rate of hypothetical MLs of total aflatoxins through the consumption of sorghum grain for further processing (table 20) after the exclusion of the outliers for which no or no acceptable explanation can be provided.
- The EU can agree with establishment of 8 µg/kg for aflatoxins total in sorghum grain destined for further processing (proposal 2) resulting in an acceptable rejection rate of 2.7 % with a reduction of the human exposure to aflatoxins (table 20).

Maximum level proposed for cereal based foods for infants and young children

- The EU is of the opinion that it would be appropriate to present the frequency distribution curve of the occurrence data as outlined above in order to be able to identify possible clear outliers. These outliers, in case no or no acceptable explanation can be provided for these unusual high levels, the EU is of the opinion that it should be considered not to take into account these outliers for the setting of the maximum levels (see reply to point b above).
- The EU furthermore proposes to recalculate the effect on exposure and rejection rate of hypothetical MLs of total aflatoxins, including hypothetical MLs lower than 1 µg/kg through the consumption of cereal-based foods for infants and young children (table 24) after the exclusion of the outliers for which no or no acceptable explanation can be provided.
- The EU proposes to discuss a maximum level lower than 1 µg/kg for aflatoxin total in cereal based foods for infants and young children following the above mentioned recalculation after exclusion of the outliers.

Agenda Item 10 (b)

Sampling plans and performance criteria for total aflatoxins in certain cereals and cereal-based products including foods for infants and young children (CX/CF 21/14/10 – Part II)

European Union Competence
European Union Vote

The European Union (EU) welcomes and appreciates the work done on the sampling plans and performance criteria for total aflatoxins in certain cereals and cereal-based products by the electronic Working Group chaired by Brazil and co-chaired by India.

COMMENTS ON THE RECOMMENDATIONS IN CX/CF 21/14/10 – Part II, paragraph 9

In reply to the recommendations in CX/CF 21/14/10-Part II, paragraph 9, the EU has following comments:

a. If sampling plans and methods performance criteria should be developed once the MLs for each of the food categories are established by CCCF.

The EU is of the opinion that the sampling plans and methods performance criteria should be discussed in parallel with the discussion on MLs to ensure that the sampling plans and method performance criteria are available once the MLs are established. For a contaminant that can heterogeneously be distributed in a given lot, as is the case for aflatoxins in cereal grains, it is important that an appropriate method of sampling of sampling is specified so that the maximum level is applied to a representative sample of the lot.

b. Whether the sampling plans and the decision rule should be aligned with the sampling plans already mentioned in the CXS 193-1995 or whether different approaches such as ISO 24333:2009, may be considered in the discussion;

The EU is of the opinion that the sampling plan and decision rule should be aligned with the sampling plans already provided in CXS 193-1995 for the control of Codex MLs for deoxynivalenol and for fumonisins (B1 + B2). As the maximum levels for total aflatoxins in cereals and cereal products under consideration and the established maximum levels for deoxynivalenol and fumonisins (B1 + B2) relates to a certain extent, it is important that the sampling procedures are aligned so that the same representative sample of the lot can be analysed for total aflatoxins, deoxynivalenol and fumonisins (B1 + B2). In addition, it is appropriate to consider to extend the sampling procedure also for the control of the Codex MLs for ochratoxin A in wheat barley and rye.

c. If CCMAS should be consulted regarding the establishment of performance criteria for a sum of components

The EU is of the opinion that it is not necessary to consult CCMAS regarding the establishment of criteria for a sum of components.

In case the maximum level applies to a sum of different components, then the criteria for precision apply to both the sum and the individual components.

Agenda Items 11 and 12

Maximum level for total aflatoxins in ready-to-eat peanuts and associated sampling plan (Held at Step 4)

Maximum levels for total aflatoxins and ochratoxin A in nutmeg, dried chili and paprika, ginger, pepper and turmeric and associated sampling plans (Held at Step 4)

European Union Competence
European Union Vote

The European Union (EU) supports the re-establishment of the electronic working groups to update the discussion papers in light of the new/additional data/information available to prepare proposals for consideration by CCCF15 (2022).

Agenda Item 13

Request for comments on the discussion paper on methylmercury in fish (CX/CF 21/14/11)

European Union Competence
European Union Vote

The European Union (EU) welcomes and appreciates the work done on the discussion paper on methylmercury in fish by the electronic Working Group chaired by New Zealand and co-chaired by Canada.

The EU would like to make following comments:

a) Maximum levels

The EU agrees to start work on the establishment of MLs for orange roughy, Patagonian tootfish and pink cusk-eel. Based on the data in Appendix III, the EU could support an ML of 0.80 mg/kg methylmercury of orange roughy, which would result in a 3% rejection rate for the global data set. For pink cusk-eel, the EU could support an ML of 1.0 mg/kg, which corresponds to a 4% rejection rate for the global data set. For Patagonian toothfish the EU supports to postpone the discussion for a year, in order to allow for a further data collection.

The EU can agree to discontinue the review of additional fish species, but would also be happy to contribute in case it would be agreed to continue the data collection.

b) Sampling plans

The EU agrees to progress the further development of the sampling plan based on the approach to specify sampling plans for specific weight classes. The EU notes that studies on larger fishes such as tuna and pink-cusk eel indicate that higher concentrations of mercury are present in the muscle close to the head, compared to the muscle close to the tail. The proposal in Table 3 of Appendix IV foresees for fishes of more than 10 kg, next to the options of sampling muscle at the head and tail or muscle from the middle, the option to sample only muscle close to the tail. As a more conservative approach the EU suggests to replace the option to sample muscle close to the tail by the option to sample muscle close to the head.

c) Other risk-management measures

The EU welcomes a guidance on risk-management measures and therefore supports a literature review, in order to assess the feasibility to develop such guidance.

d) Establishment of the eWG

The EU supports the re-establishment of the eWG to continue the work on the points a, b and c as listed in paragraph 78.

Agenda Item 14

Hydrogen cyanide and mycotoxin contamination in cassava and cassava-based products (CX/CF 21/14/12)

European Union Competence
European Union Vote

The European Union (EU) welcomes and appreciates the work done on discussion paper on hydrocyanic acid and mycotoxin contamination in cassava and cassava-based products by the Electronic Working Group chaired by Nigeria and co-chaired by Ghana.

COMMENTS ON THE RECOMMENDATIONS IN CX/CF 21/14/12 – paragraphs 17-19

In reply to the recommendations in CX/CF 21/14/12, paragraphs 17-19, the EU has following comments:

17. To develop a Code of Practice for the prevention and reduction of mycotoxins contamination in cassava and cassava-based products with focus on aflatoxins and ochratoxin A as presented in Appendix I

The EU is in favour of developing a Code of Practice for the prevention and reduction of mycotoxins contamination in cassava and cassava-based products with focus on aflatoxins and ochratoxin A and can therefore agree with the proposal for new work and the project document in Appendix I to CX/CF 21/14/12.

Two minor comments (of which one editorial) on point c under Specific criteria under heading 4, it is proposed to replace

- "is driving eradication of aflatoxins from the continent" by "is driving eradication of adverse human health effects by aflatoxins from the continent" or "is driving minimisation of aflatoxins from the continent.". It is not possible to eradicate the presence of aflatoxins completely but it is possible to eradicate the adverse human health effects as the consequence of the presence of very high levels of aflatoxins in food.
- "However, there is no currently an international document …" by "However, there is currently no international document …"

18. To re-establish the EWG to develop the CoP and to use as the basis for discussion the data/information provided in Appendices I and II of this document

The EU is in favour of re-establishing the EWG to develop this CoP and to use the information provided in Appendix II as basis for discussion.

19. To discontinue work on levels of HCN in cassava and cassava-based products and to await availability of further data and information to re-asses the need and feasibility to establish MLs for cassava and cassava-based products

The EU can agree to discontinue work on maximum levels of HCN in cassava and cassava-based products.

Agenda Item 18

Approach to identify the need for revision of standards and related texts developed by CCCF (CX/CF 21/14/16)

Mixed Competence
Member States Vote

The European Union and its Member States (EUMS) welcome and appreciate the work done by the Electronic Working Group chaired by Canada and co-chaired by Japan and the United States of America on the discussion paper on the implementation of a structured approach to identify the need for review of Codex standards and related texts for contaminants in food

COMMENTS ON THE RECOMMENDATIONS IN CX/CF 21/14/16 – paragraphs 24-26

The EUMS agree to implement option 2 on a 3-year basis as outlined in paragraphs 9 to 13 of CX/CF 21/14/16 and to evaluate option 2 to as outlined in paragraphs 14 and 16 of CX/CF 21/14/16.

The EUMS agree to the prioritisation criteria for identifying Codex standards for review and to a large extend to their priority rankings presented in Appendix I. The EUMS also agree on the general application of the priority rankings outlined in paragraph 20 with consideration of the information provided in paragraphs 21 to 23 of CX/CF 21/14/16.

As regards the proposed prioritization of criteria for identifying Codex Standards for review, the EUMS wish to make the following observation as regards the criterion trade disruption.

In case it relates to an ML for a certain food and contaminant combination that has been established because of health concerns, then the review should not lead to an increase of the ML. However a review could take place if:

- the trade disruption is related to a change of the Codex Classification of Food and Feed/ Codex commodity standard (and consequently additional commodities are covered by the ML for which no occurrence data were assessed for the establishment of the ML); and/or
- if a better description of the commodity covered by the ML could mitigate to a certain extent the observed trade disruptions (e.g. by adding “intended for further processing” or by specifying the portion of the commodity /product to which the ML applies).

Also for the other criteria, in case they are related to an ML for a certain food and contaminant combination that has been established because of health concerns, then the review should also not lead to an increase of the ML**.**