



**JOINT FAO/WHO FOOD STANDARDS PROGRAMME  
CODEX COMMITTEE ON CONTAMINANTS IN FOODS**

**12<sup>th</sup> Session**

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**PROPOSED DRAFT MAXIMUM LEVELS FOR  
CADMIUM IN CHOCOLATES AND COCOA-DERIVED PRODUCTS  
(AT STEP 4)**

*Comments submitted at Step 3 by Australia, Brazil, Canada, Colombia, Egypt, Japan, Kenya,  
Republic of Korea, USA, ECA and ICGMA*

**AUSTRALIA**

1. Australia re-iterates its previous comment regarding the practical enforceability of the proposed ML for dry mixtures of cocoa and sugar noting that detailed information on total cocoa solids may not always be readily available on the labels of such products.
2. Tables 1, 2 and 3 – the units should be amended from µg/kg to mg/kg
3. Table 3 – The ML for Cocoa Powder appears to have been increased from 1.3 mg/kg in the 2<sup>nd</sup> draft of the working paper to 1.5 mg/kg in this draft. However, this is not reflected in subsequent text throughout the document, particularly paragraph 74, paragraph 81 and Table 19, where there is a mix of 1.3, 1.2 and 1.5 mg/kg.
4. Paragraph 16 – The reference should be to paragraph 13 not 14.
5. Paragraph 33 could be reworded to clarify that the cut-off of 5% of the PTMI is referenced in the Procedural Manual. Note that the 25<sup>th</sup> edition of the procedural manual is now available.
6. Paragraph 37 could be reworded to clarify that ‘for chocolates with <30% total cocoa solids, there were 501 data points without an LOD/LOQ’ etc. For the group of chocolates with ≥50 – 70% total cocoa solids, it should read <70%.
7. Paragraph 39 – The last sentence could be amended to read: ‘*As the data has been categorised by the region from which it originated, it is therefore not directly indicative of the content of cadmium in the chocolate products actually produced in that region.* Important differences in cadmium concentrations were observed among the regions that could have consequences in the trade of cocoa products’.
8. Paragraph 41 – The last sentence could be amended to read ‘*Despite having information on the origin of the data, information on the origin of the chocolate product itself was lacking in the majority of cases. Therefore it was decided to categorise the data according to the countries that submitted the information to GEMS/Food*’. Also relevant to paragraph 57, 64, 70, 75.
9. Paragraph 45 – The final sentence can be deleted as it is repeated in Paragraph 47.
10. Paragraph 49 – The second last line could be amended to read ‘*...would only affect 4.7% of the samples and intake as a percentage of the PTMI would be reduced to 1%...*’
11. Paragraph 60 – For the first line, the value should read 0.9 not 0.6.
12. Paragraph 74 – With a proposed ML for cocoa powder of 1.5 mg/kg (as per Table 3), the rest of the paragraph would now also need to be amended as follows: ‘On a world scenario with maximum level of 1.5 mg/kg, a cadmium intake of 1.01 µg/kg b.w. per month can be observed, which represents 4.1% of the PTMI, and which would see a total of 0.9% of the samples in the world trade possibly being rejected. However, considering these scenarios with the regional data for Latin America and the Caribbean a maximum level of 1.5 mg/kg would see 2.3% of samples possibly being rejected; a maximum level that was any more restrictive would see over 5% of products in this region possibly being rejected. For the countries of North America and the Southwest Pacific, using the same scenario of a maximum level of 1.5 mg/kg would see 3.8% of their samples being rejected. Therefore, when also taking into consideration the regions of Latin America and the Caribbean, and North America and the Southwest Pacific a maximum level of 1.5 mg/kg should be considered. This maximum level would also result in the reduction of cadmium intake to 6.0 % (LAC) and 6.8% (NASWP) of the PTMI from approximately 7% and 8 % respectively, if no maximum level applied.
13. Paragraph 81 – The reference to an ML for cocoa of 1.2 mg/kg needs to be updated to 1.5 mg/kg.
14. Please note that the Australian participant is Dr Matthew O’Mullane not Ms Matthew O’Mullane.

**BRAZIL**

Brazil would like to highlight that there is a typo in tables 1, 2 and 3 of Appendix I and the units in the column "maximum level (ML) should be replaced by mg/kg in the place of µg/kg.

**CANADA**

Canada wishes to express its appreciation to the chair, Ecuador, and co-chairs, Brazil and Ghana, for once again leading the electronic working group (eWG) on the *Proposed Draft Maximum Levels (ML) for Cadmium in Chocolate and Cocoa-Derived Products*.

Canada is supportive of the proposed MLs listed in Appendix I for cadmium in cocoa powder, chocolate and dry mixtures of cocoa and sugars, as well as the further categorisation of chocolate and dry mixtures of cocoa and sugars based on their percentage of dry cocoa solids. Canada notes that the units of the MLs listed in the headings of column 2 of Tables 1 to 3 of Appendix I are "µg/kg" and should instead be expressed on a "mg/kg" basis.

Canada also notes a discrepancy in the ML proposed for cocoa powder in Table 3 of Appendix I (1.5 ~~µgm~~g/kg) with that recommended for cocoa powder in paragraph 74 of Appendix II, which states: "...a maximum level of 1.3 mg/kg should be considered."

**COLOMBIA**

Colombia is pleased to state that it is in agreement with the PROPOSED DRAFT MAXIMUM LEVELS FOR CADMIUM IN CHOCOLATE AND COCOA-DERIVED PRODUCTS, and that it supports the classification in Table 1 and the MLs set out in the proposed draft for this category.

However, it reckons that the maximum levels proposed in Table 2 should be adjusted, bearing in mind that cadmium is found mainly in cocoa (cocoa solids). It should also be noted that the values included in the proposed draft in Table 1: "Maximum levels for cadmium in chocolate" are not equivalent to or comparable with the levels in Table 2: "Maximum levels for cadmium in cocoa powders and dry cocoa-sugar mixtures for sale for final consumption"; although both cases refer to total cocoa solids, the first includes both cocoa and cocoa butter whereas in the second – because of its composition – the total cocoa solids are mainly cocoa.

For the reasons given above, it is not necessary to calculate equivalent values in both classifications; taking account only of the percentage of total cocoa solids, the values proposed in Table 2 should be greater than those in Table 1, so as to maintain consistency in relation to the characteristics of the products.

The above is the consensus reached in the Food Contaminants Subcommittee of Colombia.

**EGYPT**

Egypt supports the EWGs recommendation.

**JAPAN**

Japan appreciates the efforts of Ecuador, Brazil and Ghana, Chairs of the electronic working group on the "Proposed draft maximum levels for cadmium in chocolates and cocoa-derived products". Japan would like to submit the following comments in response to the request for comments at CL 2018/2-CF.

According to the reports of the 77th JECFA, health risk from cadmium in chocolate is very low. MLs with two decimal places (or two significant figures) require more accurate analytical methods than MLs of one decimal place.

Considering that all proposed draft MLs for cocoa powder and dry mixture of cocoa and sugars sold for final consumption have one decimal place, the CCCF should ensure consistency among the related MLs for Cd in chocolates and cocoa-derived products.

Therefore, Japan proposes rounding all values of proposed draft MLs for chocolates in the Table 1 in Appendix I to one decimal place as following table.

Commodity / Product Name	Proposed draft ML (mg/kg)	Proposed draft ML of one decimal place (mg/kg)	Notes/Remarks
Chocolate products containing or declaring < 30% total cocoa solids on a dry matter basis	0.40	<u>0.4</u>	Including milk chocolate, family milk chocolate, milk chocolate couverture, Gianduja milk chocolate, table chocolate, milk chocolate Vermicelli/milk chocolate flakes
Chocolate and chocolate products containing or declaring ≥ 30% to < 50% total cocoa solids on a dry matter basis	0.50	<u>0.5</u>	Including sweet chocolate, Gianduja chocolate, semi – bitter table chocolate, Vermicelli chocolate / chocolate flakes, bitter table chocolate.
Chocolate containing or declaring ≥ 50% to < 70% total cocoa solids on a dry matter basis	0.80	<u>0.8</u>	
Chocolate containing or declaring ≥ 70% total cocoa solids on a dry matter basis	1.00	<u>1.0</u>	

## KENYA

### GENERAL COMMENT

Kenya would like to thank the EWG led by Ecuador, Brazil and Ghana for the good work done to come up with the recommendations regarding maximum levels for cadmium in chocolates and Cocoa-derived products

### **PROPOSED DRAFT MAXIMUM LEVELS FOR CADMIUM IN CHOCOLATES AND COCOA-DERIVED PRODUCTS**

**Comment:** we accept with the classification provided in the tables 1-3 below in the categories of chocolate products provided. We also accept the MLs proposed and at the same time noted that African countries produced the most samples in the regions and the result analysis revealed that averagely the maximum limit for cadmium meets the safety limit that facilitate trade.

The low level of cadmium might be as a result of less acidic soil, less use of phosphate fertilizers or non and selection of Cocoa varieties that accumulate little cadmium.

### APPENDIX 1

**PROPOSED DRAFT MAXIMUM LEVELS FOR CADMIUM  
IN CHOCOLATES AND COCOA-DERIVED PRODUCTS**

**Table 1.** Proposal for maximum levels for cadmium in chocolates

Commodity / Product Name	Maximum Level (ML) $\mu\text{g}/\text{kg}$	Portion of the Commodity / Product to which the ML applies	Notes / Remarks
Chocolate products containing or declaring < 30% total cocoa solids on a dry matter basis	0.40		Including milk chocolate, family milk chocolate, milk chocolate couverture, Gianduja milk chocolate, table chocolate, milk chocolate Vermicelli/milk chocolate flakes
Chocolate and chocolate products containing or declaring $\geq 30\%$ to < 50% total cocoa solids on a dry matter basis	0.50		Including sweet chocolate, Gianduja chocolate, semi – bitter table chocolate, Vermicelli chocolate / chocolate flakes, and bitter table chocolate.
Chocolate containing or declaring $\geq 50\%$ to < 70% total cocoa solids on a dry matter basis	0.80		
Chocolate containing or declaring $\geq 70\%$ total cocoa solids on a dry matter basis	1.00		

**Table 2.** Proposal for maximum levels for cadmium in dry mixtures of cocoa and sugars sold for final consumption.

Commodity / Product Name	Maximum Level (ML) $\mu\text{g}/\text{kg}$	Portion of the Commodity / Product to which the ML applies	Notes / Remarks
Dry mixtures of cocoa and sugars containing <29% total cocoa solids on a dry matter basis.	0.4		
Dry mixtures of cocoa and sugars containing $\geq 29$ to <50% total cocoa solids on a dry matter basis.	0.6		Including chocolate powder.
Dry mixtures of cocoa and sugars containing $\geq 50\%$ total cocoa solids on a dry matter basis.	1.2		Including chocolate powder.

**Table 3.** Proposal for maximum levels for cadmium in cocoa powder

Commodity / Product Name	Maximum Level (ML) $\mu\text{g}/\text{kg}$	Portion of the Commodity / Product to which the ML applies	Notes / Remarks
Cocoa powder (100% total cocoa solids on a dry matter basis).	1.5		Product sold for final consumption.

**Table 3.** Occurrence data for cadmium cocoa beans by declared region of origin, based on GEMS/Food data

World region	Number of samples	Mean (mg/kg)	Minimum (mg/kg)	Maximum (mg/kg)	95 <sup>th</sup> Percentile (mg/kg)
Africa	748	0.12	0.01	1.40	0.32
South West Pacific	46	0.20	0.05	0.67	0.31
Asia	68	0.44	0.06	1.40	0.81
Latin America and Caribbean	432	0.62	0.01	6.00	2.00
Total	1294	0.30	0.01	6.00	1.14

Source: GEMS/Food

### REPUBLIC OF KOREA

The Republic of Korea supports the cut-off value (less than 5% rejection rate) used by EWG to propose maximum levels of cadmium in chocolates and cocoa-derived products. However, the cut-off value should be applied to all proposed categories of cocoa products for consistency. Therefore, we propose the following:

- We propose 0.4 mg/kg as the maximum level of cadmium in “Chocolates with <50% of total cocoa solids” (combining “Chocolates with <30% of total cocoa solids” and “Chocolates with ≥30% to <50% of total cocoa solids”) which produce the maximum rejection rates of 4.7% and 1.64%, respectively, when the two categories are analyzed separately.

- We propose 0.8 mg/kg as the maximum level of cadmium in “Chocolates with ≥50% of total cocoa solids” (combining “Chocolates with ≥50% to <70% of total cocoa solids” and “Chocolates with ≥70% of total cocoa solids”) which produce the maximum rejection rates of 3.9% and 5%, respectively, when the two categories are analyzed separately. The rejection rate of 5% will be lowered when these two categories are analyzed together.

We also support the maximum level of 1.5 mg/kg in cocoa powder (100% total cocoa solids), which is proposed based on the cut-off value.

### UNITED STATES OF AMERICA (USA)

The U.S. appreciates the work that Ecuador, Brazil, and Ghana have done in preparing the recommendations on maximum levels (MLs) for cadmium in chocolate and cocoa-derived products.

The U.S. does not object to the proposed MLs for cadmium in chocolate (Table 1), in dry mixtures of cocoa and sugars sold for final consumption (Table 2), and in cocoa powder (Table 3). We note however, that the MLs should be in milligrams/kg, not micrograms/kg.

## EUROPEAN COCOA ASSOCIATION (ECA)

Paragraph	Comment
Page 3 – Appendix I <b>Table 1</b>	<p><b>The given Maximum levels should be defined as <u>mg/kg</u>.</b></p> <ul style="list-style-type: none"> <li>- We assume this was a spelling mistake.</li> <li>- This unit is also used for the limits defined in Commission Regulation (EU) 488/2014.</li> <li>- If limits are suggested as µg/kg we strongly oppose these levels as they are not achievable for cocoa products of any origin and do not align with any other limits established elsewhere.</li> </ul>
Page 3 – Appendix I <b>Table 2</b>	<p><b>The given Maximum levels should be defined as <u>mg/kg</u>.</b></p> <ul style="list-style-type: none"> <li>- We assume this was a spelling mistake.</li> <li>- This unit is also used for the limits defined in Commission Regulation (EU) 488/2014.</li> <li>- If limits are suggested as µg/kg we strongly oppose these levels as they are not achievable for cocoa products of any origin and do not align with any other limits established elsewhere.</li> </ul>
Page 3 – Appendix I <b>Table 3</b>	<p><b>The given Maximum levels should be defined as <u>mg/kg</u>.</b></p> <ul style="list-style-type: none"> <li>- We assume this was a spelling mistake.</li> <li>- This unit is also used for the limits defined in Commission Regulation (EU) 488/2014.</li> <li>- If limits are suggested as µg/kg we strongly oppose these levels as they are not achievable for cocoa products of any origin and do not align with any other limits established elsewhere.</li> </ul>
Page 4 – Appendix II <b>Table 3</b>	Units of all values are indicated as mg/kg, which should therefore also apply to the proposed Maximum levels in tables 1, 2 and 3 (Appendix I).
Page 9 – Appendix II <b>Paragraph 40</b>	As correctly indicated in point 22 of this document fine flavour cocoa represents 5-7% of cocoa. To ensure no trade disruption from some countries, while ensuring compliance with food safety requirements, ML need to be representative and achievable for most origins.
Page 11 – Appendix II <b>Paragraph 46</b>	The indicated unit <b>mg/kg</b> should be adjusted in table 1.
Page 14 – Appendix II <b>Paragraph 56</b>	The indicated unit <b>mg/kg</b> should be adjusted in table 1.
Page 16 – Appendix II <b>Paragraph 63</b>	The indicated unit <b>mg/kg</b> should be adjusted in table 1.
Page 18 – Appendix II <b>Paragraph 69</b>	The indicated unit <b>mg/kg</b> should be adjusted in table 1.
Page 20 – Appendix II <b>Paragraph 74</b>	The indicated unit <b>mg/kg</b> should be adjusted in table 3.
Page 23 – Appendix II <b>Table 19</b>	The indicated unit <b>mg/kg</b> should be adjusted in table 2.

## INTERNATIONAL COUNCIL OF GROCERY MANUFACTURERS ASSOCIATIONS (ICGMA)

ICGMA thanks the eWG chairs for their dedication to this work and drafting a thorough document. We appreciate that for each product category, the document provides 1) occurrence data by region and 2) an analysis of the impact of different MLs for Cd, including the expected proportion of PTMI for the intake of Cd according to Cluster Diet 7 and the projected proportion of rejected samples in the world market. Overall, we are supportive of the proposed MLs included in the document.

In the introduction to Appendix 1 of the document, paragraphs 16 and 17 reiterate that the establishment of maximum levels (MLs) of cadmium for cocoa and chocolate-derived products is to address global trade, not safety concerns.

The 73<sup>rd</sup> Joint WHO/FAO Expert Committee on Food Additives (JECFA) previously identified the major contributors to cadmium exposure as cereals/grains, vegetables, meat and poultry offal, and seafood (especially molluscs) <sup>1/</sup>. Further, JECFA77 clearly expressed that both high consumers and the general population are not at risk from cadmium dietary exposure from cocoa-derived products. <sup>2/</sup>

This issue is especially important to the global cocoa and chocolate industry in light of concerns about the supply of cocoa. <sup>3/</sup> A number of factors, including but not limited to demand, weather, and farming practices, present challenges for the cocoa supply and the potential exclusion of product for non-safety reasons, such as cadmium levels, is an unnecessary burden for this industry. Alignment on this issue is critical as it could significantly threaten exports in developing countries where cocoa is primarily grown.

### **Specific Comments on Discussion Draft**

ICGMA supports the proposed ML of 0.5 mg/kg for the chocolate and chocolate products containing or declaring  $\geq 30\%$  to  $< 50\%$  total cocoa solids on a dry matter basis. This level is representative of the increase in total cocoa solids for the category and provides additional flexibility to manufacturers.

Additionally, ICGMA supports the proposed ML of 0.8 mg/kg for chocolate and chocolate products containing or declaring  $\geq 50\%$  to  $< 70\%$  total cocoa solids on a dry matter basis category as we believe this level drives global harmonization. Finally, we support the proposed ML of 1.0 mg/kg for the  $\geq 70\%$  total cocoa solids on a dry matter basis category to further the trend of increasing cadmium level with increasing cocoa solids.

### **Conclusion**

In summary, overall we are supportive of the proposed ML's in this latest draft. We support the proposed ML of 0.5 mg/kg for the chocolate and chocolate products containing or declaring  $\geq 30\%$ - $< 50\%$  total cocoa solids, as this is more practical and representative of the increase in total cocoa solids for that category. We also support the proposed ML of 0.8 mg/kg for chocolate and chocolate products containing or declaring  $\geq 50\%$ - $< 70\%$  total cocoa solids and the proposed ML of 1.0 mg/kg for chocolate and chocolate products with  $\geq 70\%$  total cocoa solids.

ICGMA also thanks the eWG chairs for their extensive work on preparing this draft discussion paper relative to proposed maximum levels for cadmium in chocolate and cocoa-derived products and looks forward to further discussion of this draft.

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<sup>1/</sup> CADMIUM (addendum) in WHO Food Additive Series 68: Safety of evaluation of certain food additives and contaminants (p. 358, [http://whqlibdoc.who.int/publications/2011/9789241660648\\_eng.pdf](http://whqlibdoc.who.int/publications/2011/9789241660648_eng.pdf))

<sup>2/</sup> JOINT FAO/WHO EXPERT COMMITTEE ON FOOD ADDITIVES - Seventy-seventh meeting Rome, 4–13 June 2013 "SUMMARY AND CONCLUSIONS" (p. 4) and W H O Technical Report Series 983 "Evaluation of certain food additives and contaminants - Seventy-seventh report of the Joint FAO/WHO Expert Committee on Food Additives" (pp. 39 - 45)

<sup>3/</sup> ICCO.2014.The Cocoa Market Situation. EC/4/2 [http://www.icco.org/about-us/international-cocoa-agreements/cat\\_view/30-related-documents/45-statistics-other-statistics.html](http://www.icco.org/about-us/international-cocoa-agreements/cat_view/30-related-documents/45-statistics-other-statistics.html)