When Food Safety and Trade Issues Merge: Risk Managing Cadmium in Cocoa

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JIFSAN Advisory Council Annual Symposium

Understanding the Impact of Arsenic, Cadmium and Lead Across the Food Supply
May 25-26, 2022
We are Ingredion

We turn fruits, grains and vegetables into value-added ingredients and biomaterial solutions for the food, beverage, paper & corrugating, brewing and other industries.

100
serving customers in more than 100 countries

11,000
talented and experienced employees

FORTUNE 500
company

~$6.0 billion
net sales in 2017

Ingredion Idea Labs™ innovation centers, manufacturing facilities and sales offices...presence in 40 countries

headquartered in Westchester, Illinois
We bring the potential of people, nature, and technology together to make life better.
CODEX ALIMENTARIUS
International Food Standards

World Health Organization
Food and Agriculture Organization of the United Nations

- Created in 1963 by the Food & Agriculture Organization (FAO) and the World Health Organization (WHO)
- Protect consumer health
  Ensure fair trade
- Food standards, guidelines, codes of practice…
  (>350 listed + languages)
- 25 Committees: Contaminants, Additives, Food Labeling, Nutrition, Food Hygiene…, Commodities…
- Risk Assessment Expert Committees
What’s the Cadmium in Cocoa Issue?

<table>
<thead>
<tr>
<th>Food contaminant</th>
<th>Main food sources of cadmium: cereals, vegetables, seafood</th>
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<tbody>
<tr>
<td>Cadmium naturally present in soils - uptake into cocoa plants</td>
<td>- Maximum Levels (MLs) already set</td>
</tr>
<tr>
<td>Geology - more in VOLCANIC SOILS High: Latin America Low: Africa</td>
<td>2013 JECFA Risk Assessment: low health concern in cocoa</td>
</tr>
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<td>Data needed from all producing regions - what’s GLOBALLY ACHIEVABLE?</td>
<td>Production &amp; Trade concerns on problematic region standards</td>
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<td>Need global, science-based standards</td>
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</table>
• **Codex Committee on Contaminants in Food (CCCF) 2014**
  reported on **2013 JECFA Risk Assessment**
  - “JECFA concluded that total cadmium exposure including for high consumers of cocoa and cocoa products was not considered to be of concern.”
  - CCCF decided **no need for MLs based on health**

• **BUT concerns for producing countries and international trade**
  - without Codex global standards, strict region precedents would become default
    e.g. EU new Maximum Levels scheduled for 2019

• **CCCF 2014 new work:**
  “Completion of work for final adoption by the Commission in 2017 or before.”
Codex: Member Countries & Observers – Roles

**Member Countries/ Governments:**
- Raise issues
- Propose priorities to committees
- Develop discussion papers
- Lead working groups
- Share data
- National, regional perspectives
- Vote

**Observer organizations:**
- Practical insights & feasibility
- Ingredients, production information
- Share data
- Best practice perspectives, all regions
- Essential input for electronic working groups on achievable solutions

Video: ‘A Chocolate Story…’
Data Gathering & Review (2013-2022)

• Member Country data

• Observer Delegations - Industry data/ Science
  • International Confectionery Association (ICA)
    - coordination via the National Confectioners Association (US), Caobisco (EU)
  • International Council of Grocery Manufacturers Associations (ICGMA)
  • Institute of Food Technologists (IFT)

• Information sharing:
  • Codex data requests: WHO GEMS Food occurrence database
  • Electronic Working Group + Chair (Ecuador)
  • US FDA/ Codex office
  • Other key government delegations
Codex 2016: What to set MLs on?

**Cocoa beans?**
- Problems for individual origins
- Blending beans
- Cleaning and processing to reduce levels

**Cocoa liquor/ paste?**
- Varied cocoa concentrations, blending
- Not relevant for exposure from finished product

**Finished product?**
- More consistent with regional regulations
- Easier to assess exposure

✓ Cocoa and chocolate products – for consumption
New Occurrence & Exposure Data

Proportionality – industry expertise essential

• CCCF 2019 concluded set MLs on proportionality basis
  - percent total dry cocoa solids

• Cocoa butter (fat) and powder (non-fat) make up total dry solids:
  - cadmium only in non-fat dry solids

• Can extrapolate for chocolate categories, but cocoa powder is a different product
  - high non-fat dry solids

2021 JECFA Risk Assessment on Dietary Exposure

• Concluded: contribution of cocoa products to dietary cadmium exposure was minor... even in countries in which the consumption of cocoa products is relatively high

• Compared hypothetical ML Scenarios for rejections:
  - proposed MLs for chocolate and cocoa powder may result in substantial rejection rates (up to 30%) for products from some regions, but has only a minor impact (mean decrease across clusters of 0.7%, range 0.0–2.4%) on total dietary cadmium exposure
What is ‘As Low As Reasonably Achievable’?

- Follow Good Practices + ?
- Risk from dietary exposure?
- Commercial feasibility
  - Regional data vs Global achievability
- ALARA levels based on available data
  - share data to ensure achievable outcome
Cadmium Maximum Levels: Status Update
Codex Committee on Contaminants in Food (CCCF15) May 2022

<table>
<thead>
<tr>
<th>Product Type</th>
<th>CODEX (mg/kg)</th>
<th>EU (mg/kg)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chocolate (&lt; 30% total dry cacao solids)</td>
<td>0.3 adopted*</td>
<td>0.1</td>
</tr>
<tr>
<td>Chocolate (≥ 30% &lt; 50% total dry cocoa solids)</td>
<td>0.7 adopted</td>
<td>0.3</td>
</tr>
<tr>
<td>Chocolate (≥ 50% total dry cocoa solids)</td>
<td>0.8 adopted</td>
<td>0.8</td>
</tr>
<tr>
<td>Chocolate (≥ 70% total dry cocoa solids)</td>
<td>0.9 adopted</td>
<td>0.8</td>
</tr>
<tr>
<td>Cocoa powder (100% total dry cocoa solids) ready for consumption</td>
<td>2.0 (CCCF 2022)</td>
<td>0.6</td>
</tr>
</tbody>
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Codex took account of global risk and achievability data

*CCCF 2019 aligned on 0.3 mg/kg, sent to the Codex Alimentarius Commission for adoption – politics disrupted progress – countries in non-volcanic regions pushed back – sent back to CCCF 2021

**Code of Practice** to promote mitigation options: feasible short term/long term, agricultural, production practices (CCCF aligned 2022).
“The Codex adoption of maximum levels for cadmium in chocolate products is a positive step forward for common global standards, based on expert scientific risk assessment and global data from producing regions. A single standard means simplicity for global compliance, enabling international trade. Moreover, basing standards on global data helps avoid unnecessary food waste,” said Martin Slayne, of The International Confectionery Association, a Codex observer.
You Tube Codex Video: A Chocolate Story…

Video developed by FAO/WHO Codex secretariat and Martin Slayne, with imagery supplied by the US National Confectioners Association

https://youtu.be/ojcwLZMYGjI

Thank you

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