Cocoa Beans: Chocolate & Cocoa Industry Quality Requirements

A Publication Supported by
ECA-CAOBISCO-FCC Joint Cocoa Quality & Productivity WG

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Cocoa Market Outlook Conference
What is Quality in cocoa?

- Complex market for chocolate and cocoa-based products
- Different demands for cocoa beans to meet particular requirements which are reflected in the value and price paid for a parcel of beans
  - Flavour
  - Physical characteristics - direct bearing on yield and manufacturing performance
  - Other aspects including traceability, geographical indicators and certification to indicate the sustainability of the production methods
- Food Safety – products which are wholesome and comply with legislation
Global Cocoa Agenda Actions:

"improve cocoa quality by better communication of industry needs, post-harvest processing and quality assessment"

“enhance food safety by wider promotion and adoption of Good Agricultural Practices...”
ECA/CAOBISCO/FCC initiative to produce and disseminate:
« Cocoa Beans: Chocolate and cocoa industry quality requirements »

Based on 1996 BCCCA booklet

Scope  «Farm to Factory Gate »
- Quality – General requirements & standards
- Food Safety aspects
- Pre-harvest & Post-harvest GAP
- Transportation, Shipping, Warehousing practices

Audience
« Those involved in the production, distribution and storage of cocoa beans »
☑ Researchers and Extension services
☑ Certifiers, Co-op managers
☑ Internal company (Processor and Manufacturers)
☑ Buyers, traitants etc
☑ Trainers of trainers, Co-op managers
☒ NOT Farmer or Farmer training
General Content/Format

• Original Structure
  • Introduction
  • Part 1 Aspects of Cocoa Bean Quality
  • Part 2 Quality Standards
  • Part 3 Aspects of Cocoa Production Affecting Quality
  • References/Sources of Further Information
  • Appendices
    • International Cocoa Standards
    • Protocols for the preparation and flavour evaluation of samples and small-scale fermentation techniques (contributed by Darin Sukha and Ed Seguine)
Flavour – key quality criterion

Evaluation methods

Types of cocoa: Mainstream and fine/flavour cocoas; genetic, environmental and post-harvest effects; new initiatives to recognise and celebrate high quality cocoas

Off flavours and their causes: mouldy, smoky, acid, earthy, bitter, contaminated

Food Safety & Wholesomeness

Main issues

Current legislation, guidelines

Summary GAP to mitigate contamination

Sources of further information
Physical Characteristics

Consistency

Yield of edible material

- bean size, shell %, fat %, moisture, foreign matter, insect damage, clumped beans

Cocoa Butter Characteristics

Free Fatty Acid

Hardness

Colour Potential – “colourability”

Important for cocoa powder

Traceability, Geographical Indicators & Certification
Mouldy Beans - Using the guide to address a quality issue

What’s the problem?
- Mouldy/musty off-flavour that cannot be removed by manufacturer

What’s the cause?
- Presence of moulds, primarily inside the bean
- Mould growth due to prolonged fermentation, inadequate drying, adsorption of moisture during storage

Any regulations? Any associated issues?
- Risk of high Free Fatty Acid (FFA) levels, some fungi associated with mycotoxin production [cross-references]

What are the standards?
Eg. ISO, FCC, CMA

Cut Test

The Grade Standards lay down the following maximum limits for producing country internal classification for fermented beans

<table>
<thead>
<tr>
<th>Grade</th>
<th>Mouldy</th>
</tr>
</thead>
<tbody>
<tr>
<td>Grade I</td>
<td>3%</td>
</tr>
<tr>
<td>Grade II</td>
<td>4%</td>
</tr>
</tbody>
</table>

FCC/ISO 2451 definition

Mouldy Bean

...a cocoa bean on the internal parts of which mould is visible to the naked eye...
What can be done to reduce the problem?
Internal mould growth can occur when bean shells are damaged, beans cluster and where moisture >8%.

Pre-harvest (environment, planting materials, pests and diseases)
Harvesting (inc. pod opening, storage)
Fermentation
Drying
Storage
Quality Control – involve farmers
Transportation and Shipping
Mouldy Beans- Using the guide to address a quality issue - GAP

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KEY POINTS: DRYING

- Sun-dry where possible, but complement or replace with well designed and maintained artificial dryers where necessary.
- Dry cocoa beans off the ground so that they are not in direct contact with soil, tarmac or concrete and are inaccessible to animals.
- Ensure beans cannot be contaminated by smoke, fumes from dryers or vehicles.
- Protect beans from rain and dew (including covering at night).
- Turn the beans frequently but do not mix beans at different stages of drying.
- Dry for a minimum of 6 days in the sun (<8% moisture).
- Control rate and length of drying period carefully when using artificial dryers to avoid high acidity levels and/or over-drying.
What can be done to reduce the problem?

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**Pre-harvest (environment, planting materials, pests and diseases)**

**Harvesting (inc. pod opening, storage)**

**Fermentation**

**Drying**

**Storage**

**Quality Control** – involve farmers

**Transportation and Shipping**
Collates information from sources including

- Codex Code of Practice for the Prevention and Reduction of Ochratoxin A Contamination
- CCE Sustainable Cocoa Trainers Manual and CocoaSafe project
- ICCO CB Guidelines on Best Known Practices in the Cocoa Value Chain
- Research reports/academic papers

Provides weblinks to other sources of information

Eg.

www.efsa.Europa.eu,
www.codexalimentarius.org
http://www.icco.org/sites/sps/  ICCO Pesticides manual
Protocols and terminology for flavour assessment

- developed by partners from research institutes and industry
- suitable for small-scale/basic laboratory equipment
- Methods for small-scale fermentation and drying (eg for experimental samples)
- adopted by Cocoa of Excellence and Heirloom Cacao Preservation Initiatives

Contributed by D. Sutja and E. Seguin
Dissemination and Use

- Available as a free downloadable pdf file
- Printed copies/USB wafers sent to main cocoa organisations
- Conferences and industry events including WCC 2016 and research meetings

Positive feedback received:
- Useful glossary/terminology in En/Fr/Es languages
- Being used as a basis for development of quality standards
- Valuable aid in training

For the Future
- How best to keep it up to date?
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Cocoa Beans:
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Fèves de cacao:
Exigences de Qualité de L'Industrie du Chocolat et du Cacao

Cacao en Grano:
Requisitos de Calidad de la Industria del Chocolate y del Cacao

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