CAOBISCO
CHOCOLATE, BISCUITS & CONFECTIONERY OF EUROPE

eca
european cocoa association

FCC
FEDERATION OF COCOA COMMERCE

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
London – 27 September 2016

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

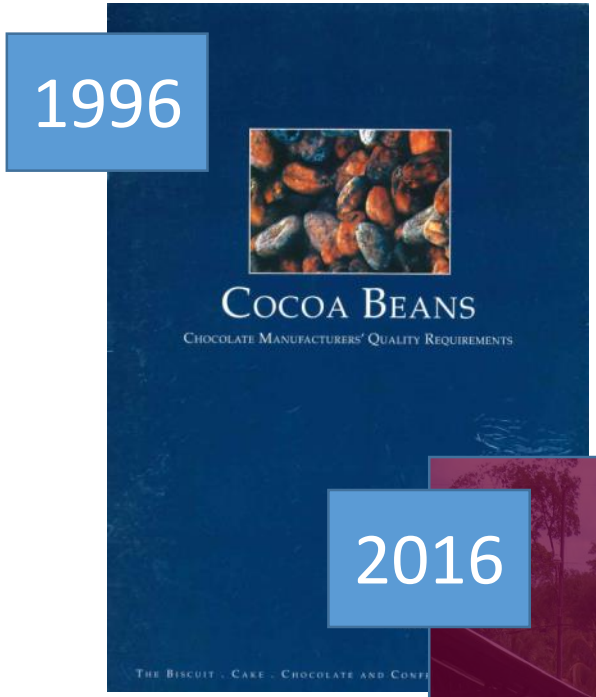
Global Cocoa Agenda Actions:

"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:

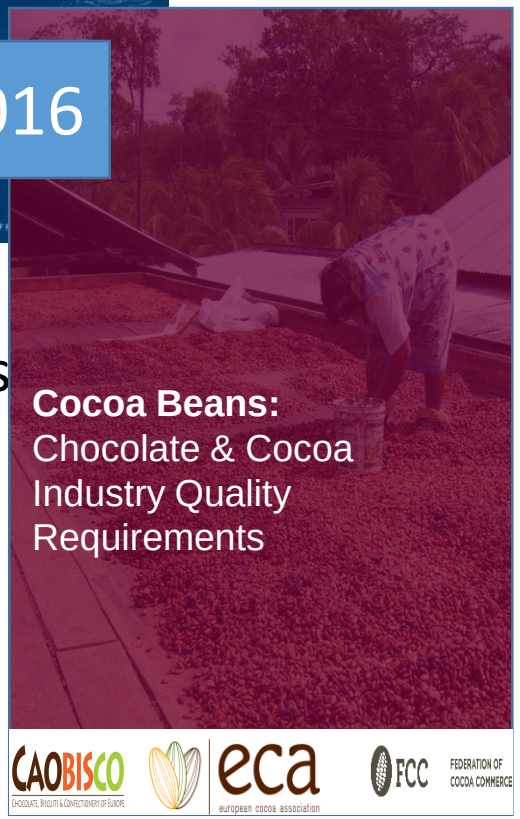
« Cocoa Beans: *Chocolate and cocoa industry quality requirements* »



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



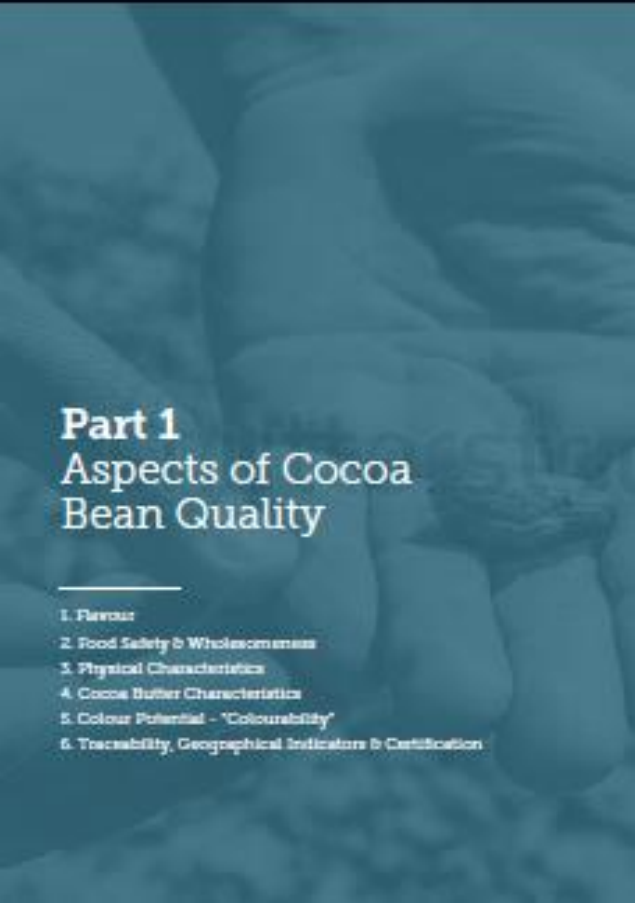
Audience

« 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


Photo: D. Sukha

Food Safety & Wholesomeness

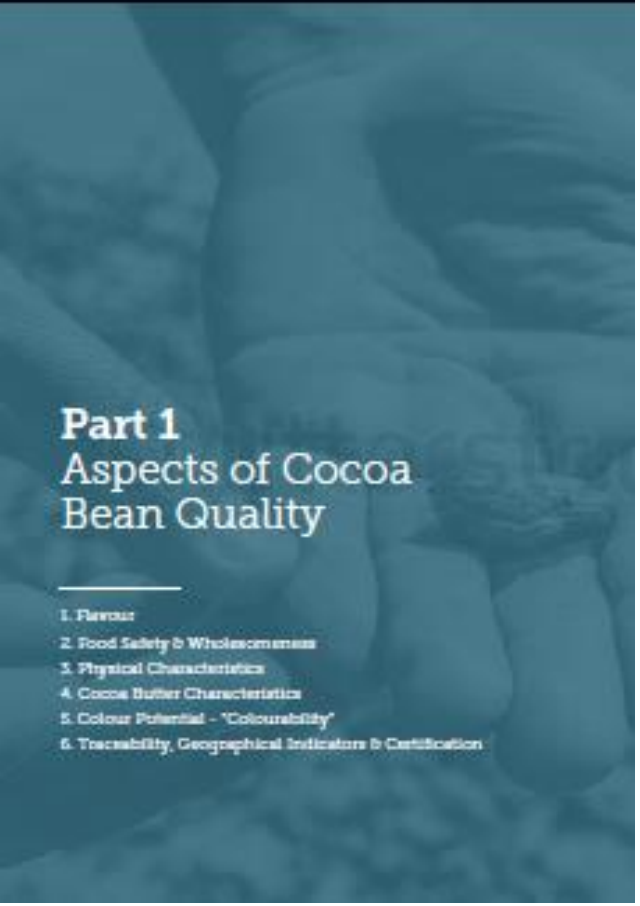
Main issues

Current legislation, guidelines

Summary GAP to mitigate contamination

Sources of further information

- Allergens
- Dioxins & PCBs
- Bacteria
- Foreign Matter
- Heavy Metals
- Infestation
- Mineral Oil Hydrocarbons
- Polycyclic Aromatic Hydrocarb (PAH)
- Mycotoxins including Ochratox (OTA)
- Pesticide Residues



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

Photo: M. Gilmour/R. Dand

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?

Associated issues?

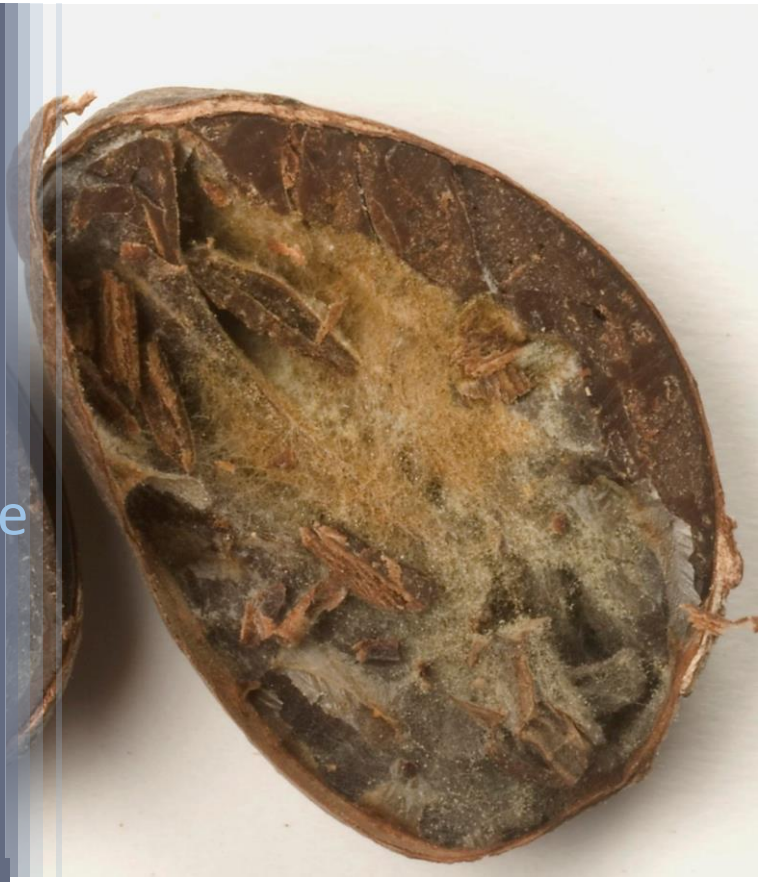
- Risk of high Free Fatty Acid (FFA) levels, some fungi associated with mycotoxin production [cross-references]

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		Mouldy
	Grade I	3%
	Grade II	4%

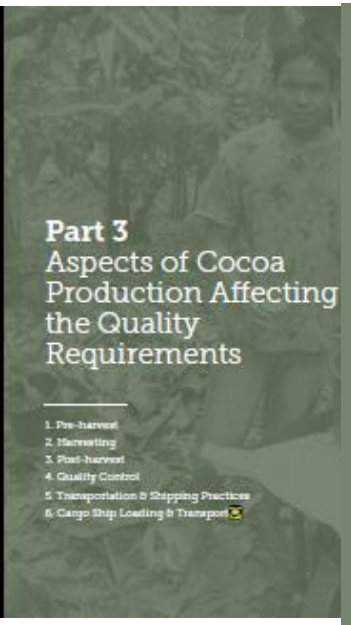


FCC/ISO 2451 definition

Mouldy Bean

…a cocoa bean on the internal parts of which mould is visible to the naked eye...

Mouldy Beans- Using the guide to address a quality issue - GAP



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

Fermentation heap typical of West Africa.

Fermentation should not include black, diseased or clumped beans.

Box fermentation.

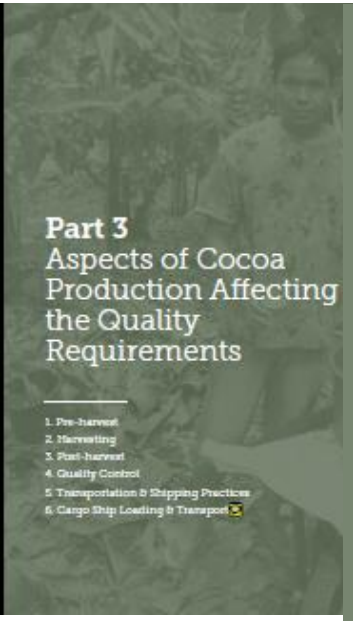
Do not add beans to a fermentation already in progress.

Photos: E.Cros, D.Sukha, M.Gilmour.

KEY POINTS: FERMENTATION

- ✓ Ensure fermentation method is appropriate to the variety, climate, quantity of beans and locally available technology.
- ✓ Discard any pieces of husk, placenta, black beans, germinated beans.
- ✓ Ensure basket, platforms and any equipment is kept reasonably clean between fermentations.
- ✓ Site fermentation in a space with adequate protection from rain, wind and direct sunlight.

Mouldy Beans- Using the guide to address a quality issue - GAP



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Sun drying on raised platforms.

Indirect fired artificial dryer.


Drying by roadside on tarmac.


Livestock feeding in and around cocoa drying on the ground.

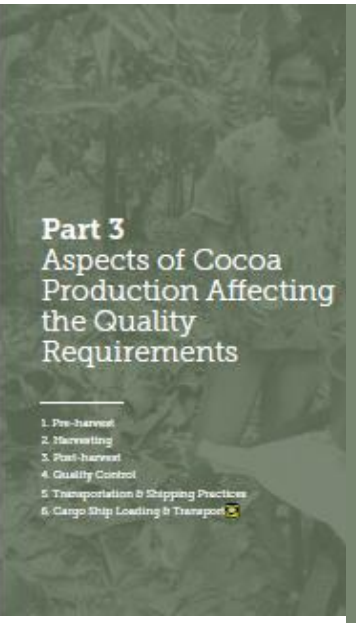

Exposure to smoke during drying.

Photos: D.Sukha.

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 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.

Mouldy Beans- Using the guide to address a quality issue - GAP



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Quality testing in a warehouse at origin.

Warehouse in Europe.

Pheromone trap to monitor pest population.

Secondary mould due to excess moisture during shipping/storage.

Photos: M.Gilmour, D.Sukha.

KEY POINTS: STORAGE

- ✓ Sort and remove any defective beans.
- ✓ Identify bean lots and manage stocks carefully.
- ✓ Use new, clean bags suitable for food contact use and do not use bags which have been used for other foods such as peanuts or sesame.
- ✓ Seal bags carefully to prevent infestation.
- ✓ Stores should be clean, weatherproof and well ventilated.
- ✓ Store sacks off the ground but protected from contact with wooden pallets that have been treated with wood preservatives.
- ✓ Ensure stacks are clear of walls to allow access for inspection.
- ✓ Ensure stores are not contaminated by fuel spills, exhaust fumes or smoke.
- ✓ Monitor pest levels and if necessary, treat with approved pesticides, or fumigate as a last resort, following GAP.

Bibliography

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

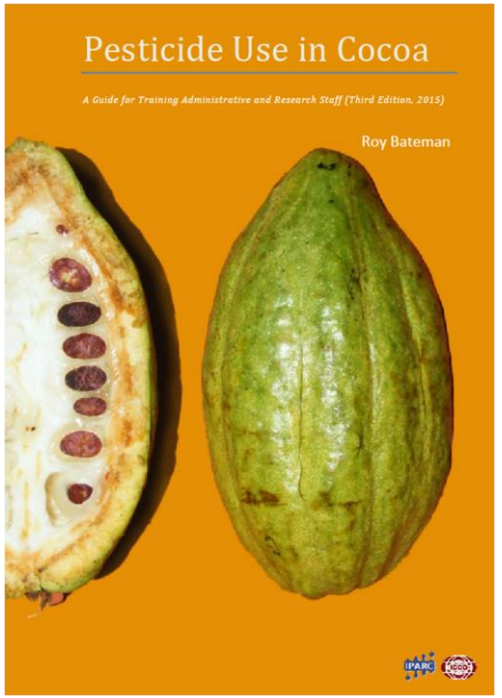
Provides weblinks to other sources of information

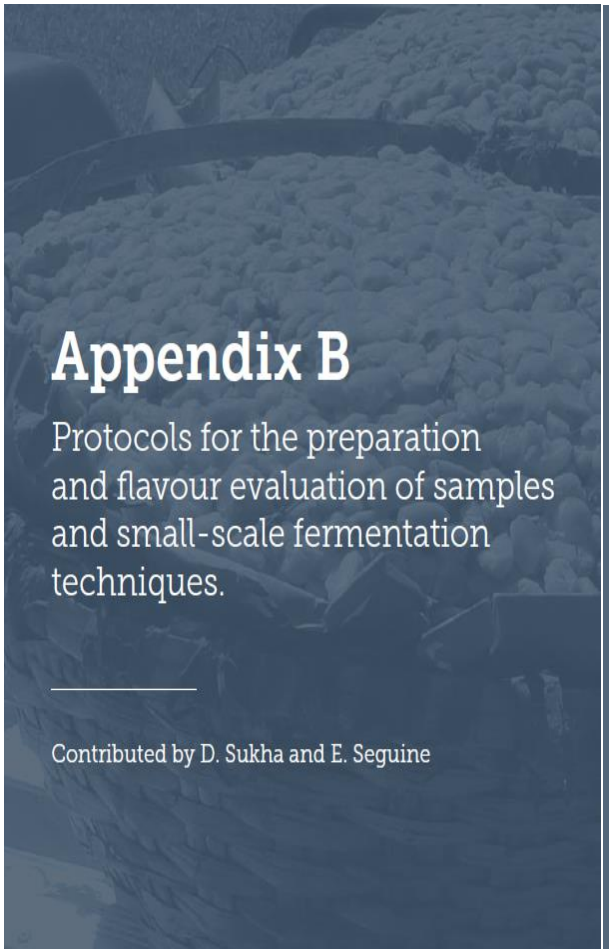
Eg.

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


Photo: S. Opoku

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

CocoaQuality.eu

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?

Thanks to:

- Food and Drink Federation of the UK (FDF) for permission to use BCCCA publication as basis for this guide
- Co-editors: Michelle End, Robin Dand, Darin Sukha & Ed Seguine
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- CAOBISCO/ECA/FCC Q&P WG contributors: ADM, Armajaro, Barry Callebaut, Cargill, Casa Luker, Cemoi, Dutch Cocoa, Ferrero, Guittard, Mars, Mondelez, Nederland, Nestlé, Olam, Storck, Touton, Valrhona

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