AFRICAN STANDARD



Cocoa beans-harvesting and handling (Code of Practice)





Reference No. ARS 2169:2025 (E) ICS 03.100.70; 67.140.30

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This African Standard was prepared by ARSO/TC 06, Coffee, cocoa, tea and related products.

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Introduction

This African standard has been developed by Technical Committee TC 06 /WG 1-Cocoa on "Cocoa and related products".

CODE OF PRACTICE FOR THE HARVESTING AND HANDLING OF COCOA BEANS

1.0 Scope

This African code of practice prescribes requirement for harvesting, fermenting, drying and storage of cocoa beans on the farm.

It does not cover warehousing and transportation of cocoa beans.

2.0 Normative References

The following referenced documents are indispensable for the application of this code of practice.

ARS 1000-2 Standard for Cocoa Beans

3. Terms and Definitions

3.1 Contaminated bean

cocoa bean which is contaminated by odours or flavours, or by dust from other products such as other foods, or by products such as oil, cement and tar.

3.2 Cocoa bean

whole seed of Theobroma cacao L which has been fermented and dried,

3.3 Cleaning

removal of soil, food residues, dirt, grease or other objectionable matter

3.4 Drying

reduction of moisture content of fermented cocoa beans to a level that is safe for storage and shipment.

3.5 Dry cocoa bean

commercial term designating cocoa beans which have been evenly dried throughout.

3.6 Defective beans

cocoa beans which are internally mouldy, <u>slaty</u>, insect-damaged, or insect infested.

3.7 Double beans

two beans fused together which can or cannot be separated by hand.

3.8 Fermented bean

cocoa bean which has been fermented for 6 days, the colour of the cotyledons ranging from partly purple and partly brown to a fully brown colour as shown by the cut test.

3.9 Foreign matter

Any material or particle other than Cocoa bean and cocoa bean wastes (broken beans, fragments and pieces of shell).

3.10 Fragment

piece of cocoa bean equal to or less than half the original bean

3.11 Germinated bean

cocoa bean of which the shell has been pierced, slit or broken by the growth of the seed germ.

3.12 Insect-damaged / infested bean

cocoa bean that have internal part which contains insect at any stage of development or have been attacked by insects which have caused damaged visible to the naked eye.

3.13 Mouldy bean

mould growth on the cotyledon cocoa bean which is visible to the naked eye..

3.14 Slaty bean

cocoa bean which shows a grey or purple colour on half or more of the surface exposed by the cut test

3.15 Storage

the action or method of keeping well fermented and dried cocoa beans for future use

4.0 Processing

Processing of cocoa should involve pod harvesting, pod breaking and removal of seed, fermentation of cocoa beans, drying and sorting.

4.1 Pod harvesting

- **4.1.1** From pollination, cocoa pods form, mature and ripen between 160 to 180 days. The pods should be harvested at approximately 75% ripeness to avoid loss of the mucilage which is the source of sugar needed during the fermentation process.
- **4.1.2** Unripe pods should not be harvested. Beans of unripe cocoa pods contribute to defects such as 'slaty' beans.
- **4.1.3** A machete or bolo, pruning shear or cacao hook on a stick should be used to remove the pods from the tree. These tools should be designed taking into consideration hygienic cleaning and disinfection (i.e. use of hot water or chlorine compound). They should be cleaned by washing with water, application of detergent, rinsing with water and submerging in sanitizing solution as appropriate.

- **4.1.4** The tools should be sharpened regularly.
- **4.1.5** Harvesting should be done every week during peak season and every two weeks for non-peak season.
- **4.1.6** Harvested pods should be stored for 5-7 days in a shaded area. Diseased pods should be separated from healthy pods right in the field to avoid contamination during transport and storage.
- **4.1.7** Care should be taken not to damage, wound or cut the pods while it is removed from the tree. Damage can lead to fungal infection of the tree and ochratoxin contamination of the bean.
- **4.1.8** Wounded pods should not be stored.
- **4.1.9** Flower cushions should not be damaged to allow for continuous production of pods.

4.1.10 Diseased, rotten pods should be removed every week using a machete, bolo, or pruning shear, to avoid the spread of fungi to healthy trees.

4.2 Pod breaking and removal of seeds

- **4.2.1** Pod breaking should be done on the cocoa farm immediately after harvesting.
- **4.2.2** A baton or pod splitter should be used to break the pods.
- **4.2.3** Care should be taken during pod breaking not to damage the seeds and allow contamination by moulds or entry of insects. The pod knife should be at most 1 cm wide to avoid damaging the bean.
- **4.2.4** The baton or pod splitter should be designed taking into consideration hygienic cleaning and disinfection. It should be regularly cleaned and disinfected by washing with water, application of detergent, rinsing with water and submerging in sanitizing solution as appropriate.
- **4.2.5** Removal of seeds or wet beans attached to the placenta should be done by using a scooping tool/scooper. Likewise, seeds should be separated to avoid clustering.
- **4.2.6** Damaged seeds like black beans and insect-damaged beans should be discarded. Scooped beans should be placed in a suitable container (*i.e.* plastic bin to drain liquid for 16-18 hours) and should not be placed on the ground.
- **4.2.7** The collectors of the 'wet beans' should put a label in each batch of beans collected from specific farmer for traceability purposes.

4.3 Fermentation of cocoa beans

Fermentation of cocoa beans normally takes 3-6 days. Factors that influence fermentation include ripeness of the pods, quantity of beans, type of cocoa and duration of fermentation. Fermentation is assessed by the odour, and external and internal colour of the beans.

- **4.3.1** Cocoa beans should be fermented in fermentation boxes, or in perforated baskets if in small quantities.
- **4.3.2** Design of fermentation structure, materials or area should take into consideration drainage of fermentation drippings, ease of turning and air circulation (i.e. slated floors, perforations, etc.).
- **4.3.3** Fermentation boxes or baskets should be covered to avoid loss of heat and prevent contamination from the air.
- **4.3.4** Materials used for fermentation should be regularly cleaned after each use. Baskets or boxes should be elevated from the ground to avoid contamination from the floor.
- **4.3.5** Cocoa beans should be turned 48 hours after loading in the fermentation boxes or baskets. The temperature during this period should be maintained between 38°C to 39 °C. The process of turning ensures uniform heating of the beans, allows air to circulate, breaks lumps and prevents formation of moulds in the beans. Without the turning process, the beans will be improperly fermented, mouldy and will produce off odours.
- **4.3.6** Care should also be taken to prevent the cocoa beans from getting in contact with water during the fermentation process by placing a suitable cover on the fermentation boxes. The cocoa beans should remain in the boxes/baskets for the next three (3) days and the temperature should be maintained between 45°C to 50 °C. Temperature lower than 45 °C will result in inadequately fermented cocoa bean.
- **4.3.7** Turning of beans in fermentation boxes should be done with a paddle or shovel, while beans in baskets should be done using hand gloves to prevent direct contact of the seeds with the hands. Equipment, such as shovel or paddle used to do manual turning should be cleaned on a regular basis.

4.4. Drying of cocoa beans

Cocoa beans should be dried to appropriate moisture level as specified in the relevant **ARS** 1000-2 standard for cocoa beans. The first day of drying is the full-term fermentation of the cocoa beans. The beans will only develop the right brown colour inside if they are properly fermented and dried.

- **4.4.1** Cocoa beans should be sun dried or dried through artificial means.
- **4.4.2** Sun drying should be done on elevated drying beds or in solar dryers to avoid contamination from the ground.

- **4.4.3** While on the drying bed, beans should be turned several times each day to ensure uniform drying.
- **4.4.4** The dryers should be covered with clear UV plastic or with a screen to prevent contamination from the air. Rapid drying causes the beans to retain excessive amounts of acetic acid which results in a sour taste. Excessive drying causes off flavours. Insufficient drying results in mouldy beans.
- **4.4.5** Drying facilities and equipment should be designed taking into consideration hygienic cleaning and possible disinfection. Drying equipment and materials should be cleaned and disinfected after each batch and should be dedicated only to the drying operation and not used for any other purposes.

4.5. Sorting

Cocoa beans should be sorted by grade. During sorting, flat, slaty, black, mouldy, and , insect-damaged beans should be removed.

- **4.5.1** During sorting personnel should wear protective clothing and footwear.
- **4.5.2** Manual sorting to remove defective beans should be done with hands properly washed and using hand gloves to prevent direct contact of the dried cocoa beans with the hands.
- **4.5.3** Equipment and materials used for sorting and grading should be cleaned after each operation.

5.0 Storage

Once the drying and sorting processes have been completed, the cocoa beans should be placed in appropriate bags and stored.

Bags of cocoa should be stored on raised platforms to prevent mouldiness.

 Cocoa beans are sensitive to foreign flavours; therefore, it should not be stored in old sacks earlier used for maize or other foodstuffs. It should not also be stored near tobacco, , or other foodstuffs such as maize, to prevent insect attack such as weevils. It should not also be stored in a smoky area to avoid smoky beans.

6.0 Documentation and records

Records of production, processing and distribution should be kept to facilitate traceability. The appropriate period should be longer than the shelf life of the dried cocoa (i.e. shelf life of cocoa beans + 6 months)

Farmers should keep up-to-date comprehensive records of all farming activities.

Records should be kept on the:

- Types, varieties and sources of planting materials;
- Types of pesticides and fertilizers and usage;
- Production site with lot codes;
- Suppliers of agricultural inputs;
- · Lot number of agricultural inputs;
- Water management practices;
- Use of agricultural chemicals;
- Water quality and safety; and
- Pest control and cleaning schedules of premises, facilities, equipment and containers.

Personnel involved in the fermentation and drying operations should keep current records on all relevant information on each lot:

- incoming materials (growers, lot numbers);
- Fermentation and drying data (batch code, temperature and time of fermentation,

physico- chemical analysis, etc.);

- Storage temperatures; and
- cleaning schedules for premises, facilities, equipment and containers.
- · The conditions under which the cocoa will be stored

BIBLIOGRAPHY

- 1. Code of practice for Phillipine cocoa beans.
- D.O Oke and K.F Omotayo(2011).Effect of forced air, artificial intermittent drying on cocoa beans in South western Nigeria. Academic journals.org, pg 1-5