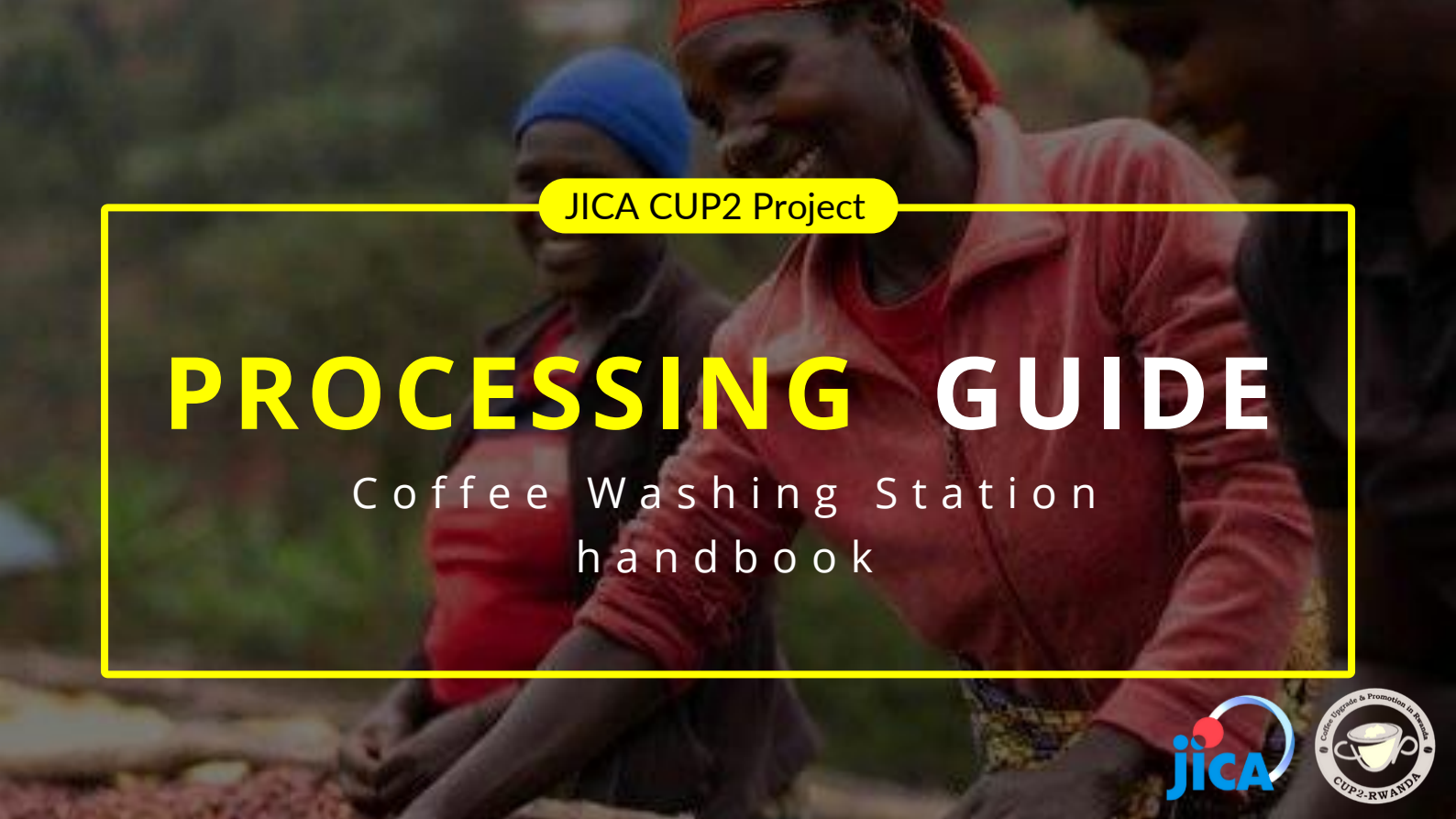


JICA CUP2 Project

PROCESSING GUIDE

Coffee Washing Station handbook

Contents

This guide introduces

Fully washed (Dry fermentation)

Glossary (English)

Traceability:
ability to track a coffee's journey from the farm to the final consumer, including all processing and handling steps
In-fruit fermentation:
a processing method where coffee cherries are fermented without removing the fruit skin or pulp, allowing natural microbes to act on the whole fruit.
Dry fermentation:
a method where coffee is fermented without adding water, allowing natural microbes to break down the mucilage in a dry or low-moisture environment.
Anaerobic:
without the presence of oxygen.
Aerobic:
in the presence of oxygen.
Encapsulation:
uneven drying due to direct sunlight causing the outer surface of the coffee beans to dry too quickly.

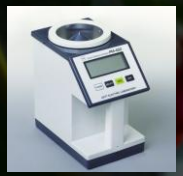
pH:
a scale that measures how acidic or basic a liquid is, ranging from 0 (acidic) to 14 (basic).
Nitrogen (N):
an essential nutrient in coffee production that supports healthy plant growth and improves yield
P (Phosphoros):
a vital nutrient in coffee production that promotes root development and flowering for better crop yield.
K (Potassium):
an important nutrient in coffee production that helps strengthen plants, improve drought resistance, and enhance bean quality.
Ventilation:
movement of air into and out of a space to ensure proper airflow, fresh air supply, and removal of heat, moisture, or contaminants.

List of tools and equipment

Cherry paddle:
a simple tool used to check the ripeness or density of coffee cherries, often by stirring cherries in water to observe their floatability during sorting.

Brix meter:
a measuring device used to determine the sugar content (°Brix) of coffee cherries, juice, or mucilage, often used to assess cherry ripeness and fermentation potential.

Moisture meter:
a measuring device used to determine the moisture content of coffee parchment or green beans, helping ensure proper drying and safe storage.



pH meter:
a handheld device used to measure the acidity or alkalinity (pH level) of coffee-related materials such as fermentation water, coffee pulp, or mucilage during processing.

Air-tight tank:
a sealed container designed to prevent air from entering, used in coffee processing to maintain anaerobic conditions and control fermentation.

GrainPro bag:
a hermetic bag used to ferment coffee cherries or parchment in an oxygen-limited environment, helping create controlled anaerobic conditions and enhance flavor development.

How and Why We Use Those Tools and Equipment

Using the right tools at each stage of coffee processing helps ensure consistent quality, better decision-making, and reduced risk of defects. The tools below are used to objectively assess cherry quality, control fermentation, and protect coffee during drying and storage.

Cherry paddle:

WHY: Used to check cherry quality during sorting.
STEP1: Randomly select 100 cherries from the bag and place them on the cherry paddle.
STEP2: Define the acceptable color range for ripe cherries.
STEP3: Count the number of ripe cherries based on this color range and calculate the percentage out of 100.
STEP4: The average percentage of ripe cherries collected from farmers must be above 70%.

STEP1

STEP2

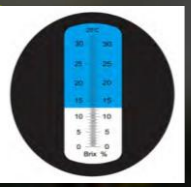
STEP3&4

Brix meter:

WHY: Used to check cherry ripeness and fermentation potential by measuring sugar content.
STEP1: Randomly pick 3 collected coffee cherries.
STEP2: Place a few drops of the juice on the Brix meter sensor.
STEP3: Read and record the °Brix value.
STEP4: Use the average result to decide the processing method and fermentation time.

STEP1&2

STEP3&4



How and Why We Use Those Tools and Equipment

Using the right tools at each stage of coffee processing helps ensure consistent quality, better decision-making, and reduced risk of defects. The tools below are used to objectively assess cherry quality, control fermentation, and protect coffee during drying and storage.

Moisture meter:

WHY: Used to check moisture content to ensure proper drying and safe storage
STEP1: Set the mode according to what you check (parchment, dried cherry or green coffee)
STEP2: Take a small sample of parchment, dried cherry or green coffee.
STEP3: Measure the moisture content using the moisture meter.
STEP4: Read and record the moisture percentage.
STEP5: If moisture is too high, continue drying. If it is within the target range, move the coffee to storage.

STEP1

STEP2

STEP3&4&5

pH meter:

WHY: Used to monitor acidity during fermentation.
STEP1: Check if it is calibrated or not with water. It must show around pH 7.0.
STEP2: Collect a sample of fermentation water, mucilage, or juice.
STEP3: Place the pH meter probe into the sample.
STEP4: Read and record the pH value.
STEP5: If pH drops too fast or too low, stop or adjust fermentation.

STEP1

STEP2&3

STEP4&5

How and Why We Use Those Tools and Equipment

Using the right tools at each stage of coffee processing helps ensure consistent quality, better decision-making, and reduced risk of defects. The tools below are used to objectively assess cherry quality, control fermentation, and protect coffee during drying and storage.

Air-tight tank:

WHY: Used to control fermentation by limiting air exposure to create an anaerobic condition.
STEP1: Clean the tank to avoid any contamination.
STEP2: Put coffee cherries or parchment into the tank.
STEP3: Seal the tank tightly to prevent air from entering.
STEP4: Use an S-hook to check whether anaerobic fermentation is occurring.
STEP5: Allow the coffee to ferment for the planned time.
STEP6: Open the tank and check pH to see if fermentation is well done as planned.

STEP1

STEP2

STEP3&4&5

STEP6

GrainPro bag:

WHY: Used to control fermentation by limiting air and protecting coffee quality.
STEP1: Put coffee cherries or parchment into the GrainPro bag.
STEP2: Remove excess air and seal the bag tightly.
STEP3: Store the sealed bag in a clean, shaded place.
STEP4: Allow the coffee to ferment for the planned time.
STEP5: Open the bag and continue processing or check quality (smell, pH, condition).

STEP1

STEP2

STEP3&4

STEP5

Check points before processing

Check points	Indicators	Rationale
Soil management 	• **pH**: Good nutrient absorption rate (5.0-6.0) • **N**: Essential for photosynthesis • **P**: Healthy root systems and flowering • **K**: Bean filling and overall cup quality	 Good soil ↓ Good cherries ↓ Good flavors
Water / hygiene 	• **Colour**: clean and transparent • **pH**: if clean, pH should be around 7.0 • **Frequency of cleaning**: Everyday machines must be cleaned before use	 Poor water ↓ Contamination and off-flavors
Traceability 	• Use **a check book** and **traceability tag** ○ Origin of coffee cherries ○ Processing method ○ Grade and weight ○ Collection date ○ Fermentation and drying period	 No traceability ↓ Improper processing and marketing

Various coffee processing methods

	1	2	3	4	5	6
Name	Fully washed (normal)	Fully washed (with in-fruit fermentation)	Honey	Anaerobic Honey	Natural	Anaerobic Natural
Image						
Feature	•Most common •Easy to control •Clean cup	•Easy to control •Clean cup	•Moderately sweet •Fruity note	•Anaerobic •Fruity notes like white grape	•No pulping needed •Sweet, complex •Winey	•Anaerobic •Tropical fruits
Process	Harvesting	Harvesting	Harvesting	Harvesting	Harvesting	Harvesting
	Sorting	Sorting	Sorting	Sorting	Sorting	Sorting
	Pulping	In-fruit fermentation	In-fruit fermentation	Pulping		
	Dry fermentation	Pulping	Pulping	Anaerobic fermentation		Anaerobic fermentation
	Washing & Grading	Dry fermentation				
	Pre-drying	Washing & Grading		Pre-drying	Pre-drying	Pre-drying
	Drying	Pre-drying	Drying	Drying	Drying	Drying
	Storage	Drying	Storage	Storage	Storage	Storage
		Storage				

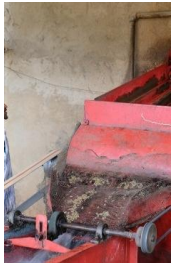
1. Fully washed – Normal

Advantage of the process	• Reduced risk of defect contamination compared to the traditional Natural process • Shorter drying times • Greater uniformity in cup profile
Recommended conditions	1. Sugar contents >18.0 2. Clean water and fermentation tank 3. Calibrated pulping machine

Steps

1	2	3	4	5	6	7	8
Harvesting	Sorting	Pulping	Dry fermentation	Washing & grading	Pre-drying	Drying	Storage
DAY 1			DAY 2		DAY 2-3	DAY 4- (for 14-18days)	-








1. Fully washed – Normal

Step 1: Harvesting

Purpose: Ripe cherries have good sugar and acidity to create flavors

Recommended equipment

Use **a container** of cherries during harvesting to easily collect cherries

Use **a plastic sheet under the tree** to collect any falling cherry.

Use **clean bags** to hold cherry during harvesting

Key concept

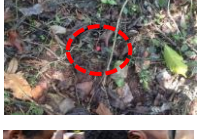
① Harvest **only well-ripen cherries**

Because well-ripen cherries are heavier

Weight	70kg	100kg
Farmgate price	700rwf	700rwf
Total income	49,000rwf	70,000rwf

②Start to harvest in **the morning**.

③Deliver cherries to the station **within 8 hours** after harvest



④Do **not** pick cherries **on the ground** to avoid **contamination**

⑤Put coffee **under shade** after harvesting to avoid rapid fermentation

1. Fully washed – Normal

Step 2: Sorting – color sorting

Purpose: Classify cherries – Ripen / unripen / overripen

Checking point ①

95% of cherries are **well ripen**

Checking point ②

Sugar contents: above 18.0

1. Fully washed – Normal

Step 2: Sorting –water sorting

Purpose: float off defective cherries

Equipment

Use **a water tank or basket** to float cherries

Key concept

① Check **colors** by hand

② Check **density by water**

** very light cherries are to be removed*

Checking points

① **95%** of cherries show **"well ripen"**

② Floaters: should be **below 10%**

1. Fully washed – Normal

Step 3: Pulping

Purpose: remove the cherry skin while preserving the beans

Equipment

Use **a pulping machine**

Use **a clean fermentation tank** to collect parchments

Key concept

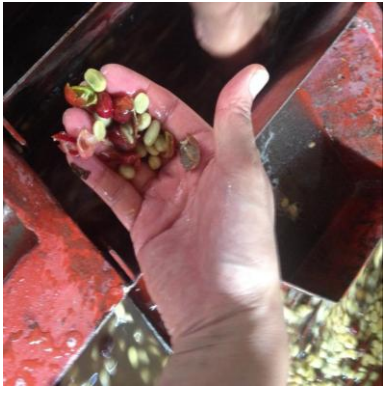
① Use **clean water to pulp.** Avoid contamination!

② **Adjust a blade, amount of cherry and flow speed** to avoid damage on parchments.

③ **Clean the machine everyday** to avoid contamination.

Checking point

Take 100 parchments and check if it's below 10% of damage beans, below 10% of unpulped cherries



1. Fully washed – Normal

Step 4: Fermentation

Purpose: remove the remaining mucilage and develop desired flavors

Equipment

- Use **a clean fermentation tank** to ferment parchments
- Use **clean water** when washing out mucilage

- Use **a pH meter** to check if fermentation is completed.

Key concept

① **Length of fermentation**: Temperature affects fermentation speed. It can be shorter in dry season and be longer in rainy season. Normally, it takes between **12-18 hours**.

② **Open-air condition**: Tank is left uncovered to **expose the parchments to air.**

**If it is very cold, you may be advised to cover the tank to facilitate fermentation.*

Checking point

① **Smell:** Avoid sour or vinegary aroma.

② **Texture:** Check if mucilage is detached from parchments.

③ **pH**: Use a pH meter and check if it falls to **4.0-4.5*** by the end of fermentation.

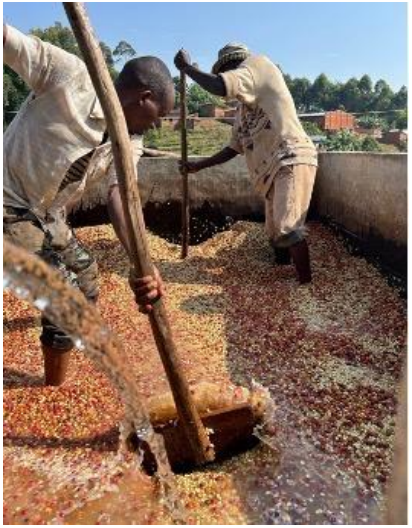
**Though you can adjust depending on buyers' demand*

1. Fully washed – Normal

Step 5: Washing and Grading

Purpose: wash off remaining mucilage and grade parchment by density

Equipment



Use **a wooden rake** for washing

Key concept

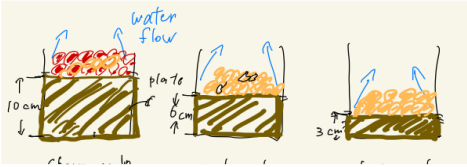
① Check **by texture** that mucilage is all removed.

② **Maintain the grading canal clean** to avoid contamination.

③ Make **a clear segregation for the different grades** (A1 / A2 / floaters) by the height of wooden plates in the canal.

Checking point

① Control quality by **changing the height of the plate** for each grade (10cm: A1 / 6cm: A2 / 3cm: floaters & pulps)



② **Over 75%** should be **A1 grade**

1. Fully washed – Normal

Step 6: Pre-drying (36-48 hours)

Purpose: remove lower-quality beans

Equipment

Covered drying beds

Key concept

① Place parchments **under shade** to sort bad parchments before getting them dry.

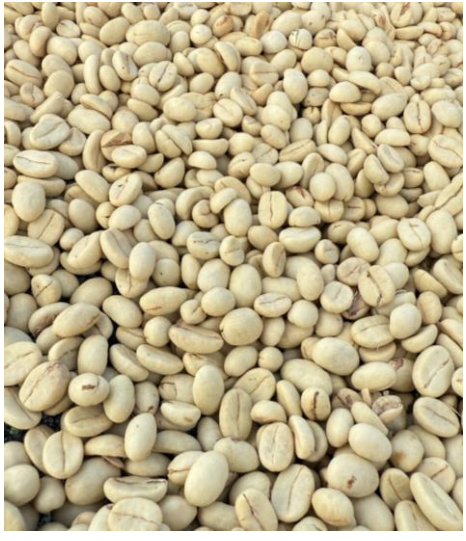
② Sort and rest parchments **for 36-48 hours** after washing. Parchments must rest well before sun-dry.

③ Set the **target colors of the defects** to sort:

- **Green** (Immature)
- **White** (floaters)
- **Black/insect damaged beans**
- **Broken/Chips/Cut** (pulping machine)

Checking point

Defects are **100% removed**



1. Fully washed – Normal

Step 7: Drying

Purpose: reduce moisture content and prepare for proper storage

Equipment

A shade net to avoid strong heat.

A plastic sheet to avoid rain and dew.

A moisture meter to check moisture.

**Moisture meter must be calibrated before use*

Key concept

① **Control temperature:** **Use a shade net** to cover from **11:00-15:00** to avoid strong heat.

② **Control humidity:** Cover parchments with **a plastic sheet** to avoid rain and dew.

③ **Resting:** 1 day in a week, **cover parchment completely for resting.**

④ **Uniformity:**

- **Stirring 4 times a day** by hand to keep equal sunshine.
- **Thickness** of the layer: **3cm (first week) -> 5-7cm**

Checking point

① **Moisture contents:** Aim for **11.5-12.0%** for best condition. Check with moisture testers twice a day.

② **Duration: 14-18 days**. The drying process must be carefully controlled to avoid rapid or uneven drying.

③ **Parchment temperature**: The temperature should be always **kept below 35°C** to prevent embryo damage.

1. Fully washed – Normal

Step 8: Storage

Purpose: stabilize beans post-drying for export or milling

Equipment

Use pallets to avoid damage

Key concept

① **Moisture control (MC):** Maintain the bean moisture content at **10-12%**

**Adjust the MC if storage is either very hot or very humid*

② **Ventilation:** Control consistent **air flow** to avoid dew and high humidity

Checking point

① **Temperature:** Keep temparature **at 15–23℃** to avoid damage

② **Humidity:** Keep humidity **at 50-70%** to avoid mold

③ **Resting:** Beans should rest for **around 2 months** to stabilize MC

Appendix A: Lot management sheet (example)

Lot management sheet

CWS: _____ Name:_____

-Receiving date: dd/mm/yyyy

-Process method: FW / HN / NR / Other (____)

-Certificate: _____

-Lot name: _____

-Main area: _____

-Fermentation: _____hours (From____:____ to ____:____)

-Soaking: _____hours (From____:____ to ____:____)

-Grade: A1 / A2 / A3 / Triage

-Drying start date: dd/mm/yyyy

-Drying end date: dd/mm/yyyy

-Moisture content: _____%

-Final weight: _____kg

Weight
kg

CWS: *the name of the coffee washing station where the coffee lot is received and processed.*

Receiving date: *the exact date when coffee cherries are delivered to the washing station.*

Process method: *the processing method applied to the lot (e.g. Fully Washed, Honey, Natural, or other specified methods).*

Certificate: *the certification status associated with the lot, if any (e.g. Organic, Fairtrade, Rainforest Alliance).*

Lot name: *the unique identification name or code assigned to the lot for traceability.*

Main area: *the main origin of the coffee cherries, such as the sector, cell, or village where they were harvested.*

Fermentation: *the total fermentation duration in hours, including the exact start and end time.*

Soaking: *the soaking duration in clean water after fermentation, including the start and end time.*

Drying start/end date: *the dates when drying begins and ends, indicating the total drying period.*

Moisture content: *the final moisture level (%) of the coffee after drying, measured before storage or milling.*