SAMPLE DOCUMENTATION

PRODUCTION OF DAIRY PRODUCTS IN FOOD SERVICE ESTABLISHMENTS

BRITISH COLUMBIA Ministry of Health

Updated September 2022

Production of Yogurt in Food Service Establishment

Yogurt (also spelled yoghurt, yogourt) is produced by bacterial fermentation of milk. Cow's milk is most commonly used however, milk from water buffalo, goats, ewes, mares, camels, yaks and plant milks are also used to produce yogurt.

Yogurt is produced using a culture of *Lactobacillus delbrueckii* subsp.*bulgaricus* and *Streptococcus thermophilus* bacteria. In addition, other lactobacilli and bifidobacteria are sometimes added during or after culturing yogurt. The butterfat of yogurt depends on the fat content of the milk used and ranges between 2 to 6 % butterfat.

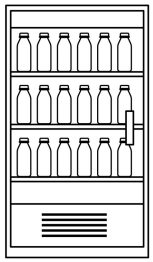
STANDARD RECIPE

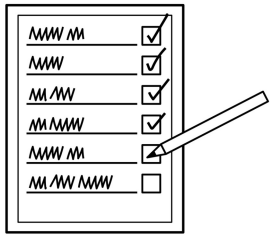
10 Litres of pasteurized milk
250 g skim milk powder (about 1 1/3 cups)
Bacterial culture (follow manufacturers instructions)

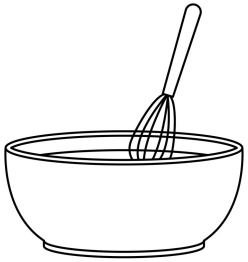
Equipment List

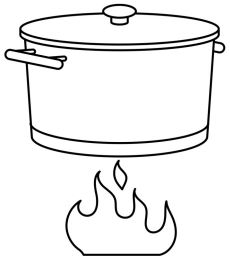
Measuring cups	Long handled metal spoon	Milk Boiler	Thermometer
Scale	Incubator	Colander	Cheese cloth
Catch bowl for whey			

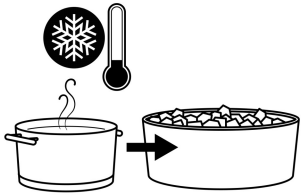
PROCESS BASED FOOD SAFETY PLAN

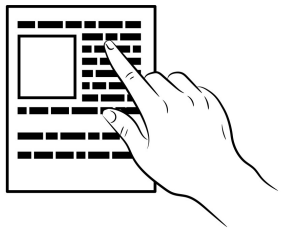
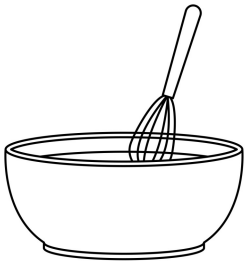
Step #	Process Step	Potential Hazards	Instructions and Outcomes
1	Purchase and refrigerate milk 	**Biological** Pathogen growth due to using product that is past best before date. Pathogen growth due to time/temperature abuse. Pathogen contamination due to condensation falling onto/into uncovered product.	• Purchase and use only pasteurized dairy ingredients from approved sources. • Keep pasteurized dairy ingredients in original commercial packaging, as purchased, until use. • Store at 4°C or colder. **Do not use products where the best before date has expired.**

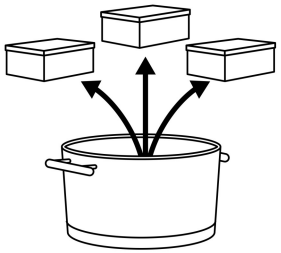
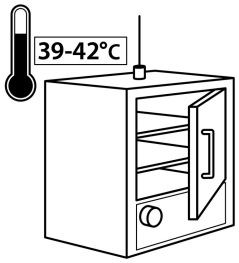
PROCESS BASED FOOD SAFETY PLAN			
Step #	**Process Step**	**Potential Hazards**	**Instructions and Outcomes**
2	Preoperational Checks 	**Biological** Pathogen growth due to time/temperature abuse. Pathogen growth due to improper storage conditions (cooler malfunction). Pathogen contamination due to incomplete sanitation procedures. Pathogen growth due to poor inventory control (use of FIFO) **Chemical** Cross contamination due to improper separation of activities. Contamination with non-food chemicals due to residual cleaners or sanitizers. Contamination with non-food chemicals due to mishandling of sanitizer spray bottlers during use or filling.	• Inspect, clean and sanitize designated work area. • Inspect equipment, utensils, and processing areas (clean and sanitized). • Use written recipe each time you make the product to ensure consistency of measurements and that all steps in the production process are followed. • Label the sanitizer spray bottles to indicate the content (non-food chemical).
3	Stage Ingredients 	**Biological** Pathogen growth due to time/temperature abuse. Pathogen contamination due to unsanitary equipment. Pathogen cross-contamination due to improper employee handling practices. **Chemical** Contamination with non-food chemicals due to residual cleaners or sanitizers. **Allergens** Allergen cross contamination due to improper separation of activities.	• Finished product attributes of cultured dairy products are determined by the total milk solids content of the recipe and heat treatment used. • The higher the butterfat in your ingredients, the thicker and creamier the end product will be. • Skim milk powder can be added to improve the consistency.

PROCESS BASED FOOD SAFETY PLAN			
Step #	**Process Step**	**Potential Hazards**	**Instructions and Outcomes**
4	Adjust Milk composition & Blend Ingredients 	**Biological** Pathogen contamination due to unsanitary equipment. Pathogen growth due to poor inventory control (use of FIFO) Pathogen contamination due to poor hygiene and improper handling by employees. Pathogen growth due to time/temperature abuse. **Chemical** Contamination with non-food chemicals due to residual cleaners or sanitizers. **Physical** Hazardous extraneous material contamination due to improper preparation of ingredients.	• Adjust milk composition to achieve the desired texture (i.e., add milk powder). See appendix for instructions of how to standardize milk using Pearson Square Method. • Blend milk ingredients and begin the heating step. • Slowly add dry ingredients to warm milk and cream portion of mix using a whisk. Ensure all ingredients are incorporated and continue heating.

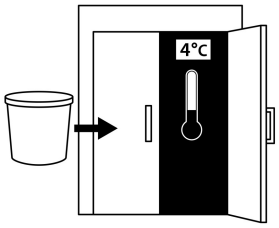
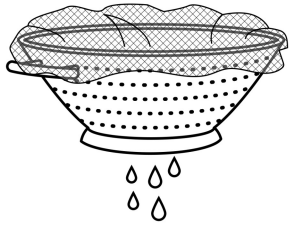
PROCESS BASED FOOD SAFETY PLAN			
Step #	**Process Step**	**Potential Hazards**	**Instructions and Outcomes**
5	Heat milk (optional)/Warm milk to inoculation temperature 	**Biological** Pathogen growth due to time/temperature abuse (too slow heating rate, incorrectly calibrated thermometer). **Chemical** Contamination with non-food chemicals due to residual cleaners or sanitizers. Contamination with non-food chemicals due to incomplete sanitation procedures. **Allergens** Contamination by allergens due to improper separation of activities. **Physical** Hazardous extraneous material contamination due to poor hygiene and improper handling by employees.	• The optimum growth temperature for the bacterial culture used in yogurt is between 37-45°C. • **Heat milk** to desired temperature as per your recipe (reach temperature within 1 hour). Example: heat to 85°C for 30 minutes or 95°C for 10 minutes. • Stir constantly to avoid burning the milk. There are milk cookers/boilers available in the market and they usually have an indicator that tells a person when the milk has boiled but does not allow the milk to overspill from the pot. **OR** • **Warm milk** up to inoculation temperature (reach temperature within 1 hour). Example: heat to 40°- 45°C (refer to starter culture requirements). *Heat is used to denature whey proteins to allow for the formation of a stable gel structure in the yogurt. Heating the milk also reduces spoilage organisms in the milk to reduce unwanted competition with the bacterial culture.* **Check temperature with clean and sanitized probe thermometer**

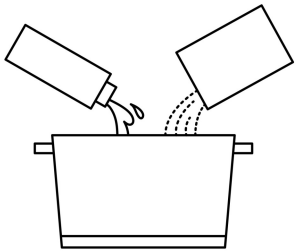
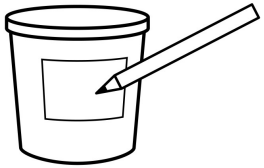
PROCESS BASED FOOD SAFETY PLAN			
Step #	**Process Step**	**Potential Hazards**	**Instructions and Outcomes**
6	Cool Milk to inoculation temperature (if milk was heated) 	**Biological** Pathogen growth due to time/temperature abuse (too slow cooling rate, incorrectly calibratred thermometer). Pathogen contamination and growth due to poor hygiene and improper handling by employees. Pathogen contamination due to uncovered or unsealed containers (improper packaging). **Physical** Hazardous extraneous material contamination due to uncovered or unsealed containers (improper packaging).	**CRITICAL CONTROL POINT (CCP1B)** • Cool down quickly to incubation temperature (reach temperature within 1 hour). • Cool the pot in a sink with cold water or ice bath. Example: cool to 37-45°C (refer to bacterial culture manufacturer for exact incubation temperature requirements) • Prolonged cooling time may allow for the growth of undesirable microorganisms (for example, spore formers naturally present in the milk). • Measure pH of milk. Hygienically remove a sample of cooled milk and measure the pH. This is your starting pH for the batch. • Discard milk sample after testing. **Corrective Action:** Discard milk if time limit has not been met. Document on batch sheet or production logbook.

PROCESS BASED FOOD SAFETY PLAN			
Step #	**Process Step**	**Potential Hazards**	**Instructions and Outcomes**
7	Prepare Bacterial Culture 	**Biological** Pathogen contamination due to poor hygiene and improper handling by employees. Pathogen contamination due to unsanitary equipment. **Chemical** Contamination with non-food chemicals due to residual cleaners or sanitizers. **Allergens** Allergen cross contamination due to improper employee handling practices.	• Use only approved commercial starter culture for yogurt. Check that culture is still within the expiry date. • Follow the manufacturer's instructions for usage rate and incubation requirements. • Hygienically measure out the required amount of starter culture from the culture package. • Hygienically close the culture package and return to storage. For foil packages, use an alcohol wipe (~60% alcohol content) to sanitize the outside of the package before sealing up. Place the package in a clean, food-grade re-sealable bag or container and store container as per the manufacturer's instructions. **Previous batches of yogurt or yogurt from other manufacturers are not approved for use as a bacterial culture.**
8	Add Bacterial Culture (inoculate) 	**Biological** Pathogen contamination due to mixing culture with contaminated dairy ingredient. Pathogen contamination due to poor hygiene and improper handling by employees. Pathogen contamination due to unsanitary equipment. **Chemical** Contamination with non-food chemicals due to residual cleaners or sanitizers. **Allergens** Presence of allergens due to improper separation of activities.	• Sprinkle the starter culture directly into the processing container or premix the culture with a small volume of milk before adding to the processing container. • For the premix method, hygienically remove a small volume of cooled milk and mix in the starter culture. When the culture is dispersed, pour the mix back into the processing container. • Mix gently and thoroughly to disperse the culture.

PROCESS BASED FOOD SAFETY PLAN			
Step #	**Process Step**	**Potential Hazards**	**Instructions and Outcomes**
9	Transfer to containers (if producing container set product) 	**Biological** Pathogen growth due to time/temperature abuse. Pathogen contamination due to use of non food grade, damaged or unclean containers (new or used). **Chemical** Contamination with non-food chemicals due to use of non food grade packaging material **Allergens** Allergen cross contamination due to unsanitary equipment. **Physical** Hazardous extraneous material contamination due to dirt and debris falling into uncovered product.	• Hygienically transfer inoculated milk to food grade containers with lids. • If re-using containers, ensure they are cleaned, sanitized, and approved for multi-use.
10	Incubate/Ferment 	**Biological** Incomplete acidity development due to improper incubation procedure. Pathogen growth due to improper incubation temperature. Pathogen contamination due to uncovered or unsealed containers (improper packaging). **Physical** Hazardous extraneous material contamination due to uncovered or unsealed containers (improper packaging).	• Keep processing container covered and move to incubator. • After 1 hour, hygienically remove a sample of "yogurt" and measure the pH. Compare the reading to the milk pH taken at step 5. • A pH drop (decrease in pH) of at least 0.1 units indicates that the fermentation has started. • Record on batch report. • Discard the sample after testing the pH. **Corrective Action:** • If the pH has not changed, retest pH after 30 minutes. If the second pH test fails to show a pH drop, there is a problem with the batch. Discard the product and start again. **Wash and sanitize all utensils, containers and equipment before re-using them. Report on batch report.**

PROCESS BASED FOOD SAFETY PLAN			
Step #	**Process Step**	**Potential Hazards**	**Instructions and Outcomes**
11	Reach end point pH	**Biological** Pathogen growth due to failure of culture/culture that is past code/inactive cultures. Incomplete acidity development due to improper incubation procedure. Pathogen growth due to time/temperature abuse. Pathogen contamination due to improper employee handling practices. Pathogen contamination due to unsanitary equipment. **Allergens** Allergen cross contamination due to improper employee handling practices.	**CRITICAL CONTROL POINT (CCP2B)** • **Endpoint pH ≤4.6 or lower within 2 hours of the expected incubation time.** • Check the product pH at the expected completion time for the fermentation stage **Important: The normal fermentation time is specific to your process and must be established during your product development.** • If the target pH has not been reached, continue incubating and recheck the pH after 1 hour. **Corrective Action:** • If the end point pH (pH 4.6 or lower) has not been reached after 2 hours past the expected incubation time, there is a problem with the batch and it must be discarded. **Wash and sanitize all utensils, containers, and equipment before re-using them. Document on batch sheet or production logbook.**

PROCESS BASED FOOD SAFETY PLAN			
Step #	**Process Step**	**Potential Hazards**	**Instructions and Outcomes**
12	Break set/Cool 	**Biological** Pathogen growth due to time/temperature abuse (too slow cooling rate, incorrectly calibratred thermometer). Pathogen growth due to improper storage conditions (cooler malfunction). Pathogen growth due to poor inventory control (use of FIFO) Pathogen contamination due to unsanitary equipment. Pathogen contamination due to poor hygiene and improper handling by employees. **Chemical** Contamination with non-food chemicals due to residual cleaners or sanitizers.	**CRITICAL CONTROL POINT (CCP3B)** • Cool to 4°C to stop the fermentation process. • Ensure proper cooling rate Cool to 4°C to stop the fermentation process. Cool down to 20°C within 2 hours, and 20°C to 4°C within 4 hours. Total cooling time not to exceed 6 hours. • Record on Batch Report.
13	Strain (if applicable) 	**Biological** Pathogen growth due to time/temperature abuse (process step not done in cooler). Pathogen contamination due to condensation falling onto/into uncovered product. Pathogen contamination due to poor hygiene and improper handling by employees. **Physical** Hazardous extraneous material contamination due to dirt and debris falling into uncovered product.	• Strain or drain off whey using approved food grade equipment. • Straining step must be performed under refrigeration. • Removing whey will yield a thicker, more viscous product (Greek style).

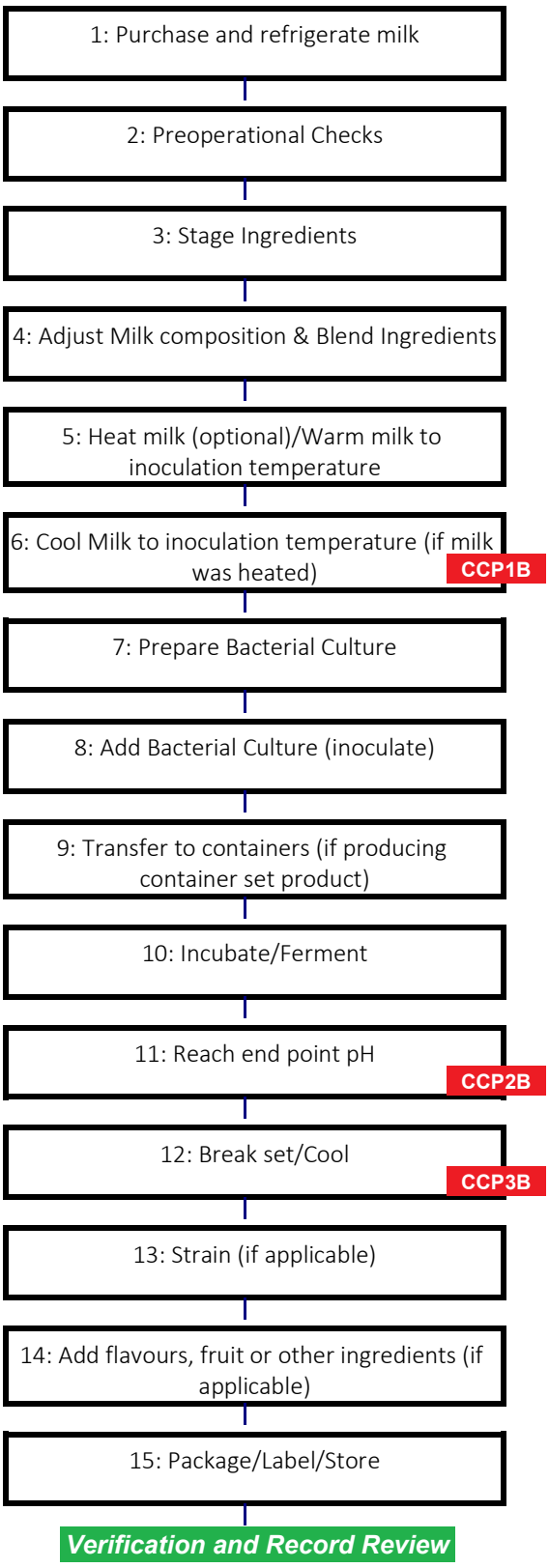
PROCESS BASED FOOD SAFETY PLAN			
Step #	**Process Step**	**Potential Hazards**	**Instructions and Outcomes**
14	Add flavours, fruit or other ingredients (if applicable) 	**Biological** Pathogen contamination due to poor hygiene and improper handling by employees. Pathogen contamination due to using flavouring ingredient that is contaminated (past code date, staged in a unhygenic manner). Pathogen contamination due to unsanitary equipment. **Allergens** Contamination by allergens due to unsanitary equipment. Allergen cross contamination due to improper separation of activities. Allergen cross contamination due to improper employee handling practices. **Physical** Hazardous extraneous material contamination due to poorly prepared (staged) flavouring ingredient (pits, nut shells, packaging)	• These ingredients can be a source of contamination and may affect the food safety and shelf life stability of the product. • Ensure flavours, fruit and other added ingredients are a low microbial risk: 1. Wash fruit 2. Use cooked fruit preparations 3. Add using sanitized supplementary utensils. • Control nut allergen cross contamination between nut ingredients (e.g. cashews, pistachios and almonds). Clean area and utensils following four step sanitation procedure between nut containing products. • Ensure flavouring ingredients are within code. Use FIFO inventory control.
15	Package/Label/Store 	**Biological** Pathogen growth due to improper storage conditions (cooler malfunction). Pathogen growth due to poor inventory control (use of FIFO) Pathogen growth due to time/temperature abuse.	• Date product with 3 day use by date. • Store at 4°C or colder. • Discard product after 3 days. • Do not freeze.

Product Description Form (Foodservice)

Product Category	Cultured Products
1. What is your product name and weight/volume?	Yogurt
2. What type of product is it (e.g. raw, ready-to-eat, ready-to-cook, or ready for further processing)	Ready to Eat (RTE), ingredient in meal preparation.
3. What are your product's important food safety characteristics (e.g. acidity, water activity, salinity, etc.)?	Pasteurized, cultured, stored refrigerated, pH $\leq$ 4.6.
4. What allergens does your product contain?	Milk See list of flavouring ingredients used in yogurt for potential allergens.
5. What restricted ingredients (preservatives, additives, etc.) does your product contain, and in what amounts e.g. grams)	None
6. How do you store your product e.g. keep refrigerated, keep frozen, keep dry) in your estblishment and when you ship your product?	Stored and distributed at refrigerated temperature (4°C).
7. What is the shelflife of your product under proper storage conditions?	3 days refrigerated (4°C).
8. Who will consume your product (e.g. the general public, the elderly, the immunocompromised, infants?)	Food Service customers.
9. How might the consumer mishandle your product and what safety measures will prevent this?	Mishandled in kitchen.
10. Where will the product be sold?	At own facility.
11. What information is on your product label?	Keep refrigerated, production date (lot code).

Yogurt

Process Flow Table



Critical Control Points Table: Yogurt

1. Identifying Hazards	2. Identifying Critical Control Points (CCP)	3. Establishing Critical Limits:	4. Establishing Monitoring Procedures (who, what, how and when)	5. Establishing Corrective Actions:	6. Establishing Verification Procedures (who, what, how and when)	7. Keeping Records
Growth of undesirable microorganisms (spore formers) due to improper cooling	**CCP1B** Cool Milk to inoculation temperature (if milk was heated)	Cool down quickly to inoculation temperature. Reach temperature within 1 hour.	1. Production worker checks temperature with clean and sanitized probe thermometer. 2. Check temperature every 5 minutes during cooling to incubation temperature. 3. Record on batch report	**When critical limits are not being met for one or more product samples.** 1. Report slow cooling to Operator. Check cooler and determine if maintenance is required. 2. Discard yogurt milk if time limit has not been met. 3. Immediately investigate the cause of the non-conformance and take necessary corrective actions to prevent reoccurrence. 4. Record all non-conformances and corrective actions on batch report.	1. Operator reviews and signs batch reports at end of production day to ensure that it has been properly completed. 2. Once per week, the Operator ensures that the temperature checks follow the procedure (observes production worker in their task). 3. Operator reviews and signs cooler temperature once per week. 4. If a non-conformance is found during the verification procedure, immediately investigate the cause of the non-conformance and take necessary corrective actions to prevent reoccurrence. 5. Record all observations on the batch report, including the date, the time and initials.	Yogurt Batch Report Cooler Temperature Log Thermometer Calibration Log
Incomplete acidity development due to improper incubation procedures	**CCP2B** Reach end point pH	Endpoint pH $\leq$ 4.6 within 2 hours of the expected incubation time	1. Production worker checks pH with clean and sanitized calibrated pH meter. 2. Start pH checks one hour before anticipated end point pH for product and repeats every hour until end of incubation period. 3. Record on batch report.	**When critical limits are not being met for one or more sample.** 1. If target pH has not been achieved, continue for one more hour. **2.** Discard the batch if end point pH is not reached after this additional incubation time. **The batch is contaminated and should not be used.** 3. Record as corrective action on batch report. **4. Clean and sanitize utensils, containers and equipment before reusing.**	1. Operator will establish fermentation time for yogurt process. 2. Operator reviews and signs batch reports at end of production day to ensure that it has been properly completed. 3. Once per week, the Operator ensures that the pH checks follow the procedure (observes production worker in their task). 4. If a non-conformance is found during the verification procedure, immediately investigate the cause of the non-conformance and take necessary corrective actions to prevent reoccurrence. 5. Record all observations on the batch report, including the date, the time and initials.	Yogurt Batch Report pH Meter Calibration Record

Note: CCPs are points in the your process where controls are essential to preventing hazards or reducing them to acceptable levels. You may not be able to prevent or reduce the risk of the hazard at any later step. A CCP is measureable. Some examples of measureable CCPS in dairy processing are the time and temperature of pasteurization, the pH of a fermented dairy product and the water activity of a dried product such as skim milk powder. Foodservice establishments may include additional preparation steps as CCPs particularly when there is no cook step in the operation. These additional CCPs control the hazards associated with crosscontamination due to sanitation and personnel.

Critical Control Points Table: Yogurt

1. Identifying Hazards	2. Identifying Critical Control Points (CCP)	3. Establishing Critical Limits:	4. Establishing Monitoring Procedures (who, what, how and when)	5. Establishing Corrective Actions:	6. Establishing Verification Procedures (who, what, how and when)	7. Keeping Records
Pathogen growth due to improper cooling procedures	**CCP3B** Break set/Cool	Cool down from incubation temperature to 20°C within 2 hours and from 20 to 4 °C within 4 hours. Total cooling time not to exceed 6 hours.	1. Production worker checks temperature with clean and sanitized probe thermometer. 2. Check temperature every hour until 4 °C is reached. 3. Record on batch report	**When critical limits are not being met for one or more product samples.** 1. Report slow cooling to Operator. Check cooler and determine if maintenance is required. 2. Place product on hold. Discard yogurt if time limit has not been met. 3. Immediately investigate the cause of the non-conformance and take necessary corrective actions to prevent reoccurrence. Record all non-conformances and corrective actions on batch report.	1. Operator reviews and signs batch reports at end of production day to ensure that it has been properly completed. 2. Once per week, the Operator ensures that the temperature checks follow the procedure (observes production worker in their task). 3. Operator reviews and signs cooler temperature once per week. 4. If a non-conformance is found during the verification procedure, immediately investigate the cause of the non-conformance and take necessary corrective actions to prevent reoccurrence. 5. Record all observations on the batch report, including the date, the time and initials.	Yogurt Batch Report Cooler Temperature Log Thermometer Calibration Log

Note: CCPs are points in the your process where controls are essential to preventing hazards or reducing them to acceptable levels. You may not be able to prevent or reduce the risk of the hazard at any later step. A CCP is measureable. Some examples of measureable CCPS in dairy processing are the time and temperature of pasteurization, the pH of a fermented dairy product and the water activity of a dried product such as skim milk powder. Foodservice establishments may include additional preparation steps as CCPs particularly when there is no cook step in the operation. These additional CCPs control the hazards associated with crosscontamination due to sanitation and personnel.

Yogurt Batch Report

Date Made: 2022-Mar-03

Best Before Date: 22 MR 06 Lot Code: 22062

Operator: Joe

Preoperational checks done Yes, JG

Ingredients Used

Ingredient	Amount	Code/Lot	Supplier
Homo Milk (3.25%BF)	10 Litre	MR15	Saputo
Skim Milk Powder	250 g	19205	Pacific
Yogurt Culture	5 g	L20123A	Danisco

Process Step	Time Start	Time End	Temp (°C)	pH
Heat Milk	8:15	8:30	80	6.3
CCP1B Cool to Inoculation Temperature	8:30	9:10	42	
Record Temperature of incubator	9:15		42	5.2
	10:30		41	
	11:15		41.5	
	11:45		42	
CCP2B Monitor pH		12:30	41	4.2
Transfer to Cooler	12:30			
CCP3B Final temperature in cooler	17:30		4	

Yield

500 g tub	2 Kg Tub
505	1950
495	1950
495	1950
490	1950
385	

Total Amount Made (kg) 2.4 7.8 10.2

Observed Deviations and Corrective Actions

Verification by: Mary Smith

Date of Record Review: 2022-Mar-06