SAMPLE DOCUMENTATION PRODUCTION OF DAIRY PRODUCTS IN FOOD SERVICE ESTABLISHMENTS





Ministry of Health

Production of Buttermilk in Food Service Establishment

Buttermilk is enjoyed as a beverage and is also used as an ingredient, particularly in baked goods. It is made using a mesophilic bacterial cultures. However, the buttermilk fermentation step is done at a lower incubation temperature than yogurt, generally just around room temperature (29°C). This low temperature fermentation can take as long as 12 hours. It results in a buttermilk that is thick and creamy. Cultured buttermilk is also used in marinades and sauces to contribute a tangy flavour.



STANDARD RECIPE

10 Litres of pasteurized milk 125 g skim milk powder (about 2/3 cup) Buttermilk bacterial culture (follow manufacturers instructions) Salt (optional).

Equipment List

Measuring cups	Long handled metal spoon	Scale	Thermometer
Kettle/Pot	Incubation area (away from drafts)		

Step #	Process Step	Potential Hazards	Instructions and Outcomes
1	Purchase and refrigerate milk	Biological Pathogen contamination 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.
			expired.

PROCESS BASED FOOD SAFETY PLAN			
Step #	Process Step	Potential Hazards	Instructions and Outcomes
2	Preoperational Checks	 Biological Pathogen contamination due to incomplete sanitation procedures. 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	BiologicalPathogen growth due to time/temperature abuse.Pathogen contamination due to unsanitary equipment.Pathogen cross-contamination due to improper employee handling practices.ChemicalContamination with non-food chemicals due to residual cleaners or sanitizers.AllergensAllergen 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. Full fat milk (3.25%BF) is a good choice however lower fat milks can also be used. The higher the butterfat, the thicker and creamier the end product will be. Skim milk powder can be added to improve the consistency. A 1% w/w added skim milk powder is recommended. Salt is added to improve flavour at end of incubation (.25 % w/w)

PROCESS BASED FOOD SAFETY PLAN			
Step #	Process Step	Potential Hazards	Instructions and Outcomes
4	Heat milk (optional)/Warm milk to inoculation temperature	 Biological Pathogen growth due to time/temperature abuse (too slow heating rate, incorrectly calibrated thermometer). 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. Allergens Contamination by allergens due to improper separation of activities. 	 The starter culture used for buttermilk is a mesophilic culture and grows at room temperature. Heat milk to desired temperature as per your recipe (reach temperature within 1 hour) Buttermilk can be made by <i>warming milk to inoculation temperature</i> following bacterial culture manufacturers recommendations. It is beneficial to use a <i>heat treatment such as 82 °C for 10 minutes</i>. This optional heat treatment will denature the milk proteins and improve shelf life. Heat treatment and the addition of skim milk powder to increase total milk solids are significant factors with respect to firmness and viscosity of the resulting buttermilk. Stir constantly to avoid burning the cream. Use of a water bath or double boiler is recommended.

Check temperature with clean and sanitized probe thermometer

PROCESS BASED FOOD SAFETY PLAN			
Step #	Process Step	Potential Hazards	Instructions and Outcomes
5	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 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 28°C (refer to starter 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 cream 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
6	Prepare Bacterial Culture	 <u>Biological</u> Pathogen contamination due to failure of culture/culture that is past code/inactive cultures. Pathogen contamination due to poor hygiene and improper handling by employees. Pathogen contamination due to unsanitary equipment. <u>Chemical</u> Contamination with non-food chemicals due to residual cleaners or sanitizers. <u>Allergens</u> Allergen cross contamination due to improper employee handling practices. 	 Use only approved commercial starter culture. 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 bacterial culture from the 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. Label the sanitizer spray bottles to indicate the content (non-food chemical)

bacterial culture.

		PROCESS BASED FOOD SAFETY	PLAN
Step #	Process Step	Potential Hazards	Instructions and Outcomes
7	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	 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.
8	Incubate/Ferment	Biological Pathogen growth due to improper incubation temperature. Pathogen contamination due to uncovered or unsealed containers (improper packaging). Pathogen contamination due to exposed packaging material/damaged packaging. Physical Hazardous extraneous material contamination due to uncovered or unsealed containers (improper packaging).	 Buttermilk may be incubated by leaving it covered at room temperature in an area away from drafts. It may take up to 12 hours for the acidity, flavour, and body to develop. Leave it undisturbed in a covered container during fermentation. Be careful not to shake or vibrate the containers. This may cause wheying off. Monitor the acidity development (pH) during the incubation

PROCESS BASED FOOD SAFETY PLAN			
Step #	Process Step	Potential Hazards	Instructions and Outcomes
9	Reach end point pH	 <u>Biological</u> 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. <u>Allergens</u> 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
10	Break set/Cool	BiologicalPathogen 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 down quickly to 10°C with gentle agitation (whisk or spatula). Cool the pot in a sink with cold water or ice bath. Product can be packaged at this point and transferred to cooler storage. Ensure proper cooling rate Check product temperature in cooler Ensure product reaches 4°C within 6 hours after breaking set. Total cooling time not to exceed 6 hours. Record on Batch Report
11	Package	 Biological Pathogen growth due to time/temperature abuse due to taking too long to complete step Pathogen cross-contamination due to poor hygiene and improper handling by employees. Pathogen contamination due to condensation falling onto/into uncovered product. Pathogen contamination due to improperly stored packaging material. Allergens Allergen cross contamination due to improperly stored packaging material. Physical Hazardous extraneous material contamination due to damaged or open packaging. 	 Sanitize work surface. Hygienically transfer buttermilk to food grade containers with lids. Labe with best before date. If re-using containers, ensure they are cleaned, sanitized and approved for multi-use.

PROCESS BASED FOOD SAFETY PLAN			
Step #	Process Step	Potential Hazards	Instructions and Outcomes
12	Store in refrigerator	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.

Product Description Form (Foodservice)

Product Category	Cultured Products
1. What is your product name and weight/volume?	Buttermilk
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 <u><</u> 4.6, added salt (flavour).
4. What allergens does your product contain?	Milk
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?	Store in lidded container in refrigerator.
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).



Critical Control Points Table: Buttermilk

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.	 Production worker checks temperature with clean and sanitized probe thermometer. Check temperature every 5 minutes during cooling to incubation temperature. 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 buttermilk 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. 	 Operator reviews and signs batch reports at end of production day to ensure that it has been properly completed. Once per week, the Operator ensures that the temperature checks follow the procedure (observes production worker in their task). Operator reviews and signs cooler temperature once per week. 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. Record all observations on the batch report, including the date, the time and initials. 	Buttermilk Batch Report Cooler Temperature Log Thermometer Calibration Log
Incomplete acidity development due to improper incubation procedures	CCP2B Reach end point pH	Reach endpoint pH of ≤4.6 within 2 hours of the expected incubation time.	 Production worker checks pH with clean and sanitized calibrated pH meter. Start pH checks one hour before anticipated end point pH for product and repeat every hour until end of incubation period. 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. 	 Operator will establish fermentation time for buttermilk process. Operator reviews and signs batch reports at end of production day to ensure that it has been properly completed. Once per week, the Operator ensures that the pH checks follow the procedure (observes production worker in their task). 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. Record all observations on the batch report, including the date, the time and initials. 	Buttermilk 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.

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Pathogen growth due to improper cooling procedures	CCP3B Break set/Cool	Cool down to 10°C within 2 hours. Stir gently with whisk or spatula. Package and then transfer to cooler and continue cooling. Must reach 4°C within 6 hours. Total cooling time not to exceed 6 hours.	 Production worker checks temperature with clean and sanitized probe thermometer. Check temperature every hour until 4 °C is reached. 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 buttermilk 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. 	 Operator reviews and signs batch reports at end of production day to ensure that it has been properly completed. Once per week, the Operator ensures that the temperature checks follow the procedure (observes production worker in their task). Operator reviews and signs cooler temperature once per week. 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. Record all observations on the batch report, including the date, the time and initials. 	Buttermilk Batch Report Cooler Temperature Log Thermometer Calibration Log

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Buttermilk 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	125 g	19205	Pacific		
Buttermilk Culture	5 g	L20123A	Danisco		

Process Step	Date	Time Start	Time End	Temp (°C)	рН
Heat Milk	Mar-03	7:4 <i>5</i>			6.3
Record heat treatment		8:10	8:20	82	
CCP1B Cool to Innoculation Temperature		8:20	9:10	28	
Add bacterial culture		9:15		28	
Record Temperature of incubator		10:30		28	
		13:00		28	
		16:00		28	
		11:45		28	
		12:00		28	
		16:00		28	
CCP2B Monitor pH		18:15		28	4.2
CCP3B Break Set/Cool		20:00	20:30	10	
Final temperature in cooler (at 24 hours)	Mar-04	6:00		4	4.1

Yield Number of 2 L jugs 5

Deviations and Corrective Actions

Date of Record Review: 4-Mar-22 Verification by: M. Smith