

Production of Dulce de Leche in Food Service Establishment

Dulce de leche is a confection traditionally used in Latin and South American countries prepared by slow heating of sugar and milk. The heating process may take several hours. The product browns and begins to look like caramel. However, the browning is not due to caramelization of sugar. It is the non-enzymatic browning reaction (Maillard Reaction) that is common in dairy products. This reaction that results from heating milk with sugar gives dulce de leche a sweet and mellow, toffee or butterscotch-like flavour. Dulce de leche can be eaten alone and is also used as filling for baked goods such as cakes and cookies.



STANDARD RECIPE

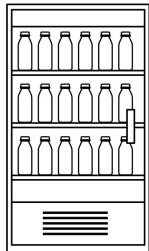
- 5 Litres of pasteurized full fat milk (3.25% B.F)
- 1/4 tsp baking soda
- 1.35 Kg white sugar (6 1/2 cups)
- 45 ml water (3 tablespoons)
- Vanilla flavouring may also be added if desired. About 2 tsp.

This recipe will yield about 2 litres of dulce de leche.

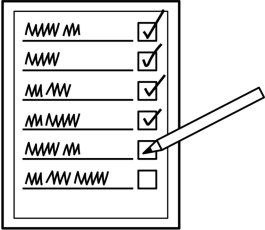

Equipment List

Scale	Thick bottom saucepan (Kadhai)	Long handled metal spoon	Spatula
Refractometer			

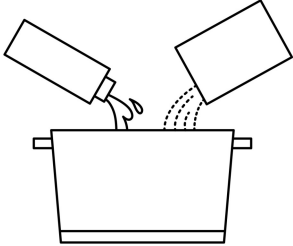
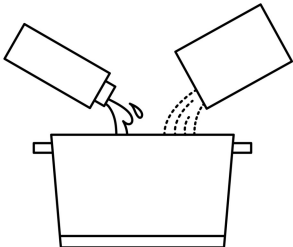
PROCESS BASED FOOD SAFETY PLAN

Step #	Process Step	Potential Hazards	Instructions and Outcomes
1	Purchase and refrigerate milk 	<p><u>Biological</u></p> <p>Pathogen contamination due to using product that is past best before date.</p> <p>Pathogen contamination due to condensation falling onto/into uncovered product.</p> <p>Pathogen growth due to time/temperature abuse.</p>	<ul style="list-style-type: none"> 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. <p style="text-align: center;">Do not use products where the best before date has expired.</p>

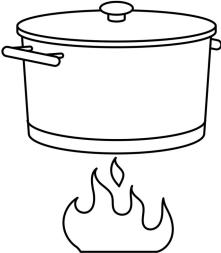
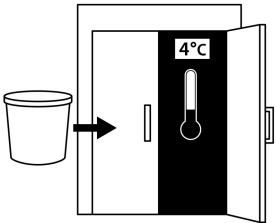
PROCESS BASED FOOD SAFETY PLAN

Step #	Process Step	Potential Hazards	Instructions and Outcomes
2	Preoperational Checks 	<p><u>Biological</u> Pathogen contamination due to incomplete sanitation procedures.</p> <p><u>Chemical</u> 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 bottles during use or filling.</p>	<ul style="list-style-type: none"> • 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 	<p><u>Biological</u> Pathogen growth due to time/temperature abuse. Pathogen contamination due to unsanitary equipment. Pathogen cross-contamination due to improper employee handling practices.</p> <p><u>Chemical</u> Contamination with non-food chemicals due to residual cleaners or sanitizers.</p> <p><u>Allergens</u> Allergen cross contamination due to improper separation of activities.</p>	<ul style="list-style-type: none"> • Dulce de Leche is made by directly heating full fat milk with sugar. The milk concentrates by evaporation and the sugar caramelizes. The addition of water at the beginning of the process prevents burning. • Baking soda (sodium bicarbonate) is added as a acidity reducer. This prevents precipitation of the milk protein during the long heating process and aids the development of the brown colour. • Slow gentle agitation and good heating rate is key success factor for safe Dulce de Leche with smooth texture (controlled sugar crystalization). • Use a thick bottom pan (Kadhali) to prevent burning and scorching. • It is also possible to make dulce de leche by heating a can of sweetened condensed milk. That method is not described in this document.

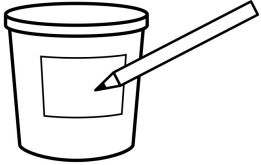
PROCESS BASED FOOD SAFETY PLAN

Step #	Process Step	Potential Hazards	Instructions and Outcomes
4	Add water	<p><u>Biological</u></p> <p>Pathogen contamination due to contaminated water</p> <p>Pathogen contamination due to unsanitary equipment.</p> <p><u>Chemical</u></p> <p>Contamination with non-food chemicals due to residual cleaners or sanitizers.</p>	<ul style="list-style-type: none"> • Pour a small amount of potable water in the bottom of the saucepan and thoroughly wet the bottom of the pan. Water is added to prevent the ingredients from burning.
			
5	Add sugar, milk and baking soda to pot	<p><u>Biological</u></p> <p>Pathogen contamination due to poor hygiene and improper handling by employees.</p> <p>Pathogen contamination due to unsanitary equipment.</p> <p><u>Allergens</u></p> <p>Allergen cross contamination due to improper separation of activities.</p> <p>Contamination by allergens due to unsanitary equipment.</p> <p>Allergen cross contamination due to improper employee handling practices.</p>	<ul style="list-style-type: none"> • Blend milk and sugar and place over heat. Bring it to a boil. • Reduce heat and simmer uncovered. • Stir occasionally to avoid burning. Once the sugar has dissolved, add the baking soda and stir to combine. <p style="text-align: center;">Check temperature with clean and sanitized probe thermometer.</p>
			

PROCESS BASED FOOD SAFETY PLAN

Step #	Process Step	Potential Hazards	Instructions and Outcomes
6	Cook and hold long time (stir constantly) 	<p><u>Biological</u> Pathogen survival due to improper heat treatment.</p> <p>Pathogen growth due to time/temperature abuse (too slow heating rate, incorrectly calibrated thermometer).</p> <p><u>Allergens</u> Allergen cross contamination due to improper separation of activities.</p>	<p>CONTROL POINT (CP1B)</p> <ul style="list-style-type: none"> • Continue to simmer for one hour. Cook the mixture until the product is a caramel colour. The volume of the product will reduce to about 1 quarter of the original volume. Monitor the Brix of the product. This may take between 1 1/2 to 2 hours. • Stir occasionally during cooking step. Scrap down sides of saucepan to ensure there are no sugar crystals that might seed the crystallization process (defect). • The temperature of the product during this cooking step will remain above 90 °C. The temperature must remain above above 60°C.
7	Cool 	<p><u>Biological</u> Pathogen growth due to time/temperature abuse (too slow cooling rate, incorrectly calibrated thermometer).</p> <p>Pathogen contamination due to poor hygiene and improper handling by employees.</p> <p>Pathogen contamination due to uncovered container in cooler</p> <p><u>Chemical</u> Contamination with non-food chemicals due to residual cleaners or sanitizers.</p> <p><u>Physical</u> Hazardous extraneous material contamination due to uncovered container in cooler</p>	<ul style="list-style-type: none"> • Cool dulce de leche to 75-80 °C to prevent potential of burn injury during packaging. • The product can be filtered through a fine mesh screen before packaging if there has been scorching and burn on the side of saucepan.

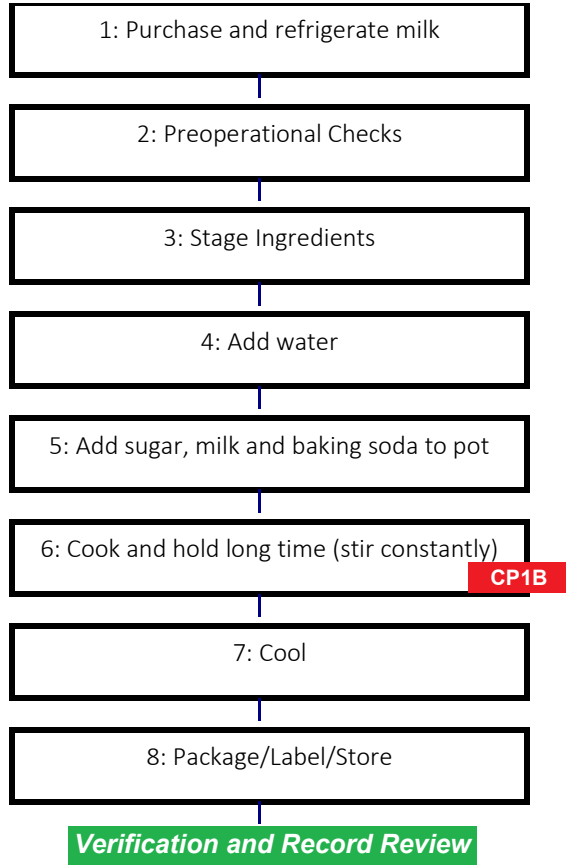
PROCESS BASED FOOD SAFETY PLAN

Step #	Process Step	Potential Hazards	Instructions and Outcomes
8	Package/Label/Store 	<p><u>Biological</u></p> <p>Pathogen growth due to improper storage conditions (cooler malfunction).</p> <p>Pathogen growth due to poor inventory control (use of FIFO for frozen paneer on hand).</p> <p>Pathogen growth due to time/temperature abuse.</p>	<ul style="list-style-type: none"> • Sanitize work surface. • Hygienically transfer cool dulce de leche to food grade containers with lids. Glass jars are suitable storage container. Product will be very thick. Use a sanitized spatula for transfer. • If re-using containers, ensure they are cleaned, sanitized and approved for multi-use. • For best results, store dulce de leche in refrigerator (4°C) for up to 1 month. Dulce de leche is microbiologically stable. • Gentle stirring during heating and cooling step will reduce undersirable sugar crystal formation during storage.

Product Description Form (Foodservice)

Product Category	Dulch de leche
1. What is your product name and weight/volume?	Dulce de Leche
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, high total milk solids, >70 °Brix (added sugar), low water activity.
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 establishment and when you ship your product?	Store in lidded container in refrigerator.
7. What is the shelflife of your product under proper storage conditions?	Product is best stored in refrigerator. It will last several months in refrigerator.
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).

Dulce de Leche
Process Flow Table



Control Points Table: Dulce de Leche

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 time and temperature of thermal process.	<p>CP1B</p> <p>Cook and hold long time (stir constantly)</p>	Maintain temperature above 60°C throughout process. It will take 1.5 to 2 hours to evaporate liquid and achieve > 70 °Brix reading on refractometer.	<ol style="list-style-type: none"> 1. Production worker checks temperature with clean and sanitized probe thermometer. 2. Record start and end of cook step on batch report. 3. Take sample for refractometer with sanitized spoon. 	<p>When critical limits have not been met for the batch.</p> <ol style="list-style-type: none"> 1. Continue heating batch of product. Monitor time, temperature and brix. Record on Dulce de Leche batch report. 2. If problem is due to malfunctioning equipment (stove) report to Operator. Place product on hold (in cooler) until equipment can be fixed. Record on gelato batch report. 3. If heat treatment cannot be completed and time limit has not been met, discard the batch. 4. Immediately investigate the cause of the non-conformance and take necessary corrective actions to prevent reoccurrence. 5. Record corrective action on batch report. 	<ol style="list-style-type: none"> 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 and brix checks follow the procedure (observes production worker in their task). 3. 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 and signature. 	Dulce de Leche Batch Report 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.

Dulce de Leche Batch Report

Date Made: 4/28/2022
 Lot Code: 22118
 Operator: Joe

Preoperational checks done Yes, JG

Ingredients Used

Ingredient	Amount	Code/Lot	Supplier
Full Fat Milk (3.25% BF)	10 Litre	MA 12	Saputo
Sugar	1.35 Kg	22062	Lantic

Process Step	Time	Temp (°C)	Brix (°B)	Comment
Add sugar, milk and baking soda to saucepan	8:00			
CP1B Cook and hold long time	8:10			
	8:55	85	40	
	9:10	95	45	volume reduced by half.
	9:30	103	58	
	9:45	103	73	volume reduced by half.
Finished Product (at 24 hours)			78	

Number of 250 ml jars (sealed and dated) 6.5

Observed Deviations and Corrective Actions

Date of Record Review: 25-Mar-22 Verification by: M. Smith