

ABSTRACT

The production of raw milk cheese, celebrated for its unique flavors, poses significant food safety risks due to the potential presence of pathogenic microorganisms. This poster highlights the Hazard Analysis and Critical Control Points (HACCP) system as a preventive strategy for enhancing food safety in raw milk cheese production. By examining recent outbreaks and recalls caused by pathogens like *Listeria monocytogenes* and *E.coli*, the importance of implementing HACCP is underscored. These incidents reveal critical breaches in safety practices and emphasize the need for rigorous hazard analysis, monitoring, and corrective actions. The paper also discusses the challenges faced by artisanal producers in adopting HACCP and suggests solutions to improve compliance and public health outcomes. Implementing HACCP is crucial for preventing foodborne illnesses and maintaining consumer trust in raw milk cheese products.

INTRODUCTION

Hazard Analysis and Critical Control Points (HACCP) is a crucial system for raw milk cheese production, identifying and controlling potential dangers like pathogenic bacteria. It involves monitoring critical control points (CCPs) like milk source, curd formation, and aging, and setting critical limitations for bacterial infection and temperature. Regular monitoring ensures CCPs remain within predetermined levels, and corrective actions are implemented promptly. Verification processes validate the HACCP plan's effectiveness, demonstrating compliance with food safety requirements and reassuring consumers about raw milk cheese quality. The raw milk cheese has a pH of 5.3 to 5.9 and a water activity of around 0.94.

PROCESS FLOW DIAGRAM AND HACCP

The flow diagram helps ensure which manufacturing step possesses potential hazards and develops critical limits, verification methods, and recordkeeping methods.

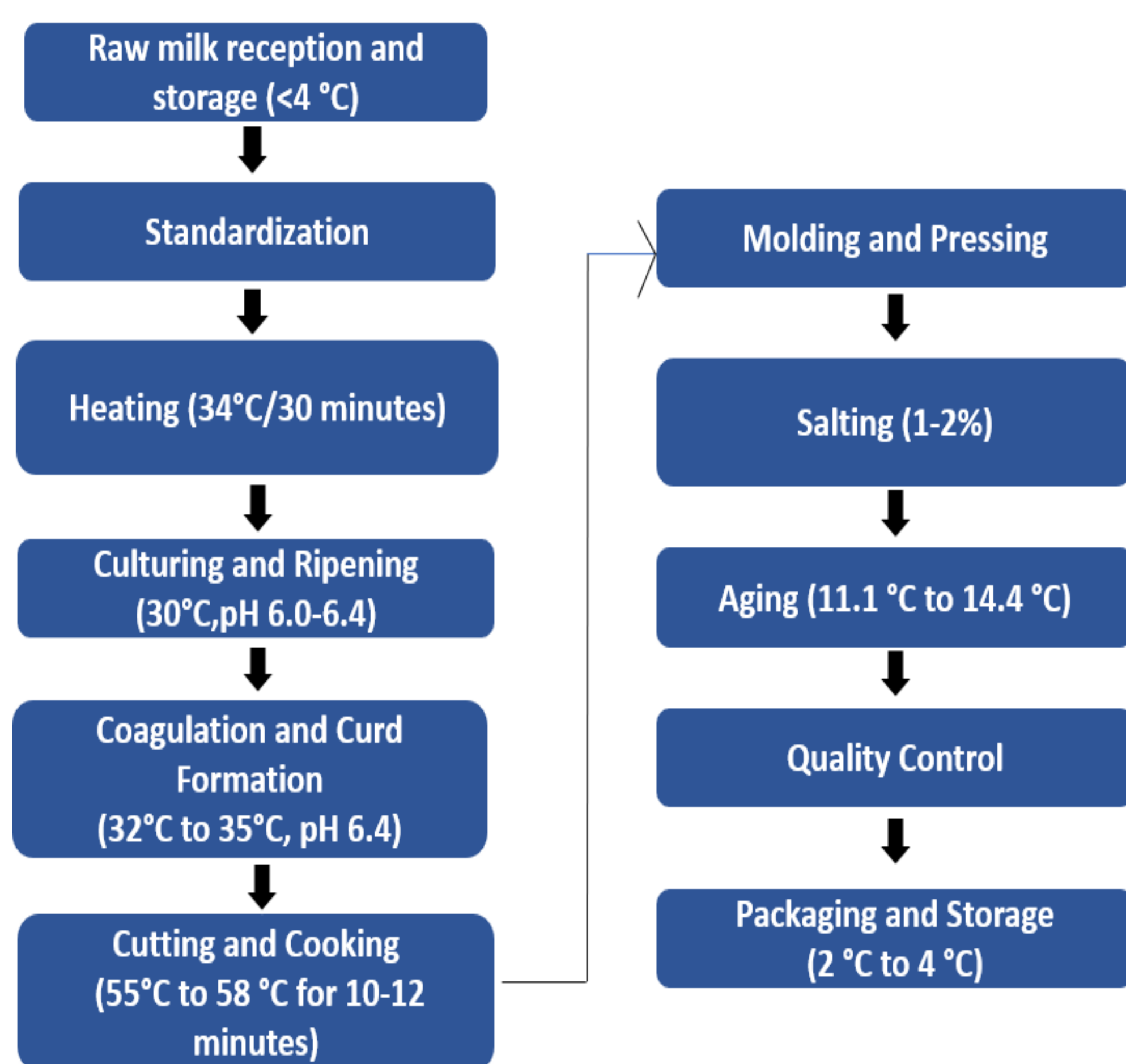


Figure 1: Process flow diagram for manufacturing of raw milk cheese



RESULTS

Ingredient/ Processing step	Identify potential food safety hazards introduced, controlled or enhanced at this step	Justification for decision	What control measure(s) can be applied to prevent the significant hazard?	Is this CCP?
Receiving of milk	B Biological hazards (e.g., E. coli, Salmonella, Listeria)	Pose a risk to consumer health if not properly controlled.	<ul style="list-style-type: none"> Supplier verification, Certificate of Analysis (COA). Visual inspection. Incoming material inspection (supervisor) Monthly evaluation. Regular cleaning and sanitization of milk storage tanks and equipment. 	Yes (CCP 1)
Heating of milk	B Biological hazards (e.g., E. coli, Salmonella, Listeria)	Lead to foodborne illnesses, posing a significant risk to consumers' health	Implement proper sanitation practices in the milking process.	Yes (CCP 2)
Coagulation and Curd formation	B Bacterial pathogens: salmonella, E. coli	Untreated or contaminated milk can harbor harmful bacteria	Use of heated milk to eliminate harmful bacteria	Yes (CCP 3)
Cutting and Cooking	B Microbial cross-contamination (e.g., from spices or other ingredients)	Combining ingredients can introduce new microorganisms.	Proper sanitation of mixing equipment.	Yes (CCP 4)
Molding and Pressing	B Bacterial pathogens contamination	Cross-contamination can occur during pressing	Sanitized equipment. Proper handling of additives	Yes (CCP 5)
Quality Control	B Microbial contamination	Microbial contamination leads to spoilage of cheese	Implement strict hygiene practices	Yes (CCP 6)

Table 1: Hazard analysis of each step of the manufacturing process of raw milk cheese

CCP	Corrective action	Verification Procedures
Receiving and Inspection of milk CCP 1	Reject deliveries exceeding the temperature limit or showing signs of spoilage.	Temperature logs with acceptance/rejection documentation, including reason for rejection.
Heating of milk CCP 2	<ol style="list-style-type: none"> If the temperature exceeds 34°C: Pause heating, adjust temperature. Segregate affected products for review. 	<ol style="list-style-type: none"> Temperature logs with corrective actions documented, including time, corrective action taken, and by whom Random sampling
Coagulation and Curd formation CCP 3	If critical limit is not met, stop the process and investigate the cause of the deviation	Regularly review monitoring records to ensure that critical limits are consistently met.
Cutting and Cooking CCP 4	If the temperature or cooking time deviates from the critical limits, adjust the parameters accordingly to bring them back into compliance.	Internal temperature data with corrective actions documented, including time, corrective action taken, and by whom.
Pressing and Draining CCP 5	Adjusting the pressing parameters, such as pressure or duration, to bring the process back into control.	Regular verification activities, such as reviewing monitoring records, conducting microbial testing
Quality Control CCP 6	Halting production and isolating affected batches of cheese, Investigating the root cause of the deviation.	Regular audits and inspections of production facilities to ensure compliance with food safety regulation.

Table 2: HACCP plan (Critical limit, monitoring control and verification)

RECALLS

There have been very few recalls regarding raw milk cheese over decades, among which mainly was due to microbial attacks of e-coli or listeria.

Company	Recall Time	Recall cause	Affects	Resource
RAW FARM LLC.	February 2024	E.coli contamination	Occurred in 4 states, 10 people affected, 4 hospitalized	https://www.foodsafetynews.com/2024/02/publishers-platform-whats-up-with-raw-milk-cheese-and-e-coli/
Vulto Creamery	March 2017	Listeria contamination	Nationwide, 6 people Affected, 2 deaths	https://www.fda.gov/safety/recalls-market-withdrawals-safety-alerts/vulto-creamery-issues-voluntary-recall-all-soft-wash-rind-raw-milk-cheeses-because-possible-health

Table 3: Recalls of raw milk cheese

CONCLUSIONS

In conclusion, the manufacturing process of raw milk cheese combines Hazard Analysis and Critical Control Points (HACCP) methods to provide the greatest levels of safety and quality. Manufacturers can ensure compliance with severe food safety laws by systematically identifying and monitoring Critical Control Points (CCPs) throughout the cheese-making process. Notably, the stages of milk supply, curd formation, and aging stand out as crucial factors for properly managing contamination hazards. Maintaining specific temperature controls during these stages, as well as packaging, storage, and transportation, is critical for reducing the biological hazards associated with raw milk. By strictly complying with specified critical limitations, manufacturers can ensure the safety of raw milk cheese, giving consumers a delicious and wholesome product they can trust.

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