V
HACCP based plans

Teacheesy

Farmhouse and Artisan Cheese & Dairy Producers European Network

Erasmus+

HACCP-based plans in the Food Safety Management System

HACCP-based procedure = Risk analysis + **HACCP-based plans**

HACCP-based plans = For each process flow:

- Identification of the hazards at each step
- Preventive measures for these hazards/steps
- Recommendations / checking procedures
- Corrective actions

Structure and use of the HACCP-based plans

- Separate tables > use of the relevant ones only (for the producer concerned)

Process steps to monitor	Why do we have to be careful?	Preventive actions	Checking /monitoring	Corrective actions
List of the process steps or operations. *Some rows may be optional and some steps may not apply to a specific product.* **The producer must:** **. keep only the steps corresponding to their practice** **. delete steps which are not applicable.**	*Detail on the nature and cause of the hazards (M: microbiological contamination or growth, C: chemical, P: physical).*	*Actions to prevent or control the risk* *= good hygiene practices* or other technical advices*	*Means to check that the preventive actions were carried out efficiently.* *= measurements or* ***more subjective actions, based on the producer's experience*** ***(eg. "visual or organoleptic inspection"…)*** **Producers must select at least one of the means proposed** **Except: legal requirements that must be followed**	*Actions in case of failure of the preventive measures in order to restore a satisfactory situation.*

*About the preventive actions ….

- **Most** preventive actions are **GHP and GMP**
- The HACCP-based plans **make the essential role of some GHP/GMP** for the safety of some **specific process steps visible**
- Eg.

section V- HACCP-based Plans

LACTIC COAGULATION CHEESES

Process step to monitor	Why do we have to be careful?	Preventive actions	Checking/Monitoring procedure	Corrective actions
Curd Treatments: Forming, Salting (8) Mixing, Additives, (9) Draining	M, C : Microbiological, chemical or physical contamination of the curd by cheese cloths, draining bags and moulds	Ensure that cloths, bags and moulds are always clean. Never put small items of equipment directly on the floor. (1) (6)	Visual inspection.	Repeat cleaning and/or disinfection. Rinse with potable water of acceptable quality. Amend cleaning procedure. If it is a recurrent issue review training of cheesemaker. Repair dirty or worn cheesecloth or equipment.
	M, C, P: Contamination of the curd by tools, handling and ingredients.	Clean and/or disinfect regularly tools and equipment. Wear clean work-clothes. Use only food-grade ingredients (additives, salt, herbs, fruits, flavourings etc.) within their expiration date.	Visual inspection.	Change suppliers of additives if they do not fit to required standards
Rind Treatment	M: Contamination and cross-contamination may occur as a result of specific processes during ripening such as rind-washing.	Ensure equipment is always clean and maintained in good condition. (1) Ensure food handlers have clean hands. Where necessary use protective gloves to cover skin lesions.	Visual inspection.	Repeat cleaning and/or disinfection. Rinse with potable water of acceptable quality. Amend cleaning procedure. If it is a recurrent issue review training of cheesemaker.

GHP staff, GHP cleaning

10 HACCP-based plans in the guide (section IV and V)

- risk analysis for **primary production**
- **milk collection**, storage in the dairy and treatment
- **lactic** coagulation cheeses
- **enzymatic and mixed** coagulation cheeses
- cheeses and milk products made by **evaporation and precipitation**
- **pasteurized milk** for consumption
- **raw milk** for consumption
- **butter and cream**
- **fermented milk products**
- **non fermented dairy products**

milk

3 families of cheeses

5 families of milk products

Milk collection, storage in the dairy and treatment

- **3 key steps** / 3 Steps
- 1- Procurement

Good practices
Checkings on the milk collected:
Regular visual inspection of the supplier's farm
Inspection of records of veterinary medicines administered

Routine monitoring of cell count and plate count
Results of checks made for tuberculosis or brucellosis

- 2- Transportation of the milk and storage

To monitor this step = to monitor a **legal requirement** on cold chain:
The cold chain must be maintained and the milk must not exceed 10°C upon arrival at the processing site, unless processed within two hours of the end of milking, or the competent authority authorises a higher temperature for technological reasons.

Milk collection, storage in the dairy and treatment

3 key steps / 3 Steps

3- Pasteurisation

- **<u>Unique CCP</u> in the guide**
- **3 ways of pasteurisation:**

1) Low Temperature Long Time (LTLT) or 'Batch' Pasteurisation
   critical limits: 63°C 30 minutes
   good practices: vat stirred, covered

2) High Temperature Short Time (HTST) Pasteurisation
   critical limits: 72°C 15 seconds
   good practices: pre-operation checks, cleaning, calibration, verification of the flow rate/holding time

3) Equivalent time and temperature combination such that products show a negative reaction to Alkaline Phosphatase (ALP) test.

Use of calibrated thermometer
or thermograph
ALP test
Records (CCP)

Lactic coagulation cheeses

- Rely predominantly on **acidification** to set the curd
- Long acidification/coagulation time (several hours)

>> **Low pH reached at the end of the drainage (< 4,6)***

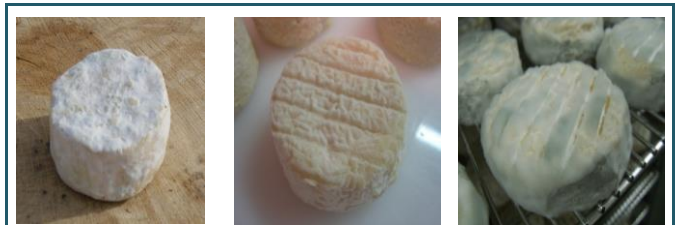
>> Prevention of the growth of pathogenic bacteria in the curd.

** For ripened cheeses: pH of the rind may increase during ripening. But the lost of moisture >> less technologically sensitive than some other surface-ripened cheeses*

Several categories:

- **Fresh or unripened soft cheeses**, made without (or with very little quantity of) rennet and no ripening

- **Ripened cheeses**



Lactic coagulation cheeses

2 key steps / 8 steps

1- Filling the vat

2- Maturation without inoculation

3- Maturation with inoculation

4- Addition of the coagulant and incubation

5.2

- Management of the dynamic changes of acidity (acidification's curve)

= management of time and temperature

- Visual inspection of the gel (satisfactory appearance with expected flavour, taste or acidity)
- **"Recommended** values: final pH 4,5-4,7 achieved within 24 hrs"

Lactic coagulation cheeses

2 key steps / 8 steps

5- Curd treatments (forming, salting, mixing, additives, draining)

6- Rind treatments

7- Ripening

8- Refrigeration = **Optional step for fresh/unripened cheeses (sold as such)**

Categories of cheeses concerned: made without (or with very little quantity of) rennet and no ripening

- Good condition of the premises and adequate functioning of refrigerated storage equipment.
- **"Recommended** value of refrigeration temperature: <8°C"

Enzymatic and mixed coagulation cheeses

Predominantly enzymatic cheeses

- Products without inoculation or with minimal acidification
- Fast coagulation time (< 1 hr)

Categories: hard and soft cheeses; fresh and ripened





Mixed coagulation cheeses

- Coagulation time between 1 and 2 hrs

Categories: surface-ripened cheese, washed-rind cheeses, mixed-rind cheeses and internally mould-ripened (blue) cheeses



Enzymatic and mixed coagulation cheeses

For some enzymatic and mixed coagulation cheeses: slow or absence of acidification **>> no "protection" against harmful bacteria**

Categories particularly concerned:

- soft mixed coagulation cheeses
- unripened, unacidified predominantly enzymatic cheeses

Enzymatic and mixed coagulation cheeses

2 key steps / 13 Steps

1- Filling the vat

2- Maturation without inoculation

3- Maturation with inoculation

4- Addition of the coagulant

5- Curd treatments (cutting , ladling, stirring, washing, draining, moulding, pressing)

Experience of cheesemaker: organoleptic inspection, measurement of temperature, time and acidity development

For cheeses with slow or without acidification

- Ensure high standards in milk production
  Refers to chapter « milk production »
- Adjust production parameters for future batches: time, temperature, type and dose of cultures

Enzymatic and mixed coagulation cheeses

2 key steps / 13 Steps

6- Milling

7- Additives

8-Salting

9- Piercing

10- Rind treatments (eg. Smoking, Oiling, Waxing, Larding, Cloth-binding, Plastic-Coating, Rind-washing/smearing)

11- Ripening

12- Refrigeration

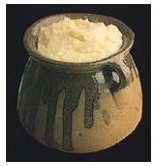
For very soft surface ripened mixed cheeses, and for unripened unacidified enzymatic cheeses:
Storage at < 8ºC immediately after processing

13- Cutting, packing and dispatch

Cheeses and milk products made by evaporation and precipitation

- Cheeses produced from whey, milk or cream and
  - precipitation of whey protein by heating +/- adding acid (eg. lactic or citric) or salt
  - or evaporation of the moisture content of the whey

>> The heat treatment inactivates many of the microbiological hazards of concern


Categories:

- whey cheeses with very **high moisture (cold storage or short shelf-life)**
- pressed, dried, smoked or ripened products from whey
- ……..

Cheeses and milk products made by evaporation and precipitation

0 Keys steps / 4 Steps

1- Filling the vat

2- Addition of ingredients (eg. Acid, additional milk, cream, salt) before or after precipitation / evaporation)

3- Precipitation, heating, evaporation of moisture, moulding and draining curd

4- Packing and dispatch

Milk for consumption

Pasteurised

3 key steps / 5 Steps

1- Raw milk storage

2- Heat treatment

3- Bottling / Filling

4- Storage before dispatch

5- Sale

Raw milk

2 key steps / 4 Steps

1- Raw milk storage

2- Bottling / Filling

3- Storage

4- Sale

Milk for consumption

Pasteurised

3 key steps / 5 Steps

1- Raw milk storage

2- Heat treatment

CCP pasteurisation: Holding time and temperature of pasteurisation
>> Refers to HACCP-based plan « milk collection, storage in the dairy and treatment »

Raw milk

2 key steps / 4 Steps

1- Raw milk storage

Recommendation: Immediate, rapid and effective cooling and refrigeration (storage at < 8ºC)

Milk for consumption

Pasteurised

3 key steps / 5 Steps

3- Bottling / Filling

Raw milk

2 key steps / 4 Steps

2- Bottling / Filling

Physical hazards >> Good practices for
- Storage of packaging
- Use of packaging (unbroken, clean)

4- Storage before dispatch

5- Sale

Recommendations:
Storage temperature ≤ 8°C
Shelf life: defined on basis of organoleptic tests

3- Storage

4- Sale

Butter/cream

2 key steps / 10 Steps

1- Cream separation

2- Inoculation

3- Cream maturation

Management of the acidification of the cream (fermentative maturation) > Adjust time or temperature until desired acidity is obtained

4- Packaging of cream

5- Storage of cream

6- Churning

- Hygiene of equipment (GHP)
- Technological parameters

Churn until “grain stage” >> extract of the maximum amount of buttermilk

7- Washing

8- Blending

9- Salting

10- Moulding-packaging

Fermented milk products

Products from acidification by lactic acid bacteria

Examples: kefir, yoghurt, buttermilk, ymer, filmjölk, rjażenka,…

According to a specific technology, the process steps may occur in different order

Fermented milk products

2 key steps / 8 Steps

1- Filling the vat

2- Pasteurisation (optional step)

3- Cooling to incubation temperature

4- Addition of starter cultures

5- Addition of fruit, colourings, flavourings etc.

6- Incubation

- Visual and organoleptic inspection
- Monitoring of acidification or pH measurement
- Generally **recommended** value: final acidity pH ≤ 4,5

7- Cooling of the product

8- Packaging

Non fermented milk products

Wide range of products (from raw milk, from heated milk,…)

Examples: Custard, Clotted Cream,…

- Absence of fermentation >> products more “sensible” than other milk products
- *Reminder:* Products with a shelf life ≤ 5 days are considered not to support the growth of Listeria monocytogenes (Regulation (EC) 2073/2005)

Non fermented milk products

2 key steps / 3 Steps

1- Procurement of Ingredients or Food Improvement Agents

2- Cooking / Heat Treatment of non-dairy ingredients

Management of “time and temperature combinations”

3- Refrigeration (including refrigerated ‘ageing’ of ice cream bases) or Freezing

- Cool rapidly to storage temperature (typically ≤8°C within four hours), unless technology requires others parameters
- Where relevant, freeze rapidly to a recommended temperature of -18°C

Tools available for HACCP based plans

5.1 Power Point on Monitoring actions
5.2 Power Point Dynamic changes in acidity
5.3 SH testing
5.4 pH testing
5.5 Training buffer capacity in milk and milk products
5.6 Power Point on surface sampling