Prevention of pollution in the Dairy industry

CD
Castellano
English
Français

The Regional Activity Centre for Cleaner Production (RAC/CP) of the Mediterranean Action Plan has prepared this brochure aiming at presenting some of the opportunities for preventing pollution at the source (PPO) that can be implemented in order to optimize production processes in the dairy industry.

EXAMPLES OF IMPLEMENTATION OF PPO

FRESH MILK

A plant that processes 25 t of fresh milk per day was able to decrease pollution of wastewater, by avoiding or reducing losses of raw material. For this:

	BENEFITS
They installed trays to catch drips and other milk spills to separate this waste from the factory's wastewater.	- Reduction of losses of milk by 3%.
They installed hermetic valves, alarms and automatic cut-offs to avoid overflow of milk storage tanks.	- Reduction of the volume of waste by 750 L/day.
They gave instructions to the foremen on how to use hoses, pipes and other installations where there could be loss of milk.	- Reduction by 20% of the COD in the waste.
They trained staff and created indicators for monitoring loss of milk.	- Savings in the cost of the raw material not lost.

Investment: € 10,820 **Savings:** 66,260 €/year **Payback period:** <2 months

CHEESE

A cheese manufacturing plant that produces 20 m^3 of whey daily took the following steps to avoid creating this waste:

	BENEFITS
They installed a system for gathering whey (pipes, pumps and storage).	- Reduction in the volume of waste by 20 m^3/day.
They installed monitoring and measuring equipment (pHmeters and temperature sensors).	- Reduction of the COD of the final waste by 40%.
They entered into an agreement with local farms to take away the whey for use as liquid feed for cattle.	- Use of a by-product generated by the process.

Investment: € 15,600 **Savings:** 12,000 €/year **Payback period:** 16 months

FERMENTED MILKS

A firm that prepares yogurt and other dairy products undertook the following steps to reduce waste from packaging:

	BENEFITS
They provided containers for each type of waste (plastic packaging for yogurt, paper/cardboard from packing for shipping yogurts…).	- Decrease of 35% of the total volume of packaging and packing waste.
They purchased a small compactor for packaging.	
They replaced wooden pallets used just once with reusable pallets.	- Reduction in the cost of managing waste.
They installed refillable tanks for the most frequently used inputs.	- Easier handling for recycling and use of waste.
They negotiated with suppliers for the removal of waste generated by their products.	

Investment: € 24,000 **Savings:** 48,083 €/year **Payback period:** <6 months

Mediterranean Action Plan

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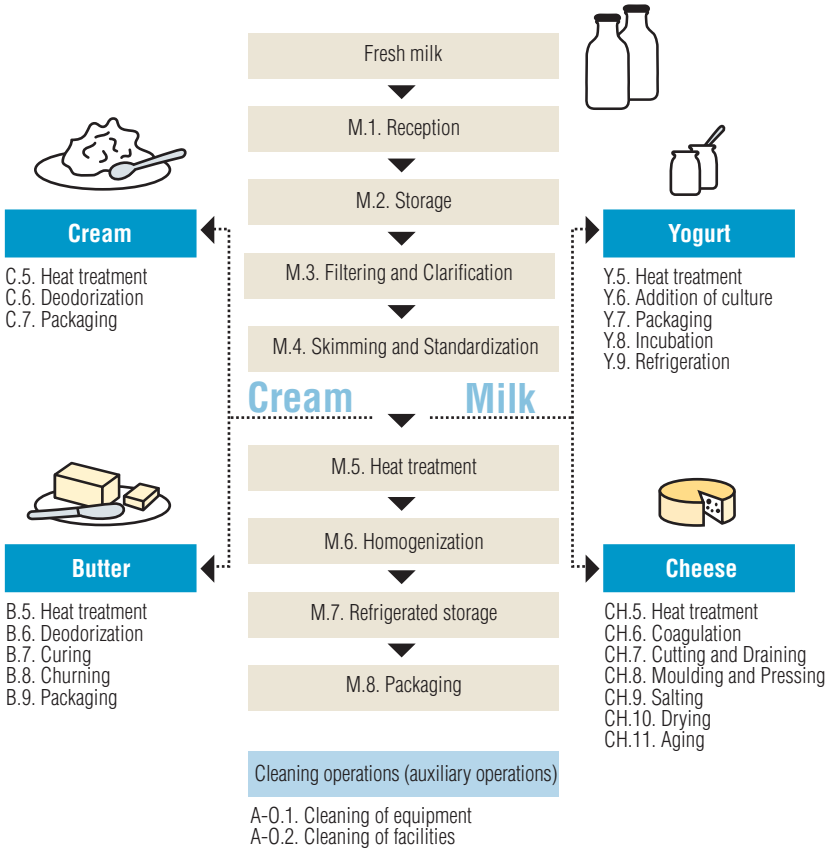
General process of the dairy industry



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Opportunities to prevent pollution at the source

Stage		Raw materi
M1	Quality control at reception of the raw material	▼
M3	Separation of sludge from clarification and its later recovery	
M5/ C5/ B5/ Y5/ CH5	Use of continuous systems for pasteurization of milk	
	Recovery of energy used for heat treatment of the milk	
B8	Use of buttermilk	
CH7/ CH8	Prevention of waste and recovery of whey	
CH9	Dry elimination of salt from cheese after salting	▼
	Physical, chemical and microbiological control of the salt brine in order to prevent its aging	▼
	Recovery of salt brine from the cheese	▼
The overall process	Reduction of losses of milk through control, separation of flows, etc.	▼
	Separation and adequate storage of solid waste	
M8/ C7/ B9/ Y7	Minimization of waste from packaging	
A-O.1.	Reduction of the consumption of water through dry-cleaning, use of pressurized water, etc.	
A-O.2.	Use of Clean in Place systems (CIP)	
	Use of single-use detergents	
	Recovery of cleaning products	
Auxiliary operations	Regular control of boiler emissions	
	Prevention of losses of refrigeration fluids and substitution of those that contain CFCs	
	Neutralization of the acidic and alkaline flows before dumping	
	Optimization of the use of energy through cogeneration	

	consumption					generation			Main determining factors
	Raw materials	Heat	Electricity	Water	Auxiliary products	Atmospheric emissions	Wastewater	Solid waste	
	▼		▼	▼	▼		▼	▼	Procedures and training for control and analysis of the product
ery			▼				▼	▼	Existence of a firm interested in using sludge
		▼	▼	▼		▼			Cost of a continuous pasteurizer
		▼	▼	▼		▼			Cost of equipment (interchangers, pumps, etc.)
			▼				▼		Existence of a market for these products
			▼				▼		Existence of viable alternatives for use of the whey
	▼			▼			▼		Cost of managing salt as a waste if not re-used
t brine in order to prevent its aging	▼			▼			▼	▼	Personnel for the control and analysis of the salt brine
	▼		▼	▼			▼		Low profitability of the investment due to low value of the salt
f flows, etc.	▼		▼				▼		Awareness should be promoted and relevant personnel trained
								▼	Space available for its storage
					▼			▼	Correct selection of minimization measures
ing, use of pressurized water, etc.				▼			▼		Training of cleaning personnel and control of consumption with meters
				▼			▼	▼	Sufficient volume of waste to make the investment in a CIP system profitable
		▼	▼	▼	▼		▼		Correct selection of detergent (efficiency, dose, etc.)
				▼	▼		▼		Sufficient consumption of detergent to make the investment profitable
					▼	▼			Rigorous use of monitoring
on of those that contain CFCs			▼		▼	▼			Correct application and efficiency in the maintenance plan for the installations
ping			▼		▼		▼		Cost of maintenance of equipment for neutralization
		▼	▼			▼			Activity with high thermal energy and electricity requirements