Mediterranean Action Plan

Regional Activity Centre
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UNEP

Regional Activity Centre
for Cleaner Production

Ministry of the Environment
Spain

Government of Catalonia
Ministry of the Environment
Centre per a l'Empresa i el Medi Ambient

Pollution Prevention in
Food Canning Processes

CD included

The Regional Activity Centre for Clean Production (RAC/CP) of the Mediterranean Action Plan has drawn up this brochure with the aim of presenting some of the opportunities for preventing pollution at source (PPO) that may be adopted in the general process of the food canning industry and for optimising production processes in the sector.

EXAMPLES OF THE INTRODUCTION OF PPO

CANNED VEGETABLES

A fruit and vegetable canning plant:

	BENEFITS	
	Water savings	Energy savings
Reused water in heat exchangers	2,115 m^3/y	
Optimised its autoclaves	1,750 m^3/y	30,600 kWh/y
Recycled the autoclave condensate	1,750 m^3/y	61,500 kWh/y

Investment: 180,000 € Saving: 150,000 €/y Pay-back period: 1.2 years

CANNED FISH

A plant which processes 50,000 t/y of fish product and generates waste with 1,600 t of COD/year:

	BENEFITS
Replaced the centrifugal fish unloading system with a pneumatic aspiration transport system	Reduction of the dumped pollutant load to 320 t COD/year
Installed a system for recovering organic solids by means of rotary filters	
Changed from a direct cooking/drying system to an indirect one	Water savings of 100,000 - 250,000 m^3/y

Investment: 250,000 € Saving: 360,000 €/y Pay-back period: 8 months

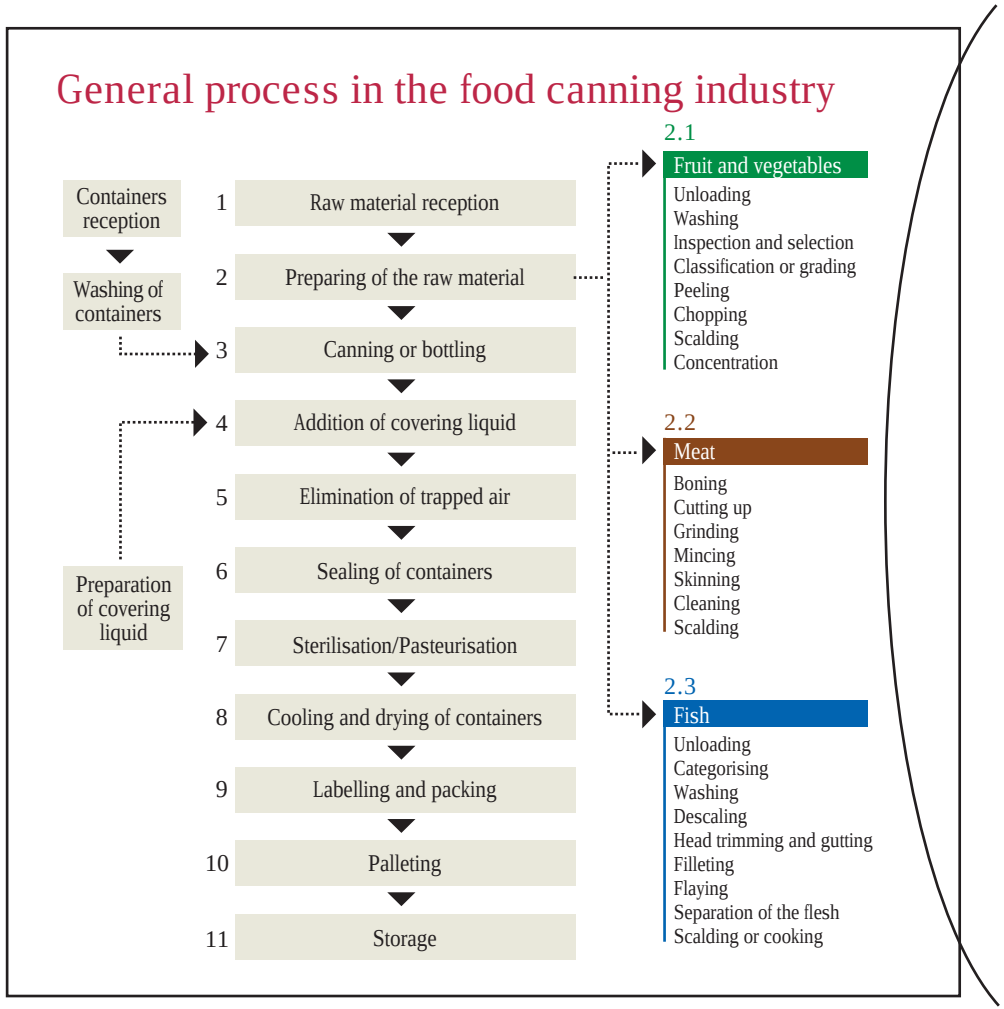
CANNED MEAT AND PRE-COOKED MEALS

A plant making pasteurised sauces and processing 1,000 t of product in 2.5-kg containers processes 400,000 containers. Its quality system accepts a rejection of 0.1% of defective containers, which means 400 cans (1,000 kg of product). To prevent the entry of damaged cans in the autoclave, the company:

	BENEFITS
Approved container suppliers and carried out periodic checks on container resistance	The company saved: - loss of finished product and containers - labour for cleaning dirty cans - water consumption for cleaning - Re-heating the water from the steriliser - Changing the autoclave water when a can breaks
Regularly revised container machines	
Carried out daily in-house quality control by visually inspecting the sealing of containers by packaging operators	

Investment: insignificant Saving: 13,500 -19,000 €/y Pay-back period: immediate

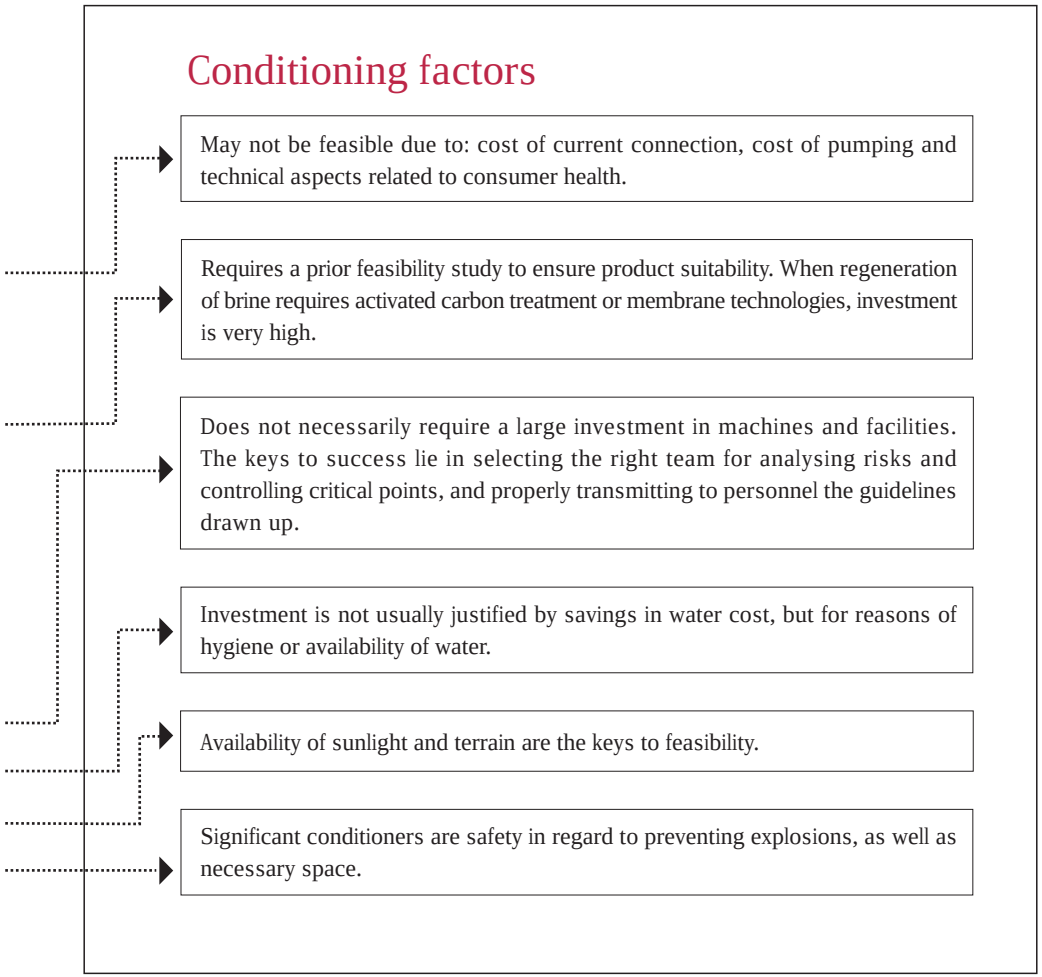
General process in the food canning industry



Opportunities for preventing pollution at source

scope of the process		consumption				generation		
		Raw material	Energy	Water	Containers	Air emissions	Solid wastes	Wastewaters
1 2.1 2.3	Minimising the consumption of water in cleaning raw materials or intermediate products			▼				▼
2.1 2.3	Adapting cutting systems to the shape and size of product	▼					▼	▼
general	Segregating and recirculating wastewater between stages of the process		▼	▼				▼
2.1	Dry alkaline peeling	▲		▼				▼
2.1	High efficiency thermal peeling		▼	▼				▼
2.1 2.2 2.3	Setting the dosing of salt and reusing brines			▼				▼
6	Optimising sterilisation		▼	▼		▼		▼
general	Closing cooling circuits		▼	▼				▼
general	Installing Cleaning in Place (CIP) systems for cleaning equipment and pipes		▼	▼				▼
5	Preventing damaged cans from entering the autoclave	▼		▼	▼	▼		▼
2.1 2.3 general	Using pneumatic transportation instead of a water channel as product transport system	▼		▼			▼	▼
general	Automatic control of the process with Hazard Analysis and Critical Control Point (HACCP)	▼					▼	▼
general	Structural cleaning of the facilities with a low-pressure system with foam or high pressure			▼				▼
2.1 2.3	Drying brines by means of solar power			▼			▲	▼
2.2	Anaerobic treatment of high-concentration wastewater and making use of biogas		▼				▼	▼

▼ Reduction ▲ Increase


Conditioning factors
May not be feasible due to: cost of current connection, cost of pumping and technical aspects related to consumer health.
Requires a prior feasibility study to ensure product suitability. When regeneration of brine requires activated carbon treatment or membrane technologies, investment is very high.
Does not necessarily require a large investment in machines and facilities. The keys to success lie in selecting the right team for analysing risks and controlling critical points, and properly transmitting to personnel the guidelines drawn up.
Investment is not usually justified by savings in water cost, but for reasons of hygiene or availability of water.
Availability of sunlight and terrain are the keys to feasibility.
Significant conditioners are safety in regard to preventing explosions, as well as necessary space.