

MedClean Propre Limpio



Regional Activity Centre
for Cleaner Production



Generalitat de Catalunya
Government of Catalonia
Department of the Environment
and Housing

No. 72

Pollution prevention case studies

Minimisation of water consumption and the generation of wastewater

Company	Corporación Alimentaria Peñasanta, SA, Vidreres (Spain).
Industrial sector	Food. The manufacture of milk and derivatives.
Environmental considerations	<p>The company Corporación Alimentaria Peñasanta, SA, (CAPSA) is devoted to the production of thermally-treated milk for human consumption, in addition to other dairy products such as cream, butter, fermented milk and cheeses.</p> <p>The conditions of hygiene of the equipment and premises must be optimal so as to guarantee the quality of the products. Maintaining these conditions requires carrying out cleaning and disinfection operations continuously. Such operations account for most of the water, energy and chemical product consumption as well as a large volume of wastewater.</p>
Background	<p>CAPSA's establishments have decided to implement a set of actions aimed at minimising the consumption of water and the generation of wastewater, which are its most significant environmental aspects. More specifically, at the Vidreres factory, the cleaning of equipment and premises was carried out following the basic sequence explained below:</p> <ul style="list-style-type: none"> • Pre-rinsing with water (or water recovered from the final rinse). • Cleaning with soda to eliminate protein, fat and lactose residue. • Intermediate rinse with clean water. • Cleaning with nitric acid to remove the milk stone (salt residue and incrustations). • Final rinse. <p>The cleaning solutions are recovered and reused successively in later cleaning cycles, and their conductivity is measured to assess the efficacy of the cleaning. In the event that the concentration of the solution does not reach an established value, it is discharged into the internal treatment network.</p>
Summary of the initiative	<p>The Vidreres milk factory has implemented the cleaning of cold milk circuits with single-phase detergents. Concretely, an additivated detergent is used, which, with one single product, is capable of eliminating proteins, fats and lactose as well as mineral salts. This product is supplemented with soda for tanks and pipework, and with nitric acid for lorry cisterns.</p> <p>In this case, the cleaning sequence is as follows:</p> <ul style="list-style-type: none"> • Pre-rinse. • Cleaning with additivated detergent. • Final rinse. <p>As for the hotter circuits, CAPSA is working on the implementation of the same cleaning system.</p>

Other actions that have managed to reduce the consumption of water and the generation of wastewater at the plant include:

- The description of water consumption by sections and the installation of meters to monitor it.
- Carrying out awareness campaigns for its workers.
- The automation of the purging of the boiler bottoms.
- The installation of automatic purging (by conductivity) in the cooling towers and evaporator condensers.
- The recovery of the condensates of all of the pasteurisers and from the coolant waters of the condenser of the fillers.

Photograph of the premises



*Tanks and pipework
to be cleaned*



CIP installation

Balances

	Old process	New process
Balance of materials		
Consumption of water per m ³ of product	1.57 m ³ /m ³	1.28 m ³ /m ³
COD dumped (base 100)	95%	72%
Consumption of nitric acid per m ³ of product	0.95 kg/m ³	0.68 kg/m ³
Consumption of soda per m ³ of product	2.3 kg/m ³	1.9 kg/m ³
Economic balance (*)		
Saving in water consumption		8,326 €/year
Saving in expenses in treating wastewater		186,963 €/year
Saving in water tax		9,596 €/year
Total saving		204,885 €/year
Total investment		€23,200
Payback period		0.11 years

(*) Data from 2004.

Conclusions

CAPSA's implementation of these good housekeeping practices has meant:

- A 23.7% reduction in water consumption.
- A 28% reduction in the consumption of acid and a 13% reduction in that of soda.
- Energy saving (unquantified).
- Increased production capacity.

NOTE: This case study seeks only to illustrate a pollution prevention example and should not be taken as a general recommendation.



Regional Activity Centre
for Cleaner Production

Dr. Roux, 80
08017 Barcelona (Spain)
Tel. (+34) 93 553 87 90
Fax. (+34) 93 553 87 95
e-mail: cleanpro@cprac.org
<http://www.cprac.org>