

MedClean Propre Limpio



Regional Activity Centre
for Cleaner Production



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

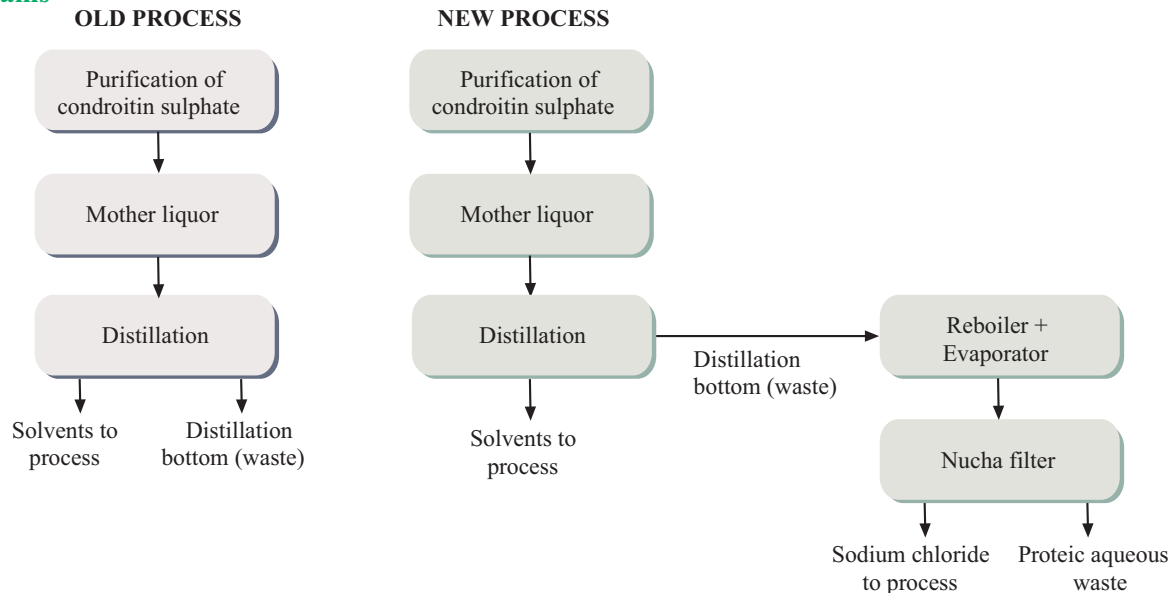
No. 70

Pollution prevention case studies

Installation of equipment for the reuse of sodium chloride used in the manufacturing process

Company	BIOIBÉRICA, SA, Palafolls (Spain).
Industrial sector	Manufacture of pharmaceutical products.
Environmental considerations	<p>The company BIOIBÉRICA, SA is devoted to the manufacture of pharmaceutical products, chondroitin sulphate and heparin, among others. Its production process is made up of several stages, which include the reception of raw materials and the extraction and purification stages. During these stages, different chemical products and materials are used, such as proteins, organic solvents, sodium chloride, water, etc., which generate aqueous waste flows with solvents.</p> <p>The waste flows generated by the process have a notable environmental impact and of these, the greatest is the mother liquor generated during chondroitin sulphate purification process. This waste flow of the mother liquor is treated internally by means of a distillation column that allows the recovery of the solvents, and generates another flow which is called <i>distillation bottom</i>, whose composition is a mixture of sodium chloride, water and proteins, which is difficult to manage since the high soluble salt concentration make its inertisation or final deposition difficult.</p>
Background	<p>BIOIBÉRICA, SA, generated an aqueous-saline waste flow, called distillation bottom, coming from the distillation column treating the waste generated in the chondroitin sulphate purification process.</p> <p>In 2002, the company decided to minimise this waste flow from the distillation bottom generated in the treatment of the chondroitin sulphate treatment waste and, at the same time, to introduce of a set of modifications to improve the production process.</p> <p>Action was directed in accordance with the following premises:</p> <ul style="list-style-type: none"> • Reducing the consumption of raw materials. • Reducing the quantity of waste generated in the mother liquor distillation process. • Reusing the sodium chloride. • Reducing the consumption of process water.
Summary of actions	<p>Wastes generated in the mother liquor distillation process, the distillation bottom, are treated in a vacuum evaporator fitted with a reboiler and forced circulation so as to avoid the deposition of crystals on the walls of the device, until the point when the sodium chloride crystallises. When the concentrate reaches this point, it is sent to a Nucha-type filter where the sodium chloride crystals are retained, with great care taken to ensure that it is not redissolved.</p> <p>the water and the sodium chloride to be reused in the process. Waste containing protein is currently destroyed, though its recovery is being studied.</p>

Diagrams



Balances

	Old process	New process
Balance of materials		
Aqueous waste	25,000 l/batch	5,000 l/batch
Sodium chloride consumption	2,000 kg/batch	880 kg/batch
Water consumption	25 m ³ /batch	5 m ³ /batch
Economic balance		
Aqueous waste management costs	6,400 €/batch	1,156 €/batch
Sodium chloride cost	360 €/batch	158 €/batch
Cost of water	7.75 €/batch	1.65 €/batch
Process cost	0 €/batch	1,500 €/batch
Savings and expenses		
Saving in the management of the aqueous waste		5,264 €/batch
Saving in raw materials		208 €/batch
Water treatment and process costs		1,500 €/batch
Saving per batch		
		3,972 €/batch
Total annual saving		
		1,449,780 €/year
Investment in installations		
		€900,000
Payback period		
		0.62 years

Conclusions

The execution of this project has succeeded in reducing sodium chloride consumption by 408.8 tonnes/year and the waste associated with the manufacture of chondroitin sulphate by 7,300 m³/year, which represents an 80% reduction in this waste matter previously generated by the company and whose management is complicated. Moreover, the company is looking into the possibility of transforming the protein waste into a by-product instead of a waste product, which would represent the total elimination of the waste flow previously generated by the company. This action lies within the framework of the environmental improvement plans and of the natural environment protection policy in the area where it is located. This policy was initiated when adhering to the ISO 14000 environmental management system in 1997 and to the EMAS system in 1999.

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



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