

MedClean Propre Limpio



Regional Activity Centre
for Cleaner Production



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

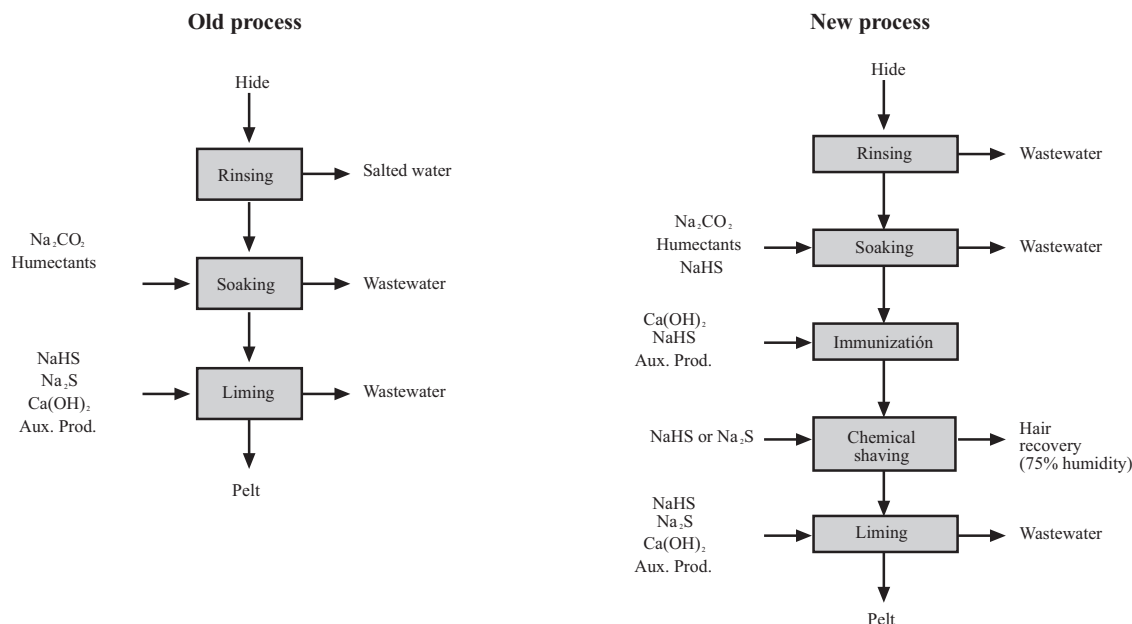
No. 24

Pollution prevention case studies

Hair recovery in the liming process

Company background	Adopted in 13 companies that belong to the Gremi de Blanquers d'Igualada.
Industrial sector	Tanning industry.
Environmental considerations	The elimination of the hair from bovine hides is traditionally achieved, after soaking, through the use of chemicals in baths with a high level of alkalinity. Under the action of the added sodium sulphide the keratin bonds are destroyed, and the hair is eliminated in the form of suspended solids or dissolved in the wastewater. The sulphide concentrations required for this operation are 2-3 % of the hide's weight. This traditional practice leads to residual baths with a high content in suspended solids, a high level of COD, high concentrations of sulphides and an important water usage of approximately 18-22 litres/kg of hide.
Background	The main incentives that led to the development of this project were the following: the need to comply with current regulations regarding permissible of respecting the available regulations relative to the permissible wastewater discharges; the possibility of using a residual matter with a high nitrogen content for agricultural purposes; the possibility of achieving a high water saving by eliminating the hair in its solid form; the possibility of reducing the consumption of sulphide.
Summary of actions	<p>The new technology is based on an immunization of the hair with an alkali such as sodium hydroxide or lime at a pH of 12.8-13 during 45-60 minutes. Sodium sulphide or sodium sulfhydrate are then added in quantities of 1-1.2% and after 30 minutes, a chemical shaving of the hair takes place. At this moment the bath is emptied from the drum and in a closed circuit passes through a filter separating the hair in its solid form. In the same filter the hair is washed reducing its salt content, thus facilitating its usage for agricultural purposes due to its high content in nitrogen. The re-circulation of the water continues during approximately 90 minutes. Afterwards, a small quantity of sodium sulphide and lime (0.5%) is added (0.5%) to destroy any remaining hair roots. Smaller quantities of water are needed in the following steps, thus realizing the same soaking and liming operation with a quantity of 15-16 litres/kg of hide.</p> <p>The action was divided into three phases:</p> <ol style="list-style-type: none"> 1. Research and analysis carried out in the facilities of the Associació d'Investigació de les Indústries del Curtit i Annexes (AIICA) to be able to determine the formulation of products, temperatures, process time and efficiency variations when the different factors vary. 2. Industrial test and adaptation of the chemical process. 3. Adaptation of the industrial facilities.

Diagrams



Balances (data on 13 companies)

		Old Process	New Process	Savings
Material Balance	Raw Material	2,000 t/month	2,000 t/month	—
	Water	42,000 m ³ /month	30,000 m ³ /month	12,000 m ³ /month
	Chemical Products	190 t/month	145 t/month	45 t/month
Pollution Level (in %)	COD	100	60	40
	Suspended Matter	100	40	60
Waste with Potential Recovery Value	Hair (25% dry matter)	—	400 t/month	—
Water and Chemical Consumption	Annual Consumption	462,000 m ³ /year	330,000 m ³ /year	132,000 m ³ /year
	Consumption Fees	47,200 €/year	33,714 €/year	13,486 €/year
	Discharging Fees	1,304,087 €/year	751,202 €/year	552,885 €/year
	Sodium sulphide	158,654 €/year	111,058 €/year	47,596 €/year
	Lime	52,885 €/year	40,986 €/year	11,899 €/year
Management costs	Humectants	528,846 €/year	462,740 €/year	66,105 €/year
	Miscellaneous	—	132,212 €/year	-132,212 €/year
	Control and Supervision	—	108,173 €/year	-108,173 €/year
Annual Savings	Maintenance	—	79,327 €/year	-79,327 €/year
	Waste Management	—	372,260 €/year	—
Investment Costs			600,962 €/year	
Payback Period			1.6 years	

Conclusions

In addition to the reduction in chemicals and water consumption, the process change carried out by these 13 companies has enabled the correct management of a solid waste that up to then was discharged together with the wastewaters. This way, the wastewater discharge costs have been reduced and the possibility of recovering this waste for agricultural purposes has emerged, reducing waste management costs even more.

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