

Conditioning factors:

In order to avoid mechanical damage to leather, the pressure of the machines should be adjusted and the hides should be well washed without attached dung.
Respect operational times and closely monitor the process.
Avoid mixing liming liquors with acid baths in order to prevent formation of SH ₂ .
Add bisulphite in order to avoid loss of SH ₂ .
Solvent can be recovered up to a certain point. Use of water-base surfactants is recommended and studies should be carried out on their recycling possibilities.
After having undertaken recycling several times, the bath should be replaced in order to maintain a uniform tanning quality.
Use between 6-8% sulphate, maintain the final temperature between 38-42°C, pH between 3.8-4.2 and tanning time between 8-12 hours.

Liquors should be carefully collected in order to avoid mixing with other wastewater.
Use of electronic scales or scales set for each item to be weighed is recommended.
Personnel should be trained to promote wise use of water.

EXAMPLES OF IMPLEMENTATION OF PPOs

HAIR RECOVERY FROM THE LIMING PROCESS IN CATTLE HIDES

	BENEFITS
13 tanneries processing 2,000 t/month of cattle hides installed a closed system of collection aimed at the liming baths and a 1-mm rotary filter in order to reduce pollution load of the effluents and recover solid waste hair for use as a fertilizer.	<ul style="list-style-type: none"> - Savings in chemicals: 23% of the weight - Savings in water used for washing: 28% - Reduction of COD by 40% and suspended matter by 60% in the wastewater - Possibility of using hair as an agricultural fertilizer

Investment (for 13 tanneries): 600,000 € **Savings:** 371,664 €/y **Payback period:** 19 months

RE-USE OF CHROME FROM THE TANNING OF SHEEP SKINS

A tannery that performs chrome tanning of 600,000 sheep skins per year:

	BENEFITS
Recycled effluents containing chrome by installing a storage tank to which the tanning bath is pumped after filtering and to which one third of new tanning solution is added.	- Reduction of wastewater requiring treatment by 8.5%
Increased the temperature and closely monitored pH in the tanning baths in order to increase the fixing of chrome in the leather.	- Reduction of toxic salts with chrome to be discharged by 55%
Recycled used black-ink solution by adding half a volume of new ink solution, by means of installing storage tanks, pipes and filters.	- Reduction of effluents from dyeing baths by 25%
Separated wastewater from liming and rinsing processes in order to treat them and eliminate discharge of sulphides into the wastewater.	

Investment: 22,050 € **Savings:** 86,436 €/y **Payback period:** 3 months

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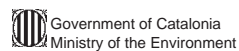
dyeing baths

period: 3 months

Mediterranean Action Plan

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Pollution prevention opportunities in the Tanning industry within the Mediterranean region



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The Regional Activity Centre for Cleaner Production (RAC/CP) of the Mediterranean Action Plan has prepared this brochure to present several pollution prevention opportunities (PPOs) for optimization of production processes in the tanning industry, which recycles a by-product of slaughterhouses (chiefly cattle and sheep hides) in order to transform it into tanned leather, a material used to prepare many useful objects.

The most widely used **tanning methods** are **mineral**, which uses trivalent chrome salts, and **vegetable**, which is based on the tanning power of vegetable extracts from wood or bark of several trees.

For example,

- 1 ton of salted **cattle hide** yields about 250 kg of finished and dry leather, 500 kg of wet by-products and 500 kg of sludge from treatment of the wastewater.
- 1 ton of Spanish medium-quality dry **sheep skin** yields about 250 kg of finished leather, 170 kg of trimmings, 200 kg of wool and 400 kg of waste and sludge from treatment of the wastewater.

General process in the tanning industry:

