

MedClean Propre Limpio



Regional Activity Centre
for Cleaner Production



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

No. 33

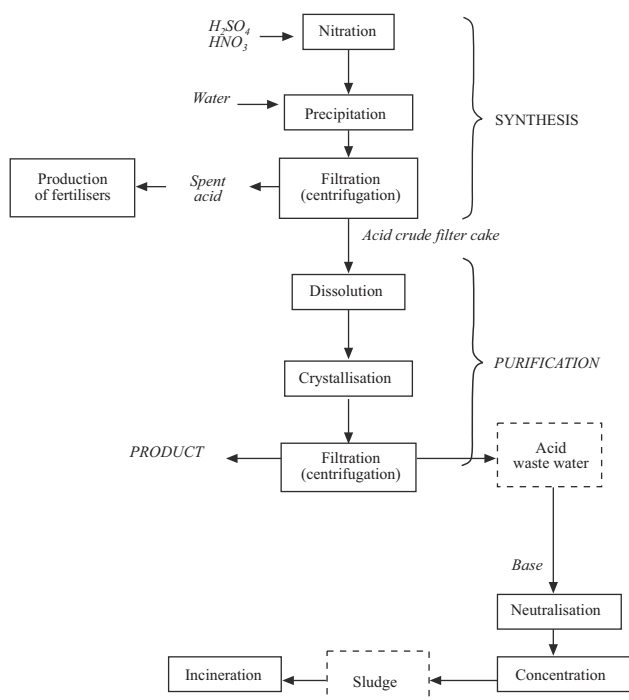
Pollution prevention case studies

Modifying an established production process to generate less waste

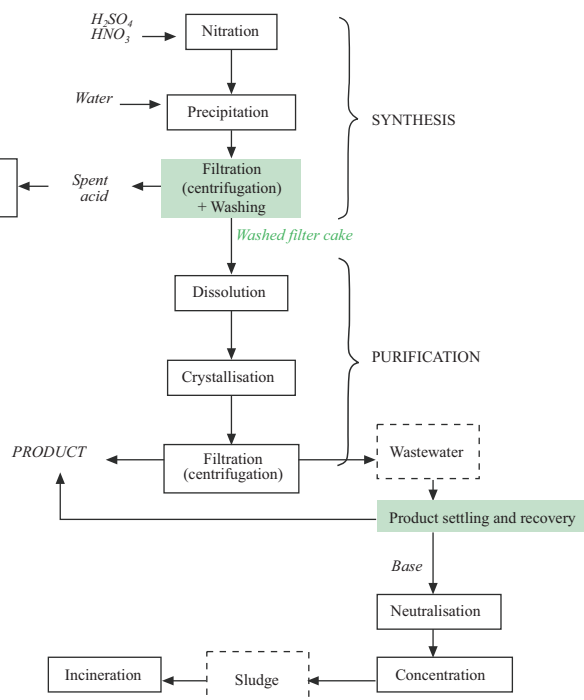
Company background	Fertilizers and Chemicals LTD (Haifa, Israel) is a medium-sized chemical company with about 270 employees that produces liquid fertiliser formulations, water treatment chemicals and organic intermediates.
Industrial sector	Chemical industry.
Environmental considerations	<p>The purification step following organic nitration synthesis usually leads to the formation of large quantities of wastewater polluted with inorganic sulphates and nitrates, along with unwanted isomers as by-products.</p> <p>The treatment of the wastewater at the organic intermediates plant is quite expensive, involving neutralisation and concentration, followed by incineration of the concentrate at an outside facility.</p>
Background	The filter cake of raw acidic nitration product is soaked with sulphuric and nitric acids. The filter cake is not washed before dissolution for purification because the wet cake hardens and then becomes very difficult to peel off. As a result, large quantities of these acids end up in the wastewater, must be neutralised and, after concentration, equally large amounts of concentrate are generated, which need to be disposed of at a high cost.
Summary of actions	<p>The process conditions at the precipitation step following nitration were modified in such a way that it now yields significantly larger crystals than previously. This allows for washing of the acid crude filter cake without it hardening.</p> <p>The short washing step introduced (actually displacement of the acid associated with the filter cake) is then performed in the centrifuge at the filtration stage.</p> <p>Consequently, wastewater acidity is now very low, requiring only a small amount of base for neutralisation, thus significantly decreasing generation of sludge to be incinerated. Due to very low concentrations of inorganic material in the wastewater, it is now possible to separate and recirculate the additional quantities of product precipitated from the wastewater during storage.</p>

Diagrams

OLD PROCESS



NEW PROCESS



Balances

	Old process (Ton/y)	New process (Ton/y)	Savings (€/y)
Generation of sludge	2,000	1,000	125,000
Consumption of neutralisation material	150	60	23,000
Product recovery from wastewater	0		102,000
Annual savings (€/y)			250,000
Total investment (€)			204,000
Payback period			10 months

Conclusions

The process modification implemented allowed the amount of waste material generated in production to be greatly reduced. At the same time, operating costs were significantly reduced allowing for a very quick return on the investment.

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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