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Regional Activity Centre
for Cleaner Production



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Pollution prevention case studies

Pollution prevention in a dairy product industry

Company background

Misr Company for Dairy and Food (Egypt) is one of the largest producers of dairy products in Egypt. The factory processes annually an average of 7,200 tonnes of milk, producing mainly pasteurised milk, white cheese, blue cheese and mish. Yoghurt, sour cream, ghee and processed cheese are also produced. An industrial audit was conducted in this company in order to identify pollution prevention opportunities.

Industrial sector

Food industry sector. Production of dairy products.

Environmental considerations

The audit identified a series of environmental considerations to take into account, mainly due to the following reasons:

- Different solid wastes were stored haphazardly in open areas and roads, constituting a fire risk and impairing the general appearance of the premises.
- Considerable amounts of milk were wasted due to overflow during the filling of storage and service tanks.
- Milk leakages occurred in the milk packaging and refrigeration units.
- Oil used in the car and truck maintenance facilities was drained to factory sewers, encouraging drain blockage and consequent development of foul odours.
- Excessive consumption of mazot in the boiler house, due to poorly turned boilers. This also resulted in excessive air emissions being discharged from the boiler stacks.

Background

During the audit stage, particular attention was paid to those improvements which could be carried out at low or no cost to the factory, focusing on the following options:

1. Good housekeeping: improvement of factory units and buildings, maintenance and upgrading of factory drainage, sewers, and manholes to eliminate blockage and overflow problems, collection of garage oil for resale, and segregation of solid wastes generated to be afterwards disposed or sold.
2. Water and energy conservation: optimisation of the ratio of air to mazot to increase the efficiency of the boilers and restoration of the softening unit to prevent the scaling of the boiler by chemical treatment of the feedwater.
3. Reuse and recycling: upgrading of raw milk storage units and the refrigeration room of the packaged milk products to prevent spoilage and loss, reuse of 50% of the permeate with a high lactose concentration in the cheese packaging stage in place of fresh water, and installation of level controls in storage tanks and control valves throughout the factory.

Summary of actions

The following actions and achievements were put into practice:

1. With low cost, improvement of the cleanliness of the factory premises was achieved, a monthly accumulation of 0.75 tonnes of used garage oil was sold at €81.4 per tonne, thereby reducing the strength of wastewater, and preventing blockage of sewers and overflow, and an efficient removal of solid wastes from the site was achieved with additional economic benefits due to selling of the same.
2. By means of the boiler tune-up and upgrade, mazot consumption was reduced by 60 tonnes/year and, in addition, energy consumption reduction was also achieved. With the restoration of the softening unit, a 16% increase in boiler efficiency was achieved.
3. By means of the installation of a refrigeration system which permitted temperature to be fully controlled and the relocation of the packaging unit from a restricted area to be adjacent to the refrigeration facility thus preventing handling losses, production capacity, process efficiency and quality control were improved, and a reduction of 3.3 tonnes/month of milk losses was achieved.

By reusing permeate in the cheese packaging stage, a 50% drop in the organic load generated from the white cheese unit was achieved, and 2,200 m³ of water were saved on an annual basis.

By installing level controls and control valves, daily savings of 350 kg of milk were obtained and pollution loads were reduced, thus improving cleanliness and hygiene.

Balances

Options	Environmental benefits	Investments	Annual savings	Payback period
Good housekeeping	<ul style="list-style-type: none"> • Prevention of blockage of sewers and overflow • Overall improvement of the factory's image and cleanliness 	€3,997	€36,245	1.3 months
Boiler upgrade and softening unit restoration	<ul style="list-style-type: none"> • Increase in boiler efficiency • Reduction of mazot consumption and gas emissions 	€592	€10,924	< 1 month
Increase in milk refrigeration efficiency	<ul style="list-style-type: none"> • Increase in production capacity, process efficiency and quality control • Reduction of reject rates of the final product 	€7,861	€11,741	8 months
Permeate reuse	<ul style="list-style-type: none"> • 50% drop in organic load generated from the white cheese unit • Water savings 	None	€612	Immediate
Installation of milk tank level controls and food quality valves	<ul style="list-style-type: none"> • Milk savings • Pollution loads reduction • Improvement of hygiene and safety 	€21,951	€37,266	7 months

Conclusions

By carrying out an environmental audit, the dairy product company identified several opportunities to prevent pollution, increase the efficiency of processes and obtain economic benefits. These opportunities were focused on good housekeeping, recovery solutions, better quality of milk products and by-products and reduction in water and energy consumption, and could be carried out at low or no cost, therefore having very short payback periods.

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

Case study presented by:

EEAA

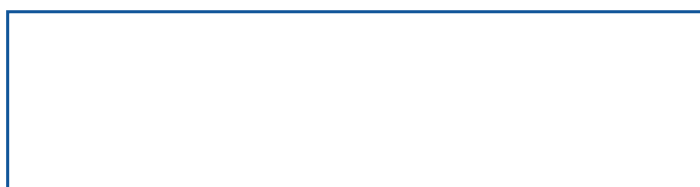
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