

MedClean Propre Limpio



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Pollution prevention case studies

Water consumption reduction in a poultry slaughterhouse

Company	<p>The poultry slaughterhouse Živinoprodukt is one of the largest slaughterhouses in Bosnia and Herzegovina. It employs 102 workers. It belongs to a group of medium size companies for production, slaughter, cooling and freezing of poultry meat.</p> <p>The total slaughter capacity is about 2,700 pieces/hour. That means 18,000 pieces in one shift.</p> <p>The products assortment of Živinoprodukt consists of broiler chicken, confection (drumstick with the leg, breasts, wings, backs) and edible offal (stomach, liver and heart).</p>
Industrial sector	Food industry, poultry slaughterhouse and chicken processing.
Environmental considerations	<p>In its production process, Živinoprodukt must pay great attention to hygiene and cleanliness. For the needs of production, water from the public water supply was being used. Thus, every year around 72,000 m³ of drinking water were spent at a rate of 48 m³/t. That represented an excessive usage of the natural resource. On the other hand, the drinking water cost accounted for 2.7% of the average selling price of 1 ton of final product, resulting in a considerable amount in the total financial business of the slaughterhouse.</p>
Background	<p>Within the EC LIFE Third Countries project “Capacity Building in Cleaner Production in Bosnia Herzegovina” (2002-2005) an industrial process analysis was carried out in Živinoprodukt to assess the overall consumption of drinking water and to identify measures through which water consumption per unit of product could be reduced. The analysis revealed the main reasons for the excessive consumption:</p> <ul style="list-style-type: none"> i) Discontinuous work in the slaughterhouse, which contributed to an increase in water consumption of up to 30%, due to the need to clean the working area every time production stopped. ii) Human factor, or irresponsible water management. A detailed analysis of water consumption at all consuming units within the production process was made. Furthermore, the opportunity for constructing a water well in order to avoid the use of drinking water in the process was assessed.
Summary of actions	<p>Upon completion of a feasibility study on technical, environmental and economical aspects, the following measures were introduced into the process:</p> <ol style="list-style-type: none"> 1. Construction of a water well with a capacity of 15 l/s of process water, which is sufficient for production capacity of 3,780-5,670 t of final products. Connecting 30% of consuming units to this water source was found feasible. In that way, 14.4 m³ of drinking water per tonne of final product were replaced by cheaper process water.

2. Installation of new nozzles on the machines for the rinsing of the slaughtered broilers in the production process that was consuming 57% of total drinking water due to water leakage in the old nozzles.
3. Installation of pistols with spray nozzles on rubber hoses for industrial cleaning of working areas, which were consuming 12% of total drinking water.
4. Installation of an electro-magnetic valve for control of consumption of water for cooling of compressor power units and ammonia condensate.

Balances

Consumption (before)	Measure	Consumption (after)	Water saving	Investment	Annual savings
14.4 m ³ /t of drinking water from city supply system with a price of 0.93 €/m ³	Construction of process water well	14,4 m ³ /t of the process water from well with the price of 0.38 €/m ³	0	€17,895	€20,875
17.28 m ³ /h	Change of nozzles of machines for the rinsing of the slaughtered broilers	10.56 m ³ /h	19,622.4 m ³ /year	€246	€18,260
3.64 m ³ /d	Installation of pistols with spray nozzles on rubber hoses	2.18 m ³ /d	532.9 m ³ /year	€299	€496
10,860 m ³ /year	Installation of electro-magnetic valve on the compressor power units	6,483.8 m ³ /year	4,376.2 m ³ /year	€562	€4,072
Water saving				24,531.5 m ³ /year	
Total investment				€19,002	
Total savings				€43,703	
Payback period				5.2 months	

Conclusions

By applying the four proposed measures, water consumption was reduced by 65 % (24,531.5 m³/year) which represented a saving of €43,703. With the installation of the electro-magnetic valve, a significant saving was also achieved in salt consumption, through the reduction in the use of softened water (883.9 €/year).

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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