Reducing water and effluent costs in meat processing

In meat, poultry and fish processing the volume of effluent produced is directly proportional to the amount of water used. One way to reduce the former is to reduce the latter! This is important because in many countries water and effluent charges are significant costs that are often rising faster than other costs. One fact is that many companies use more water than they need to and simple measures can reduce water volumes used and, hence, costs. The waste water generated by plants typically has high COD (chemical oxygen demand) and suspended solids values. In poultry processing over 60% of water usage is for evisceration and carcase cleaning and washing processes.

Ironically in the EU, water figures, especially in poultry processing plants, are high because of the need to satisfy the requirements of EU meat hygiene legislation – probably a classic case of one group of legislators practising idealism without considering its ramifications in other areas!

Usually excessive water is used because we just do not know how much we use and the real costs of using it and the fact that many staff over clean to ensure hygiene standards are met.

For example, if we reduced volume, COD and suspended solids by 25% we could save some 40% of our associated costs.

Key factors in water saving are:

- Giving staff benchmark levels for water use and costs for each area of the plant.
- Give suggestions on how to reduce water use.
- Define good housekeeping practices for reducing water use.
- Let staff know how water and effluent charges are calculated and what they are.

Typical good practice water consumption figures are 8-15 litres per chicken per day and 40-60 litres per turkey per day. So, if your figures are higher than this you should be asking the question 'Why?'

As a guide Table 1 shows water use figures for turkey processing.

Table 1. Water use by area.

Area	Water use (%)
Floor washing/equipment cleaning	30
Feather fluming	1
Crate and module washing	6
Vehicle washing	1
Scald tank	9
Evisceration	24
Carcase chilling	27
Personal hygiene	2

Step	Task	Areas for improvement
Delivery	Washing	• Optimise time between last feed and kill • Install metered water dispensers • Use low volume, high pressure sprays
Slaughter		• Improve stunning • Improve blood collection
Evisceration and processing	Carcase washing Spray cooling	• Use direct spray nozzles • Control water use • Maintain nozzles
General cleaning	Clear scraps Wash down Conveyor clean	• Collection and dry clean up • Use of cyclonic vacuum cleaners • Use appropriate cleaning methods • Use appropriate chemicals
Effluent treatment		• Maintain screens - optimise performance

Fig. 1. Areas for water savings.

When calculating water costs remember that there is an additional power cost in the production of hot water and additional costs are incurred with on-site softening of water. Usually, per m^3 charges for effluent are two to three times higher than water charges.

Obviously when you know what your water usage is and which areas have the greatest costs, the greatest savings are going to come from focusing on these!

Typically water savings of 10-20% are achievable and the associated financial saving justifies the exercise. Water wastage comes from leaks, taps and hoses left on, poorly maintained sprays, wrong spray heads and poor targeting of sprays. Examples of water savings are shown in Fig. 1.

Other ways to save water is to interface sprays and conveyors/shackle lines so that the former cease operation when the latter stop for any reason, such as a breakdown. Up to a quarter of water used in evisceration is for carcase sprays so the use of the correct sprays, correctly targeted on to carcases is important. Spray washing the walls is wasting water!

Some 30% of water is used for cleaning so improving cleaning should give real water savings. It might make sense to use better or more cleaning agents because their costs are more than offset by the savings related to water usage (water, effluent and heating).

For example, do not use large volumes of water to remove meat scraps – they can be collected by dry clean-up methods (scrapers and brushes, encouraging staff to collect off lines and bin, etc). Do not let solid waste into the drainage system!

Remember if there is no hose in an area staff can not use it! ■

Multi-resistant E. coli

AES Chemunex have an alternative detection method for ESBL-E. coli, including the O104:H4 strain, which caused the recent outbreak in Germany.

The protocol is easy to carry out: one enrichment step in BPW at 37°C for 24 hours, followed by an isolation on the SEMIA chromogenic plate incubated at 37°C for 24 hours.

Suspicious ESBL-E. coli form blue-green colonies on SEMIA.

The blue-green colouration results from production of β-glucuronidase, which is associated with resistance to Ceftazidime making this medium highly specific.

The use of an antibiotic mix greatly enhances inhibition of any background flora and makes reading and interpretation easy.

AES Chemunex also offers E. coli antisera (O104 and H4) for serotyping. ■