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## **PROCESSING TIP . . .**

### **REDUCING PROCESS WASTEWATER LOADING BY INCREASING BLEED TIME**

It is logical to assume that allowing birds to bleed out for a longer period of time during the slaughter process would result in greater blood recovery for rendering and less blood entering the scalding and other processing wastewater streams. However the potential economic impact of increasing bleed times in poultry processing has not been established, until now.

Extension poultry scientists at the University of Georgia conducted an experiment to establish the impact that different bleed times can have on the subsequent organic load found in scalding wastewater in terms of chemical oxygen demand (COD) and surcharge fees that can ensue. Currently on average, poultry processing plants bleed broiler carcasses for approximately 90 seconds. Industry bleed times can range from ~60 seconds (bleed times lower than 60 seconds raise the concern that birds might not exsanguinate prior to entering the scalding tank) to ~120 seconds (longer bleed times tend to lead to feather picking difficulty due to increasing feather set post-exsanguination).

#### **Bleed Time Experiment**

Twenty-four, 8-week old male commercial broilers with an average live weight of 9.0 lbs (4.1 kg) were randomly divided into 2 treatment groups, those bled for a period of 60 seconds and those bled for 120 seconds. Each broiler was electrically stunned and exsanguinated, and the blood collected for the specified period of time and weighed. Once bleed out was completed, any remaining blood draining from the carcass was allowed to enter an individual scalding tank containing 4.2 gallons (16 liters) of clean, heated water. Each carcass was then lowered into the tank and manually agitated for 2 minutes. The carcass was then removed and a sample of the scalding water was collected for COD analysis.

#### **Results: Blood Volume Recovered**

The weight of blood collected from each broiler was first converted to a percentage (%) of live body weight and the 2 bleed times were compared. The results of this comparison show that carcasses bled for 120 seconds averaged a recovered blood volume of 2.5% of live body weight, which was significantly greater than the 2.0% found in carcasses bled for 60 seconds. Interestingly, the results also show a substantial difference in the variation of individual bleed out volumes between the 2 bleed out times. The volume of blood from carcasses bled for 60 seconds ranged from 1.0 to 2.9% of live body weight, while carcasses bled for 120 seconds ranged from 2.0 to 2.8%.

### **PUTTING KNOWLEDGE TO WORK**

### Results: COD Load in Scalding Wastewater

Because a known volume of water was used in each scalding (16 L), the COD concentration (mg/L) of each of the 24 scalding wastewater samples was converted to a load (in grams) by simply multiplying the COD mg/L concentration result by the scalding water volume (i.e., 16 L). The result was grams of COD loading in each scalding wastewater sample and the 2 different bleed times were again compared.

The results of this comparison that carcasses bled for only 60 seconds averaged a COD load of 9.85g, which was significantly greater than the average COD load of 6.49g found in carcasses bled for 120 seconds, an average difference per bird of 3.36g. In other words, the carcasses bled for only 60 seconds contributed an increased average of 0.5% of live weight in unrecovered blood into the scalding resulting in a 34% increase in the COD load.

As with the recovered blood volume, the results also show a substantial difference in the variation of COD loading between the 2 bleed out times. The COD load for 60 seconds ranged from 3.97 to 14.13g, while carcasses bled for 120 seconds ranged from 5.02 to 7.94g.

### Economic Impact

With results of this experiment showing a per bird decrease in 3.36g of COD load to wastewater through a 60 second increase in bleed time, an economic impact based on reduced surcharge fees can be calculated. For a typical broiler slaughter plant processing 250,000 birds per day (bpd), 260 processing days per year, and paying \$0.30 per lb of COD in surcharges:

$$\begin{aligned}(250,000 \text{ bpd}) (3.36\text{g}) &= 840,000\text{g/d or } 840 \text{ kg/d} \\ 840 \text{ kg/d} &= 1852 \text{ lbs/d} \\ (1852 \text{ lbs/d}) (\$0.30/\text{lb}) &= \$ 555.60 / \text{day} \\ (\$ 555.60/\text{d}) (260 \text{ processing days/year}) &= \mathbf{\$ 144,456.00 /year}\end{aligned}$$

The results of this experiment demonstrate that increasing bleed time has a direct impact on processing wastewater COD load. Using these experimental data, an increase of bleed time from 1 to 2 minutes could potentially save a typical processing plant over \$140,000 per year in reduced wastewater surcharges.



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“Your local County Extension Agent is a source of more information on this subject.”