AviBrom Confirmed Effective in Commercial and University Poultry Processing Trials

Two research trials—one commercial and one university—evaluated and compared the antimicrobial efficacy of AviBrom® when applied in poultry processing. Both studies confirmed the efficacy of AviBrom as a postharvest intervention to significantly reduce *Salmonella* and *Campylobacter*.

COMMERCIAL TRIAL[1]

DESIGN

In a commercial turkey processing plant a new carcass wash cabinet was designed and installed to provide a mechanical washing action. Immediately following the cabinet there was a dip tank that was installed to apply an acidifier. For the experimental design turkey hens were processed in a typical daily fashion, with no alterations to normal operations.

- Just prior to the Avibrom spray cabinet one of the wings was cut off the carcass in a randomized fashion. This sample served as the control or non-treated paired sample.
- Post Citrox™ dip, the opposite wing was cut off the same carcass. This sample served as the treated paired sample. Each sample consisted of a composite of 4 wings.
- These samples were processed following FSIS standard method for rinse procedures utilizing neutralizing buffered peptone water (nBPW).

Three groups were treated with AviBrom at 300 ppm in the spray cabinet + Citrox (1.5 pH) Dip, 16 samples per group for a total of 48 samples. Three groups were treated with AviBrom 300 ppm in the final wash cabinet, 10 samples per group, for a total of 30 samples.

TABLE 1. SUMMARY OF LOG_{10} TRANSFORMED SAMPLE RESULTS

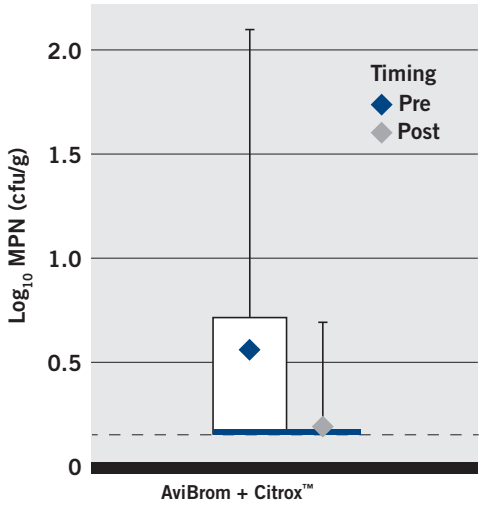
Metric	TREATMENT	PRE-TREATMENT	POST-TREATMENT	REDUCTION	SD OF REDUCTION	*P*-VALUE
APC	AVIBROM + CITROX	4.69	3.48	-1.21	0.85	<0.01
EB	AVIBROM + CITROX	3.85	2.73	-1.11	0.47	<0.01
MPNs	AVIBROM + CITROX	0.57	0.21	-0.36	0.60	0.01

RESULTS

- Statistically significant reductions were seen for Aerobic Plate Counts (APCs), Enterobacteriaceae (EBs) and Most Probable Numbers (MPNs) when using AviBrom + Citrox (Table 1, Table 2 and Figure 1).

When looking at MPN, it is important to note that the levels were low in the pre-treatment group, which makes it difficult to show a significant difference post-treatment. However, Table 2 shows that AviBrom® improved the % Limit of Quantification (LOQ), even when levels were low in the pretreatment group.

FIGURE 1: Boxplot of MPN results



UNIVERSITY TRIAL[2] STUDY DESIGN

- The study was conducted at the University of Arkansas Pilot Processing Plant in accordance with standard processing procedures
- Antimicrobial treatments were applied in multiple locations including the use of a spray cabinet (post-pick), post-evisceration dip (10 seconds), chiller (60-minute chill time), and post-chill dip (10 seconds) to test the antimicrobial products. Treatment groups are shown in Figure 2.
- Prior to any antimicrobial treatment application, control birds were processed and sampled to evaluate the total microbial load going into the system at the post-pick station.

TABLE 2. PERCENT OF MPN RESULTS BELOW LOQ

TREATMENT	RESULTS BELOW LOQ (%)	
	PRE	POST
AVIBROM + CITROX	54.2	83.3
PRE-IOBW POST FINAL WASH	80.0	86.7

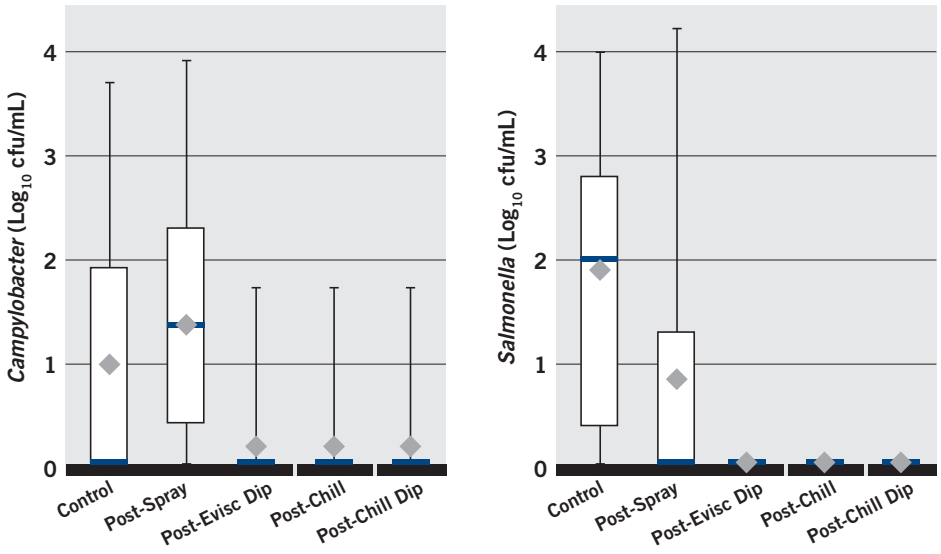
STUDY RESULTS

- AviBrom reduced *Salmonella* (Figure 3 and Table 3) throughout processing. Data shows that there are significant treatment effects throughout processing. Overall, the use of AviBrom reduced *Salmonella* load when used in poultry processing.
- Likewise, *Campylobacter* is also reduced by the addition of AviBrom (Figure 3 and Table 3). There were also significant reductions in prevalence from Control to Post-Spray with treatment resulting in a decrease in prevalence from 70% to 30%.

FIGURE 2. TREATMENT GROUPS

GROUP	STATION	ANTIMICROBIAL TREATMENT
GROUP 1	PRE-POST-PICK-SPRAY	CONTROL
GROUP 1	POST-PICK SPRAY	AVIBROM (400 PPM)
GROUP 1	POST-EVISCERATION DIP	AVIBROM (400 PPM)
GROUP 1	CHILL	PAA (75 PPM)
GROUP 1	POST-CHILL DIP	AVIBROM (400 PPM) + CITROX (1.5 PH)

FIGURE 3: Boxplot of *Salmonella* & *Campylobacter* Results by Group and Location



Campylobacter and *Salmonella* microbial recovery from poultry carcasses were reduced when AviBrom was added to poultry processing.

TABLE 3. SUMMARY OF *CAMPYLOBACTER* AND *SALMONELLA* RESULTS FOR ALL GROUPS AND LOCATIONS

LOCATION	SAMPLES	*CAMPYLOBACTER*			*SALMONELLA*		
		MEAN	SD	PREVALENCE (%)	MEAN	SD	PREVALENCE (%)
CONTROL	10	1.01	1.41	40	1.86	1.49	70
POST-SPRAY	10	1.86	1.51	70	0.81	1.44	30
POST-EVISC DIP	10	0.17	0.54	10	0.00	0.00	0
POST-CHILL	10	0.17	0.54	10	0.00	0.00	0
POST-CHILL DIP	10	0.17	0.54	10	0.00	0.00	0

SUMMARY

AviBrom® was effective in significantly reducing *Salmonella* and *Campylobacter* throughout poultry processing intervention. These effects are likely bactericidal—which has been shown in additional research studies[3]—and does not generate a viable but non-culturable response as seen with other antimicrobial compounds, like Peracetic Acid (PAA)[4]. Given the other benefits of AviBrom—such as being less odorous and corrosive to production equipment—AviBrom is a potent alternative antimicrobial treatment for poultry processing and production when implemented as a component of a multi-hurdle approach[5].

PASSPORT
Food Safety Solutions powered by ARM & HAMMER

1 Passport Food Safety Solutions Commercial Trial, 2019. Data on File.
2 Feye KM, Bokengroger C, McReynolds J, Owens CM, Ricke SC. Evaluation of AviBrom for the reduction of foodborne pathogens in a pilot poultry processing plant. University of Arkansas, 2019. Data on file.
3 Gage LP, Nixon B, Bodine K. Peracetic acid (PAA) induced viable but non-culturable *Salmonella* in poultry meat. IAFP 2015.
4 Álvarez-Ordóñez A, Prieto M, Bernardo A, Hill C, López M. The Acid Tolerance Response of *Salmonella* spp.: An adaptive strategy to survive in stressful environments prevailing in foods and the host. *Food Research International* 2012;45:482-492.
5 Liimatta et al., 2010. Degradation testing of concrete. Data on file.