Evaluation of Hygiena's BAX® System Real-Time PCR Assay for *Salmonella* in Poultry Primary Production Boot Swabs

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Introduction:

Salmonella commonly infects poultry and is extensively found in primary production facilities throughout the United States and UK. Since the organism is shed in feces, boot swab sampling provides an easy collection system to assess the prevalence of *Salmonella* in flocks. If found positive, the appropriate control measures and sanitation procedures can be applied to decrease and prevent contamination during processing. PCR screening methods are a fast and effective option for detecting *Salmonella* in such sample types.

Purpose:

The objective of this study was to evaluate the performance of the BAX® Real-Time PCR assay for *Salmonella* in poultry primary production boot swabs using 2 different enrichment volumes.

Method:

Boot swabs acquired from an industry partner over two weeks were tested for the presence of *Salmonella*. Samples from week 1 (n = 26) were enriched in 225 mL of pre-warmed BPW while samples from week 2 (n=20) were enriched in 100 mL of pre-warmed BPW. After incubation at 37˚C, all sample enrichments were screened by PCR with and without a BHI secondary enrichment and culture confirmed according to the isolation procedures in the National Poultry Improvement Plan Program standards (NPIP, December 2019).

Results:

Boot swabs with and without a BHI secondary enrichment returned consistent positive results for *Salmonella* in 11/26 (week 1) and 6/20 (week 2) samples (Table 1). All PCR results were confirmed correct by culture demonstrating 100% sensitivity and 100% specificity.

Table 1. BAX® System Method Presumptive vs. Confirmed Results

Sample Type	Enrichment	Incubation	N	BAX® System Presumptive		Culture Confirmed
				24 hours	24 hours + secondary enrichment	24 hours
1 Boot swab (week 1)	225 mL of pre-warmed (35°C) BPW	37°C for 24h	26	11	11	11
1 Boot swab (week 2)	100 mL of pre-warmed (35°C) BPW	37°C for 24h	20	6	6	6

Table 1. Detection of *Salmonella* spp. from boot swab enrichments using BAX® System Real-time *Salmonella* Assay.

Significance:

These results demonstrate the ability of a rapid Real-Time PCR assay to be used as a reliable indicator for the status of *Salmonella* in flocks statistically equivalent to culture. Furthermore, this study demonstrates the ability of detection in two enrichment volumes:

- Enrich 1 boot swab in 225 mL of pre-warmed (35°C) BPW and incubate at 37°C for 24 hours.
- Enrich 1 boot swab in 100 mL of pre-warmed (35°C) BPW and incubate at 37°C for 24 hours.

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