



Aim:

To evaluate the performance of the RapidChek SELECT *Salmonella* test system against the FDA BAM (Chapter 5 *Salmonella*) for the detection of *Salmonella* spp. in shrimp and catfish.

Experimental Protocol:

Sample Inoculation:

Single colony isolates of *Salmonella* Typhimurium (ATCC 14028) were grown in 10 mL of TSB broth at 35°C for 24 hours. The cultures were enumerated by dilution plate counting.

Two methods were evaluated in the study (RapidChek and FDA BAM). Samples were bulk-inoculated with *Salmonella* Typhimurium using a low inoculum (1 cell per sample). Non-inoculated samples were treated as negative controls.

Method Comparison – FDA BAM: Chapter 5: *Salmonella*:

Samples were enriched with 225mL of Lactose Broth (LB). The samples were homogenized by stomaching for 2 minutes and incubated at 35±2°C for 22-26 hours. Following incubation 1mL of sample was transferred into 10mL of Tetrathionate broth and 0.1mL of sample was transferred into 10 mL of Rappaport-Vassiliadis (RV) broth. The RV and TT were incubated at 42±0.2°C and 35±2°C for 22-26 hours. After incubation the

contents of the RV and TT tubes were mixed by vortexing and 10uL aliquots were struck to Hektoen Enteric (HE), and Xylose Lysine Deoxycholate (XLD) agars and incubated at 36± 1°C for 18-24 hours. After incubation plates were examined for the presence of typical *Salmonella* colonies. All plates were then incubated at 35±2°C for an additional 18-24 hours.

Method Comparison – Romer Labs RapidChek SELECT *Salmonella*:

Samples were enriched with 225mL of RapidChek SELECT Primary Media, homogenized by stomaching for 30 seconds and incubated at 42±2°C for 16-22 hours. Following incubation 0.1mL of enrichment was transferred into tubes containing 1.0mL of RapidChek SELECT Secondary Media and returned to the 42°C incubator for an additional 6-8 hours. RapidChek secondary enrichments were also evaluated after 16-22h of incubation. Following both incubation time-points the required number of test strips were removed from the RapidChek SELECT *Salmonella* canister and a single strip was inserted, with the arrow facing down, into each sample tube. The strip was allowed to develop for a minimum of 10 minutes and all results were interpreted in 20 minutes. All samples regardless of presumptive result, were confirmed by streaking to HE and XLD agars as previously described.



Results:

Table 1: Detection of *Salmonella* Typhimurium ATCC 14028 in Shrimp

Analyte	Method	Number of samples	Inoculation level cells/sample	Presumptive Positives	Confirmed Positives
<i>Salmonella</i> Typhimurium ATCC 14028	RapidChek	5	0	0	0
		20	1	11	11
	FDA BAM	5	0	0	0
		20	1	NA	12

Table 2: Detection of *Salmonella* Typhimurium ATCC 14028 in Catfish

Analyte	Method	Number of samples	Inoculation level cells/sample	Presumptive Positives	Confirmed Positives
<i>Salmonella</i> Typhimurium ATCC 14028	RapidChek	5	0	0	0
		20	1	10	10
	FDA BAM	5	0	0	0
		20	1	NA	7

Table 3. Summary statistical analysis of the method comparison between RapidChek and the cultural method for the detection of *Salmonella* spp. in seafood

Analyte	Inoculation Level (cells per sample)	Number of Samples	RapidChek	FDA BAM	Chi-square ^a	Sensitivity Rate ^b	False Negative Rate ^c	Specificity Rate ^d	False Positive Rate ^e	Accuracy ^f
<i>S. Typhimurium</i> ATCC 14028	0	5	0	0	0.197	100	0	100	0	111
	1	40	21	19						

^a Mantel-Haenszel Chi-square analysis (significant difference if greater than 3.84)

^b Sensitivity Rate = (No. of test method presumptive positives)/(No. of test method confirmed positives) x 100

^c False Negative Rate = 100 - Sensitivity Rate

^d Specificity Rate = (No. of test method negatives)/(No. of confirmed negatives) x 100

^e False Positive Rate = 100 - Specificity Rate

^f Accuracy (Relative Sensitivity) = (No. of test method positives)/(No. of reference method positives) x 100

Discussion and Conclusions:

RapidChek detected 11 and 10 low-level inoculated shrimp and catfish samples, respectively, while the FDA BAM reference method detected 12 and 7 samples as positive (Tables 1 and 2). All RapidChek method presumptive positives and

negatives were confirmed by the cultural method. There was no significant difference realized in the number of positives between RapidChek and the cultural method (Table 3).

The RapidChek SELECT *Salmonella* test system demonstrated equivalent



performance to the culture method for the recovery and detection of *Salmonella* in seafood samples in significantly less time. Results can be obtained with RapidChek in just 22 hours as compared to 62 - 76

hours with the cultural method. RapidChek will provide users with a rapid, reliable, cost-effective tool for monitoring and controlling *Salmonella* species in these sample matrices.

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