



## Quarterly Results for Serotyping of Salmonellae from Meat and Poultry Products

January – December 2009

### Background

The Food Safety and Inspection Service (FSIS) issued the *Pathogen Reduction; Hazard Analysis and Critical Control Point (PR/HACCP) Systems, Final Rule* on July 25, 1996: Federal Register, Vol. 61, No. 144, pp. 38805-38989 (<http://www.fsis.usda.gov/OPPDE/rdad/FRPubs/93-016F.pdf>). The PR/HACCP rule sets *Salmonella* performance standards for establishments that slaughter or produce selected classes of food animals or raw ground products. Under PR/HACCP, performance standards were established for carcasses of cows/bulls, steers/heifers, market hogs, broilers, ground beef, ground chicken, and ground turkey based on nationwide microbiological baseline studies conducted before the rule was implemented. In June 2006, FSIS began sampling turkey carcasses for *Salmonella*. Guidance on standards for turkey carcasses can be found in the Federal Register, Vol.70, No. 32, pp.8058-8060 (<http://www.fsis.usda.gov/OPPDE/rdad/FRPubs/02-046N.pdf>).

Prior to 2006, there were two phases of the FSIS regulatory program for *Salmonella* in raw products: non-targeted and targeted testing. Non-targeted or "A" set samples were collected at establishments randomly selected from the population of eligible establishments with a goal of scheduling every eligible establishment at least once a year. Other codes (such as "B", "C", and "D") represented sample sets collected from establishments targeted for follow-up testing following a failed set. FSIS replaced the targeted/non-targeted approach with risk-based scheduling in 2006. The serotype data in this report are from all sample sets.

In February 2006, FSIS announced in the Federal Register, Vol. 71, No. 38, pp. 9772-9777, (<http://www.fsis.usda.gov/Frame/FrameRedirect.asp?main=http://www.fsis.usda.gov/OPPDE/rdad/FRPubs/04-026N.htm>) and described in detail in a Federal Register Notice of January 2008, Vol. 73, No. 18, pp. 4767-4774, (<http://www.fsis.usda.gov/Frame/FrameRedirect.asp?main=http://www.fsis.usda.gov/OPPDE/rdad/FRPubs/2006-0034.htm>) that quarterly results from *Salmonella* verification testing would be posted and that the Agency would provide individual test results to establishments before completion of a set. The Agency has published quarterly *Salmonella* results since 2006 ([http://www.fsis.usda.gov/PDF/Q1\\_2009\\_Salmonella\\_Testing.pdf](http://www.fsis.usda.gov/PDF/Q1_2009_Salmonella_Testing.pdf); [http://www.fsis.usda.gov/PDF/Q2\\_2009\\_Salmonella\\_Testing.pdf](http://www.fsis.usda.gov/PDF/Q2_2009_Salmonella_Testing.pdf); [http://www.fsis.usda.gov/PDF/Q3\\_2009\\_Salmonella\\_Testing.pdf](http://www.fsis.usda.gov/PDF/Q3_2009_Salmonella_Testing.pdf); [http://www.fsis.usda.gov/PDF/Q4\\_2009\\_Salmonella\\_Testing.pdf](http://www.fsis.usda.gov/PDF/Q4_2009_Salmonella_Testing.pdf)).

In June 2006, FSIS developed new criteria for scheduling establishments ([http://www.fsis.usda.gov/pdf/scheduling\\_criteria\\_salmonella\\_sets.pdf](http://www.fsis.usda.gov/pdf/scheduling_criteria_salmonella_sets.pdf)) that are risk-based and designed to focus FSIS resources on establishments that have the most samples positive for *Salmonella* and the greatest number of samples with serotypes most frequently associated with human salmonellosis as defined by the Centers for Disease Control and Prevention (CDC) (<http://www.cdc.gov/ncidod/dbmd/phlisdata/salmonella.htm>). Establishments are no longer randomly selected under the new criteria. One of the goals of the revised risk-based program is to identify the source of serotypes of the greatest human health concern and to report those findings directly to establishments. FSIS also now ensures that all pathogens of public health



concern are identified regarding both their subtype (serotype and PFGE pattern) and their drug resistance profiles.

## Results

This report includes four quarters of *Salmonella* serotype data for 2009. Data depicted represent samples collected from January 1 through December 31, 2009. The number of isolates of each serotype, the percent of isolates out of total positive, and the percent of isolates of total samples collected are displayed in Tables 1-32. Second quarter results do not match the Agency's quarterly *Salmonella* published results. A ground beef sample previously reported as positive was later identified as negative.

The 10 most commonly isolated serotypes for each product class during each quarter are identified by name in each table. Less commonly identified serotypes are included in the "other serotypes" category. When there is more than one serotype in tenth place, all serotypes in tenth place are listed. The tables also include entries classified as "unidentified" isolates. A single, specific serotype could not be determined for these isolates.

Figures 1-11 display the percent of isolates identified out of total isolates serotyped for each product class by quarter from July 2005 forward for the top 10 serotypes associated with human illness in 2008 as reported by the Centers for Disease Control and Prevention (CDC), <http://www.cdc.gov/mmwr/preview/mmwrhtml/mm5813a2.htm>. For consistency in the graphs, data collected prior to the 2006 revisions were updated to include results from all sets. In reviewing Figures 1-11, the y-axis, representing the serotype percentage, varies from graph to graph because the incidence of different serotypes by commodity varies greatly and year-to-year variations in percentages are difficult to discern on one scale of high value.

## Limitations

Restructuring how *Salmonella* sets are scheduled means that comparison of results from 2006 onwards to previous years will be less meaningful in terms of trends. Similarly, the changes to the verification program will prevent valid comparisons of testing results over time (e.g., quarter-to-quarter or year-to-year trends).



Table 1  
Serotypes Profile of Analyzed PR/HACCP Verification Samples by Quarter.  
Broilers  
All Samples – 1<sup>st</sup> Quarter 2009

Serotypes	# Isolates	% of Total Positive	% Analyzed Samples
Kentucky	54	39.71	3.55
Enteritidis	26	19.12	1.71
Heidelberg	24	17.65	1.58
8,20:-:z6	6	4.41	0.39
Typhimurium (var. Copenhagen)	5	3.68	0.33
Montevideo	2	1.47	0.13
Schwarzengrund	2	1.47	0.13
Typhimurium	2	1.47	0.13
Worthington	2	1.47	0.13
4,12:i:-	1	0.74	0.07
4,5,12:i:-	1	0.74	0.07
Agona	1	0.74	0.07
III48:g,z51:-	1	0.74	0.07
Kiambu	1	0.74	0.07
Litchfield	1	0.74	0.07
Mbandaka	1	0.74	0.07
Quakam	1	0.74	0.07
Senftenber	1	0.74	0.07
Thompson	1	0.74	0.07
Other serotypes	0	0.00	0.00
Unidentified	2	1.47	0.13
Not typed	1	0.74	0.07
<sup>a</sup> Total positive	136		8.95
Total number of analyzed samples	1519		

<sup>a</sup> The percentages listed for total positive isolates may not equal the sum of % analyzed samples due to rounding



Table 2  
Serotypes Profile of Analyzed PR/HACCP Verification Samples by Quarter.  
Market Hogs  
All Samples – 1<sup>st</sup> Quarter 2009

Serotypes	# Isolates	% of Total Positive	% Analyzed Samples
Derby	8	21.62	0.45
Typhimurium (var. Copenhagen)	6	16.22	0.34
Infantis	4	10.81	0.22
Anatum	3	8.11	0.17
Agona	2	5.41	0.11
Heidelberg	2	5.41	0.11
Adelaide	1	2.70	0.06
Braenderup	1	2.70	0.06
Bredeney	1	2.70	0.06
Johannesburg	1	2.70	0.06
London var. 15+	1	2.70	0.06
Montevideo	1	2.70	0.06
Ohio	1	2.70	0.06
Reading	1	2.70	0.06
Saintpaul	1	2.70	0.06
Schwarzengrund	1	2.70	0.06
Typhimurium	1	2.70	0.06
Worthington	1	2.70	0.06
Other serotypes	0	0.00	0.00
<sup>a</sup> Total positive	37		2.08
Total number of analyzed samples		1781	

<sup>a</sup> The percentages listed for total positive isolates may not equal the sum of % analyzed samples due to rounding.



Table 3  
Serotypes Profile of Analyzed PR/HACCP Verification Samples by Quarter.  
Cows/Bulls  
All Samples – 1<sup>st</sup> Quarter 2009

Serotypes	# Isolates	% of Total Positive	% Analyzed Samples
Montevideo	2	40.00	0.26
6,7:k:-	1	20.00	0.13
Give	1	20.00	0.13
Mbandaka	1	20.00	0.13
Other serotypes	0	0.00	0.00
<sup>a</sup> Total positive	5		0.66
Total number of analyzed samples	763		

<sup>a</sup> The percentages listed for total positive isolates may not equal the sum of % analyzed samples due to rounding.



Table 4  
Serotypes Profile of Analyzed PR/HACCP Verification Samples by Quarter.  
Steers/Heifers  
All Samples – 1<sup>st</sup> Quarter 2009

Serotypes	# Isolates	% of Total Positive	% Analyzed Samples
	0.00	0.00	0.00
Other serotypes	0.00	0.00	0.00
Unidentified	1	100.00	0.08
Total positive	1		0.08
Total number of analyzed samples	1267		



Table 5  
Serotypes Profile of Analyzed PR/HACCP Verification Samples by Quarter.  
Ground Beef  
All Samples – 1<sup>st</sup> Quarter 2009

Serotypes	# Isolates	% of Total Positive	% Analyzed Samples
Dublin	8	19.05	0.26
Newport	6	14.29	0.19
Montevideo	5	11.90	0.16
Typhimurium	4	9.52	0.13
Kentucky	3	7.14	0.10
Anatum	2	4.76	0.06
Anatum var. 15+	2	4.76	0.06
Cerro	2	4.76	0.06
Meleagridis	2	4.76	0.06
3,15:3,h:-	1	2.38	0.03
Agona	1	2.38	0.03
Infantis	1	2.38	0.03
Muenchen	1	2.38	0.03
Muenster	1	2.38	0.03
Rubislaw	1	2.38	0.03
Typhimurium (var. Copenhagen)	1	2.38	0.03
Other serotypes	0	0.00	0.00
Unidentified	1	2.38	0.03
<sup>a</sup> Total positive	42		1.36
Total number of analyzed samples	3078		

<sup>a</sup> The percentages listed for total positive isolates may not equal the sum of % analyzed samples due to rounding



Table 6  
Serotypes Profile of Analyzed PR/HACCP Verification Samples by Quarter.  
Ground Chicken  
All Samples – 1<sup>st</sup> Quarter 2009

Serotypes	# Isolates	% of Total Positive	% Analyzed Samples
Enteritidis	9	47.37	10.23
Braenderup	2	10.53	2.27
Heidelberg	2	10.53	2.27
Kentucky	2	10.53	2.27
4,12:r:-	1	5.26	1.14
4,5,12:i:-	1	5.26	1.14
8,20:-:z6	1	5.26	1.14
Montevideo	1	5.26	1.14
Other serotypes	0	0.00	0.00
<sup>a</sup> Total positive	19		21.59
Total number of analyzed samples		88	

<sup>a</sup> The percentages listed for total positive isolates may not equal the sum of % analyzed samples due to rounding.



Table 7  
Serotypes Profile of Analyzed PR/HACCP Verification Samples by Quarter.  
Ground Turkey  
All Samples – 1<sup>st</sup> Quarter 2009

Serotypes	# Isolates	% of Total Positive	% Analyzed Samples
Saintpaul	8	33.33	3.90
Hadar	5	20.83	2.44
Agona	2	8.33	0.98
Heidelberg	2	8.33	0.98
Albany	1	4.17	0.49
Branderburg	1	4.17	0.49
Cerro	1	4.17	0.49
Muenchen	1	4.17	0.49
Schwarzengrund	1	4.17	0.49
Senftenber	1	4.17	0.49
Other serotypes	0	0.00	0.00
Unidentified	1	4.17	0.49
<sup>a</sup> Total positive	24		11.71
Total number of analyzed samples	205		

<sup>a</sup> The percentages listed for total positive isolates may not equal the sum of % analyzed samples due to rounding.



Table 8  
Serotypes Profile of Analyzed PR/HACCP Verification Samples by Quarter.  
Turkeys  
All Samples – 1<sup>st</sup> Quarter 2009

Serotypes	# Isolates	% of Total Positive	% Analyzed Samples
Hadar	1	100.00	10.00
Other serotypes	0	0.00	0.00
Total positive	1		10.00
Total number of analyzed samples	10		



Table 9  
Serotypes Profile of Analyzed PR/HACCP Verification Samples by Quarter.  
Broilers  
All Samples –2<sup>nd</sup> Quarter 2009

Serotypes	# Isolates	% of Total Positive	% Analyzed Samples
Kentucky	39	35.45	1.84
Enteritidis	26	23.64	1.23
Heidelberg	19	17.27	0.90
Hadar	6	5.45	0.28
Typhimurium (var. Copenhagen)	6	5.45	0.28
8,20:-z6	4	3.64	0.19
4,5,12:i:-	3	2.73	0.14
Typhimurium	2	1.82	0.09
4.12:i:-	1	0.91	0.05
6,7:k:-	1	0.91	0.05
Minnesota	1	0.91	0.05
Montevideo	1	0.91	0.05
Schwarzengrund	1	0.91	0.05
Other serotypes	0	0.00	0.00
Total positive	110		5.20
Total number of analyzed samples		2114	



Table 10  
Serotypes Profile of Analyzed PR/HACCP Verification Samples by Quarter.  
Market Hogs  
All Samples –2<sup>nd</sup> Quarter 2009

Serotypes	# Isolates	% of Total Positive	% Analyzed Samples
Derby	5	15.63	0.37
Typhimurium (var. Copenhagen)	5	15.63	0.37
Johannesburg	3	9.38	0.22
Agona	2	6.25	0.15
Saintpaul	2	6.25	0.15
Typhimurium	2	6.25	0.15
Adelaide	1	3.13	0.07
Anatum	1	3.13	0.07
Bredeney	1	3.13	0.07
Cerro	1	3.13	0.07
Chailey	1	3.13	0.07
Havana	1	3.13	0.07
Heidelberg	1	3.13	0.07
Infantis	1	3.13	0.07
Mbandaka	1	3.13	0.07
Muenchen	1	3.13	0.07
Rissen	1	3.13	0.07
Senftenber	1	3.13	0.07
Uganda	1	3.13	0.07
Other serotypes	0	0.00	0.00
<sup>a</sup> Total positive	32		2.40
Total number of analyzed samples	1334		

<sup>a</sup> The percentages listed for total positive isolates may not equal the sum of % analyzed samples due to rounding.



Table 11  
Serotypes Profile of Analyzed PR/HACCP Verification Samples by Quarter.  
Cows/Bulls  
All Samples –2<sup>nd</sup> Quarter 2009

Serotypes	# Isolates	% of Total Positive	% Analyzed Samples
Newport	2	50.00	0.31
Give	1	25.00	0.15
Uganda	1	25.00	0.15
Other serotypes	0	0.00	0.00
<sup>a</sup> Total positive	4		0.62
Total number of analyzed samples	647		

<sup>a</sup> The percentages listed for total positive isolates may not equal the sum of % analyzed samples due to rounding.



Table 12  
Serotypes Profile of Analyzed PR/HACCP Verification Samples by Quarter.  
Steers/Heifers  
All Samples –2<sup>nd</sup> Quarter 2009

Serotypes	# Isolates	% of Total Positive	% Analyzed Samples
Give	1	33.33	0.07
Poona	1	33.33	0.07
Unidentified	1	33.33	0.07
Other serotypes	0	0.00	0.00
Total positive	3		0.21
Total number of analyzed samples	1413		



Table 13  
Serotypes Profile of Analyzed PR/HACCP Verification Samples by Quarter.  
Ground Beef  
All Samples –2<sup>nd</sup> Quarter 2009

Serotypes	# Isolates	% of Total Positive	% Analyzed Samples
Dublin	9	27.27	0.41
Newport	5	15.15	0.23
Montevideo	3	9.09	0.14
Cerro	2	6.06	0.09
Meleagridis	2	6.06	0.09
Typhimurium	2	6.06	0.09
3,10:e,h:-	1	3.03	0.05
3,10:-:1,w	1	3.03	0.05
Anatum	1	3.03	0.05
Brandenburg	1	3.03	0.05
III21:z10:3,n,x,z15	1	3.03	0.05
Kentucky	1	3.03	0.05
Muenchen	1	3.03	0.05
Muenster	1	3.03	0.05
Typhimurium (var. Copenhagen)	1	3.03	0.05
Zanzibar	1	3.03	0.05
Other serotypes	0	0.00	0.00
<sup>a</sup> Total positive	33		1.50
Total number of analyzed samples	2193		

<sup>a</sup> The percentages listed for total positive isolates may not equal the sum of % analyzed samples due to rounding.



Table 14  
Serotypes Profile of Analyzed PR/HACCP Verification Samples by Quarter.  
Ground Chicken  
All Samples –2<sup>nd</sup> Quarter 2009

Serotypes	# Isolates	% of Total Positive	% Analyzed Samples
Kentucky	11	50.00	7.80
Enteritidis	6	27.27	4.26
Typhimurium (var. Copenhagen)	3	13.64	2.13
4,12:i:-	1	4.55	0.71
Heidelberg	1	4.55	0.71
Other serotypes	0	0.00	0.00
<sup>a</sup> Total positive	22		15.60
Total number of analyzed samples	141		

<sup>a</sup> The percentages listed for total positive isolates may not equal the sum of % analyzed samples due to rounding.



Table 15  
Serotypes Profile of Analyzed PR/HACCP Verification Samples by Quarter.  
Ground Turkey  
All Samples –2<sup>nd</sup> Quarter 2009

Serotypes	# Isolates	% of Total Positive	% Analyzed Samples
Saintpaul	7	22.58	2.58
Hadar	6	19.35	2.21
Agona	3	9.68	1.11
III 18:z4,z32:-	3	9.68	1.11
Senftenber	3	9.68	1.11
Derby	2	6.45	0.74
Newport	2	6.45	0.74
Schwarzengrund	2	6.45	0.74
4,12:e,h:-	1	3.23	0.37
Anatum	1	3.23	0.37
Bredeney	1	3.23	0.37
Other serotypes	0	0.00	0.00
<sup>a</sup> Total positive	31		11.44
Total number of analyzed samples	271		

<sup>a</sup> The percentages listed for total positive isolates may not equal the sum of % analyzed samples due to rounding.



Table 16  
Serotypes Profile of Analyzed PR/HACCP Verification Samples by Quarter.  
Turkeys  
All Samples –2<sup>nd</sup> Quarter 2009

Serotypes	# Isolates	% of Total Positive	% Analyzed Samples
Hadar	11	32.35	1.22
Agona	8	23.53	0.88
Heidelberg	2	5.88	0.22
4,12:d:-	1	2.94	0.11
8,20:-:z6	1	2.94	0.11
Albany	1	2.94	0.11
Derby	1	2.94	0.11
Infantis	1	2.94	0.11
Johannesburg	1	2.94	0.11
Kentucky	1	2.94	0.11
Montevideo	1	2.94	0.11
Muenchen	1	2.94	0.11
Newport	1	2.94	0.11
Schwarzengrund	1	2.94	0.11
Senftenber	1	2.94	0.11
Typhimurium	1	2.94	0.11
Other serotypes	0	0.00	0.00
<sup>a</sup> Total positive	34		3.76
Total number of analyzed samples		905	

<sup>a</sup> The percentages listed for total positive isolates may not equal the sum of % analyzed samples due to rounding.



Table 17  
Serotypes Profile of Analyzed PR/HACCP Verification Samples by Quarter.  
Broilers  
All Samples –3<sup>rd</sup> Quarter 2009

Serotypes	# Isolates	% of Total Positive	% Analyzed Samples
Kentucky	54	42.86	3.05
Enteritidis	25	19.84	1.41
Heidelberg	12	9.52	0.68
Typhimurium (var. Copenhagen)	10	7.94	0.56
4,5,12:i:-	3	2.38	0.17
Montevideo	3	2.38	0.17
Braenderup	2	1.59	0.11
Mbandaka	2	1.59	0.11
Schwarzengrund	2	1.59	0.11
Typhimurium	2	1.59	0.11
Other serotypes	11	8.73	0.62
<sup>a</sup> Total positive	126		7.11
Total number of analyzed samples	1773		

<sup>a</sup> The percentages listed for total positive isolates may not equal the sum of % analyzed samples due to rounding.



Table 18  
Serotypes Profile of Analyzed PR/HACCP Verification Samples by Quarter.  
Market Hogs  
All Samples –3<sup>rd</sup> Quarter 2009

Serotypes	# Isolates	% of Total Positive	% Analyzed Samples
Derby	4	23.53	0.45
Johannesburg	2	11.76	0.22
Adelaide	1	5.88	0.11
Agona	1	5.88	0.11
Anatum	1	5.88	0.11
Heidelberg	1	5.88	0.11
Infantis	1	5.88	0.11
London	1	5.88	0.11
Montevideo	1	5.88	0.11
Saintpaul	1	5.88	0.11
Typhimurium (var. Copenhagen)	1	5.88	0.11
Uganda	1	5.88	0.11
Other serotypes	0	0.00	0.00
Unidentified	1	5.88	0.11
<sup>a</sup> Total positive	17		1.91
Total number of analyzed samples	891		

<sup>a</sup> The percentages listed for total positive isolates may not equal the sum of % analyzed samples due to rounding.



Table 19  
Serotypes Profile of Analyzed PR/HACCP Verification Samples by Quarter.  
Cows/Bulls  
All Samples –3<sup>rd</sup> Quarter 2009

Serotypes	# Isolates	% of Total Positive	% Analyzed Samples
Agona	1	33.33	0.26
Kentucky	1	33.33	0.26
Montevideo	1	33.33	0.26
Other serotypes	0	0.00	0.00
Total positive	3		0.78
Total number of analyzed samples		386	



Table 20  
Serotypes Profile of Analyzed PR/HACCP Verification Samples by Quarter.  
Steers/Heifers  
All Samples –3<sup>rd</sup> Quarter 2009

Serotypes	# Isolates	% of Total Positive	% Analyzed Samples
Bareilly	1	25.00	0.07
Montevideo	1	25.00	0.07
Muenster	1	25.00	0.07
Typhimurium	1	25.00	0.07
Other serotypes	0	0.00	0.00
Total positive	4		0.28
Total number of analyzed samples	1416		



Table 21  
Serotypes Profile of Analyzed PR/HACCP Verification Samples by Quarter.  
Ground Beef  
All Samples –3<sup>rd</sup> Quarter 2009

Serotypes	# Isolates	% of Total Positive	% Analyzed Samples
Montevideo	39	50.00	1.98
Cerro	4	5.13	0.20
Kentucky	4	5.13	0.20
Meleagridis	4	5.13	0.20
Newport	4	5.13	0.20
Agona	3	3.85	0.15
Typhimurium	3	3.85	0.15
Anatum	2	2.56	0.10
Dublin	2	2.56	0.10
Muenchen	2	2.56	0.10
Other serotypes	8	10.26	0.41
Unidentified	3	3.85	0.15
<sup>a</sup> Total positive	78		3.97
Total number of analyzed samples	1967		

<sup>a</sup> The percentages listed for total positive isolates may not equal the sum of % analyzed samples due to rounding.



Table 22  
Serotypes Profile of Analyzed PR/HACCP Verification Samples by Quarter.  
Ground Chicken  
All Samples –3<sup>rd</sup> Quarter 2009

Serotypes	# Isolates	% of Total Positive	% Analyzed Samples
Heidelberg	4	26.67	4.88
Kentucky	4	26.67	4.88
Enteritidis	3	20.00	3.66
4,5,12:i:-	1	6.67	1.22
Blockley	1	6.67	1.22
Schwarzengrund	1	6.67	1.22
Typhimurium (var. Copenhagen)	1	6.67	1.22
Other serotypes	0	0.00	0.00
<sup>a</sup> Total positive	15		18.29
Total number of analyzed samples		82	

<sup>a</sup> The percentages listed for total positive isolates may not equal the sum of % analyzed samples due to rounding.



Table 23  
Serotypes Profile of Analyzed PR/HACCP Verification Samples by Quarter.  
Ground Turkey  
All Samples –3<sup>rd</sup> Quarter 2009

Serotypes	# Isolates	% of Total Positive	% Analyzed Samples
Albany	2	28.57	2.22
Hadar	2	28.57	2.22
Saintpaul	2	28.57	2.22
Schwarzengrund	1	14.29	1.11
Other serotypes	0	0.00	0.00
<sup>a</sup> Total positive	7		7.78
Total number of analyzed samples	90		

<sup>a</sup> The percentages listed for total positive isolates may not equal the sum of % analyzed samples due to rounding.



Table 24  
Serotypes Profile of Analyzed PR/HACCP Verification Samples by Quarter.  
Turkeys  
All Samples –3<sup>rd</sup> Quarter 2009

Serotypes	# Isolates	% of Total Positive	% Analyzed Samples
Hadar	5	31.25	1.71
Albany	2	12.50	0.68
Muenchen	2	12.50	0.68
Senftenber	2	12.50	0.68
Agona	1	6.25	0.34
Anatum	1	6.25	0.34
Derby	1	6.25	0.34
Saintpaul	1	6.25	0.34
Typhimurium (var. Copenhagen)	1	6.25	0.34
Other serotypes	0	0.00	0.00
<sup>a</sup> Total positive	16		5.46
Total number of analyzed samples	293		

<sup>a</sup> The percentages listed for total positive isolates may not equal the sum of % analyzed samples due to rounding.



Table 25  
Serotypes Profile of Analyzed PR/HACCP Verification Samples by Quarter.  
Broilers  
All Samples –4<sup>th</sup> Quarter 2009

Serotypes	# Isolates	% of Total Positive	% Analyzed Samples
Kentucky	36	41.86	3.61
Enteritidis	16	18.60	1.60
Heidelberg	10	11.63	1.00
Senftenber	4	4.65	0.40
4,12:i:-	3	3.49	0.30
4,5,12:i:-	3	3.49	0.30
Worthington	3	3.49	0.30
Infantis	2	2.33	0.20
Montevideo	2	2.33	0.20
Other serotypes	5	5.81	0.50
Unidentified	2	2.33	0.20
<sup>a</sup> Total positive	86		8.63
Total number of analyzed samples		997	

<sup>a</sup> The percentages listed for total positive isolates may not equal the sum of % analyzed samples due to rounding.



Table 26  
Serotypes Profile of Analyzed PR/HACCP Verification Samples by Quarter.  
Market Hogs  
All Samples –4<sup>th</sup> Quarter 2009

Serotypes	# Isolates	% of Total Positive	% Analyzed Samples
Derby	5	21.74	0.66
Johannesburg	4	17.39	0.53
Adelaide	2	8.70	0.26
Bredeney	2	8.70	0.26
Infantis	2	8.70	0.26
Typhimurium 5-	2	8.70	0.26
Anatum	1	4.35	0.13
Ohio	1	4.35	0.13
Orion var. 15+,34+	1	4.35	0.13
Schwarzengrund	1	4.35	0.13
Typhimurium	1	4.35	0.13
Other serotypes	0	0.00	0.00
Unidentified	1	4.35	0.13
<sup>a</sup> Total positive	23		3.02
Total number of analyzed samples	761		

<sup>a</sup> The percentages listed for total positive isolates may not equal the sum of % analyzed samples due to rounding.



Table 27  
Serotypes Profile of Analyzed PR/HACCP Verification Samples by Quarter.  
Cows/Bulls  
All Samples –4<sup>th</sup> Quarter 2009

Serotypes	# Isolates	% of Total Positive	% Analyzed Samples
	0	0.00	0.00
Other Serotypes	0	0.00	0.00
Total positive	0		0.00
Total number of analyzed samples	240		



Table 28  
Serotypes Profile of Analyzed PR/HACCP Verification Samples by Quarter.  
Steers/Heifers  
All Samples –4<sup>th</sup> Quarter 2009

Serotypes	# Isolates	% of Total Positive	% Analyzed Samples
III61:-:1,5,7	1	50.00	0.12
Muenchen	1	50.00	0.12
Other serotypes	0	0.00	0.00
Total positive	2		0.24
Total number of analyzed samples	844		



Table 29  
Serotypes Profile of Analyzed PR/HACCP Verification Samples by Quarter.  
Ground Beef  
All Samples –4<sup>th</sup> Quarter 2009

Serotypes	# Isolates	% of Total Positive	% Analyzed Samples
Montevideo	4	36.36	0.31
Dublin	2	18.18	0.15
4,12:i:-	1	9.09	0.08
Mbandaka	1	9.09	0.08
Muenchen	1	9.09	0.08
Typhimurium	1	9.09	0.08
Typhimurium 5-	1	9.09	0.08
Other serotypes	0	0.00	0.00
<sup>a</sup> Total positive	11		0.84
Total number of analyzed samples	1303		

<sup>a</sup> The percentages listed for total positive isolates may not equal the sum of % analyzed samples due to rounding.



Table 30  
Serotypes Profile of Analyzed PR/HACCP Verification Samples by Quarter.  
Ground Chicken  
All Samples –4<sup>th</sup> Quarter 2009

Serotypes	# Isolates	% of Total Positive	% Analyzed Samples
Kentucky	4	33.33	6.35
Enteritidis	2	16.67	3.17
4,5,12:i:-	1	8.33	1.59
8,20:-z6	1	8.33	1.59
Cerro	1	8.33	1.59
Infantis	1	8.33	1.59
Typhimurium	1	8.33	1.59
Typhimurium 5-	1	8.33	1.59
Other serotypes	0	0.00	0.00
<sup>a</sup> Total positive	12		19.05
Total number of analyzed samples		63	

<sup>a</sup> The percentages listed for total positive isolates may not equal the sum of % analyzed samples due to rounding.



Table 31  
Serotypes Profile of Analyzed PR/HACCP Verification Samples by Quarter.  
Ground Turkey  
All Samples –4<sup>th</sup> Quarter 2009

Serotypes	# Isolates	% of Total Positive	% Analyzed Samples
Hadar	1	33.33	2.38
Schwarzengrund	1	33.33	2.38
Senftenber	1	33.33	2.38
Other serotypes	0	0.00	0.00
<sup>a</sup> Total positive	3		7.14
Total number of analyzed samples		42	



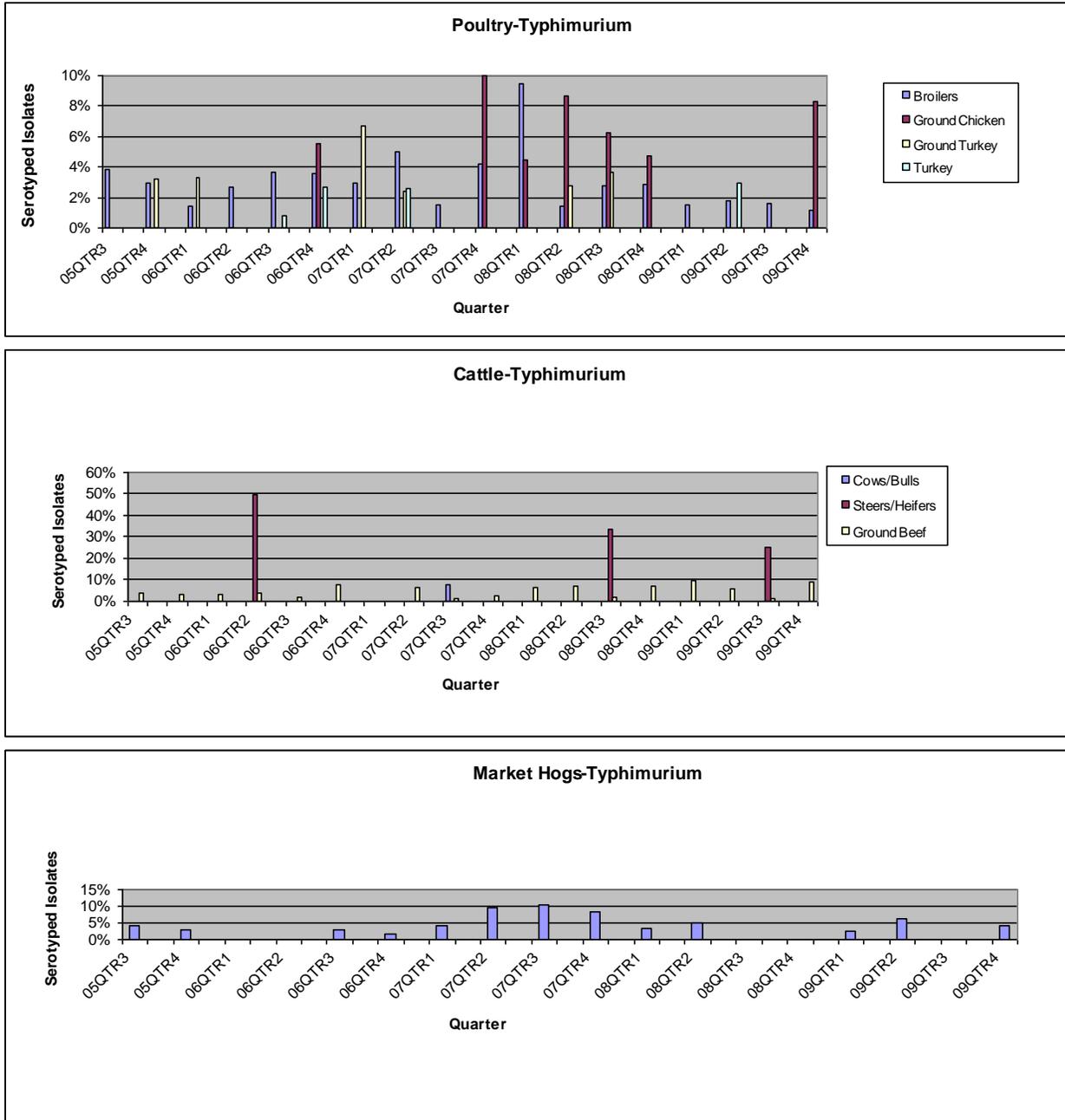
Table 32  
Serotypes Profile of Analyzed PR/HACCP Verification Samples by Quarter.  
Turkeys  
All Samples –4<sup>th</sup> Quarter 2009

Serotypes	# Isolates	% of Total Positive	% Analyzed Samples
Hadar	1	33.33	0.45
Kentucky	1	33.33	0.45
Mbandaka	1	33.33	0.45
Other serotypes	0	0.00	0.00
<sup>a</sup> Total positive	3		1.34
Total number of analyzed samples	224		

<sup>a</sup> The percentages listed for total positive isolates may not equal the sum of % analyzed samples due to rounding.



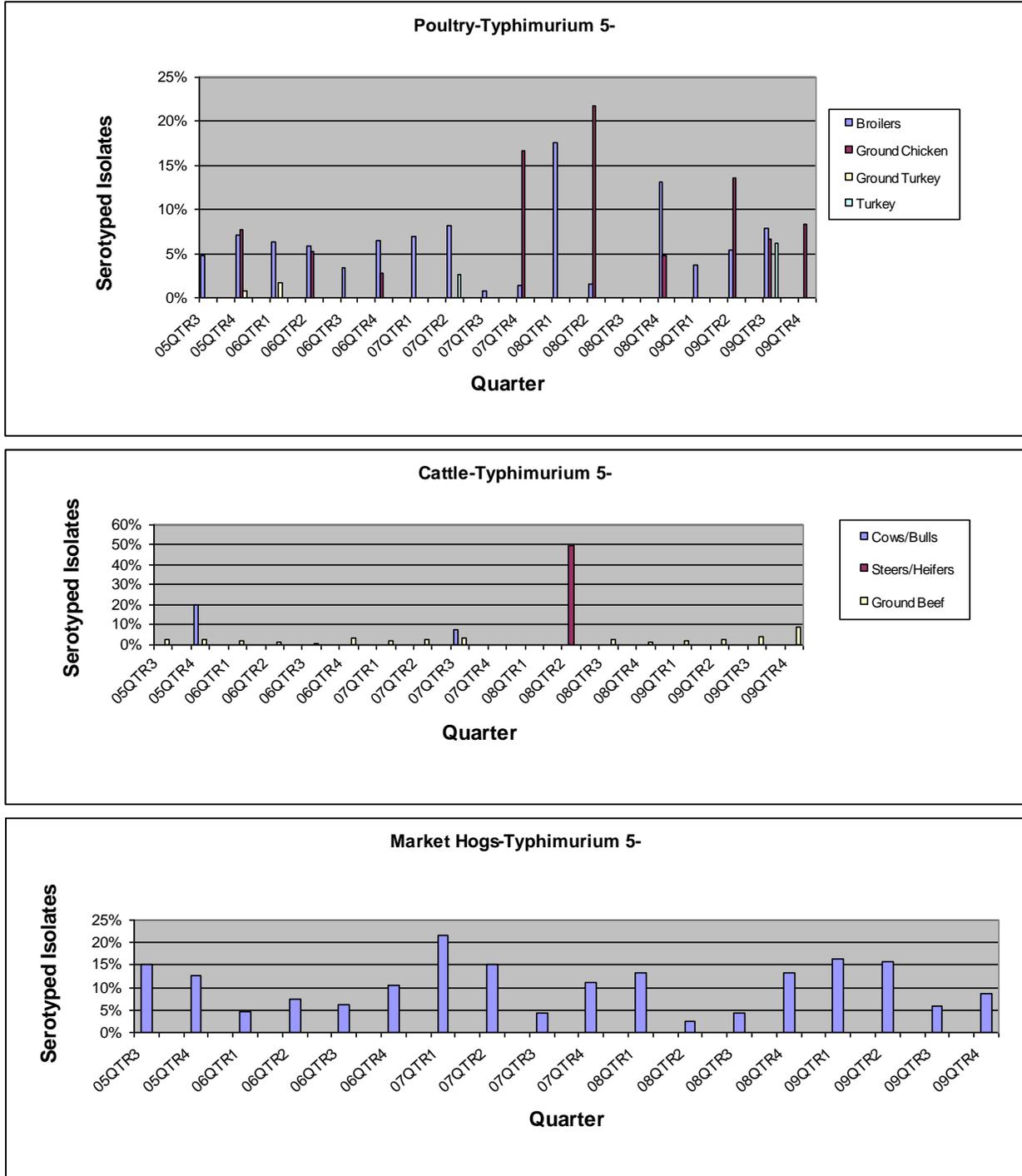
Figure 1  
Typhimurium – USDA, FSIS, PR/HACCP Verification Sampling by Quarter\*  
All Samples



\*Please note that the y-axis % varies from graph to graph.



Figure 2  
Typhimurium 5-\*\*- USDA, FSIS, PR/HACCP Verification Sampling by Quarter\*  
All Samples

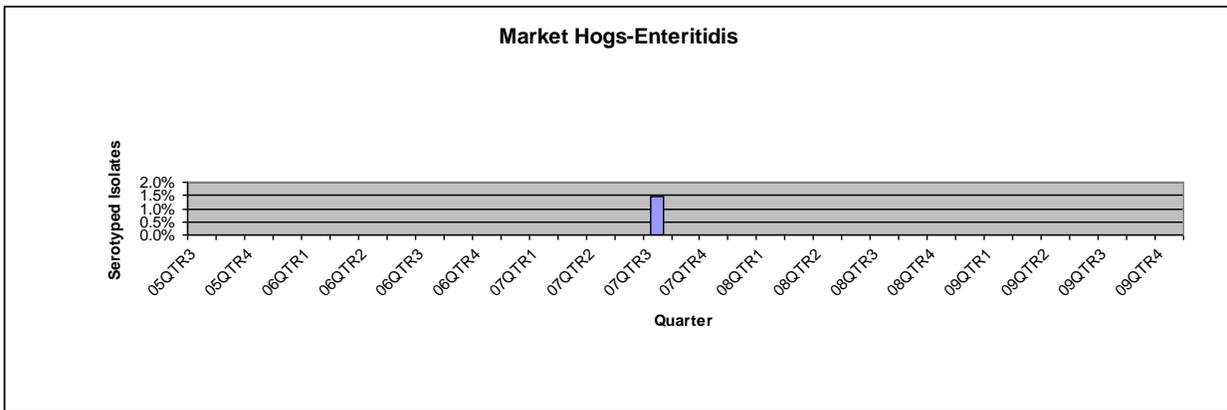
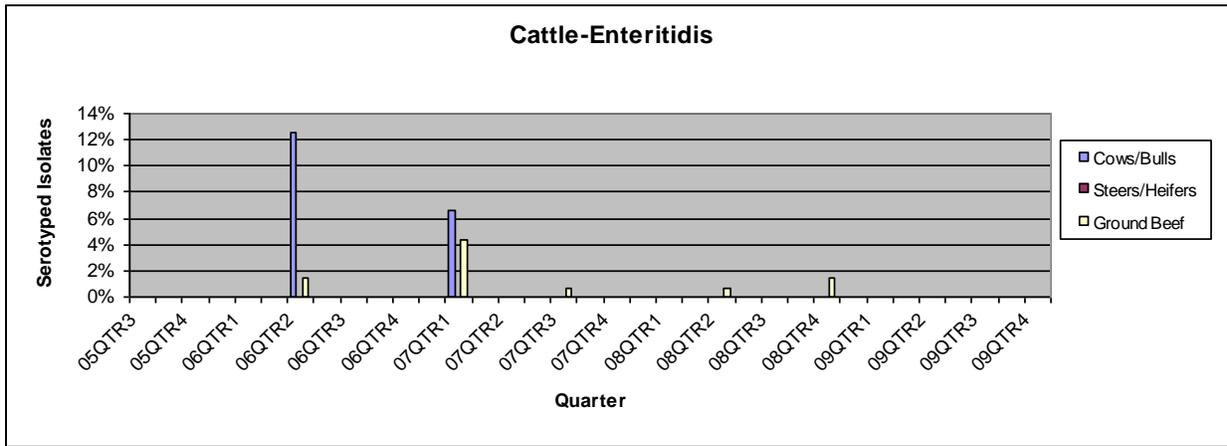
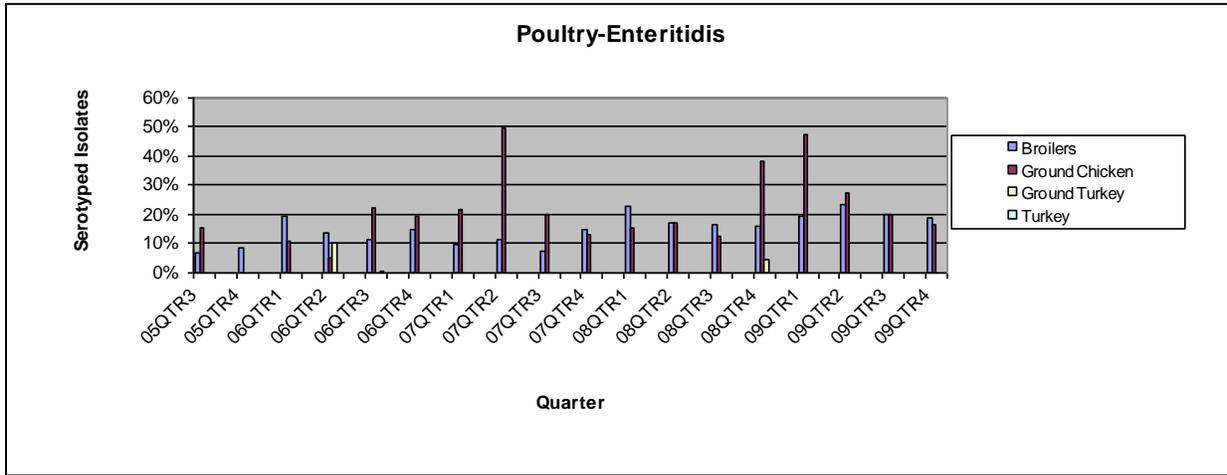


\*Please note that the y-axis % varies from graph to graph.

\*\* Formerly Typhimurium var. Copenhagen



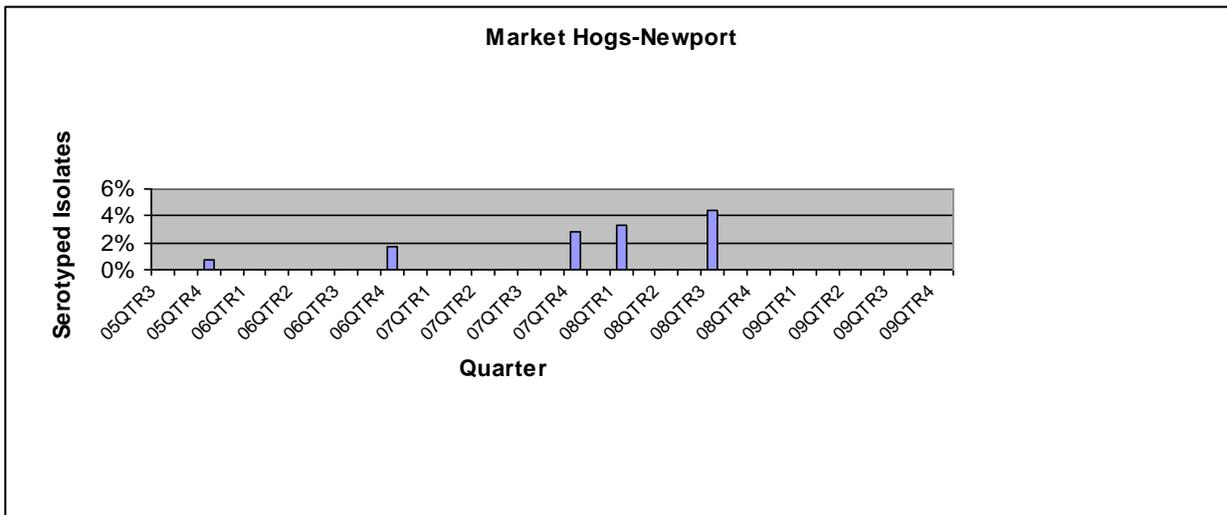
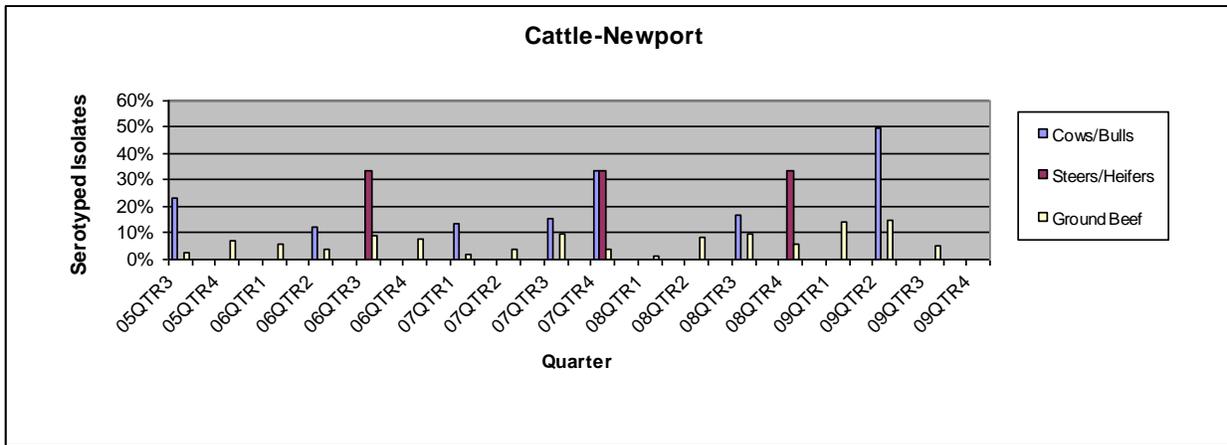
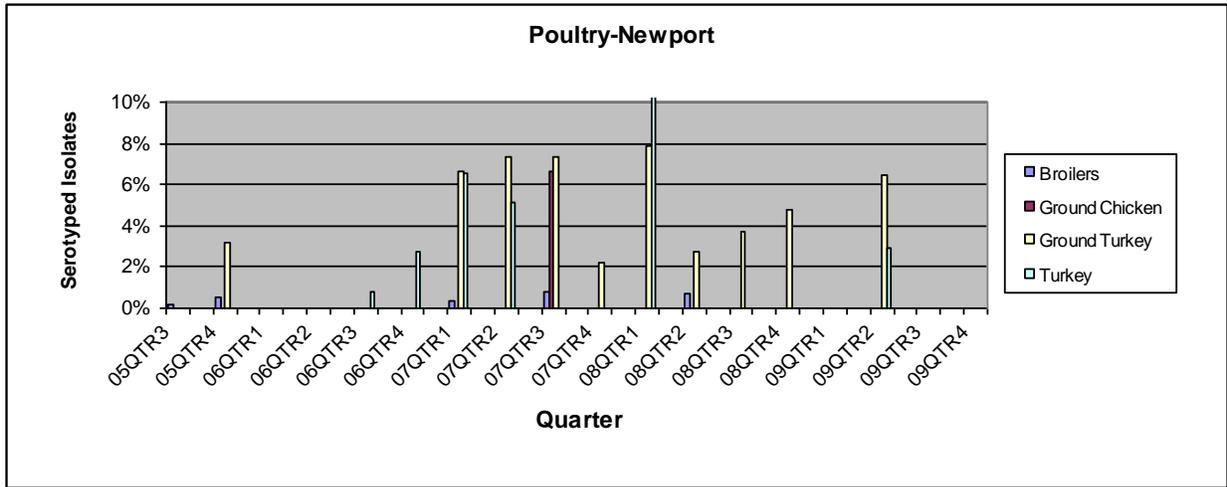
Figure 3  
Enteritidis – USDA, FSIS, PR/HACCP Verification Sampling by Quarter\*  
All Samples



\*Please note that the y-axis %varies from graph to graph.



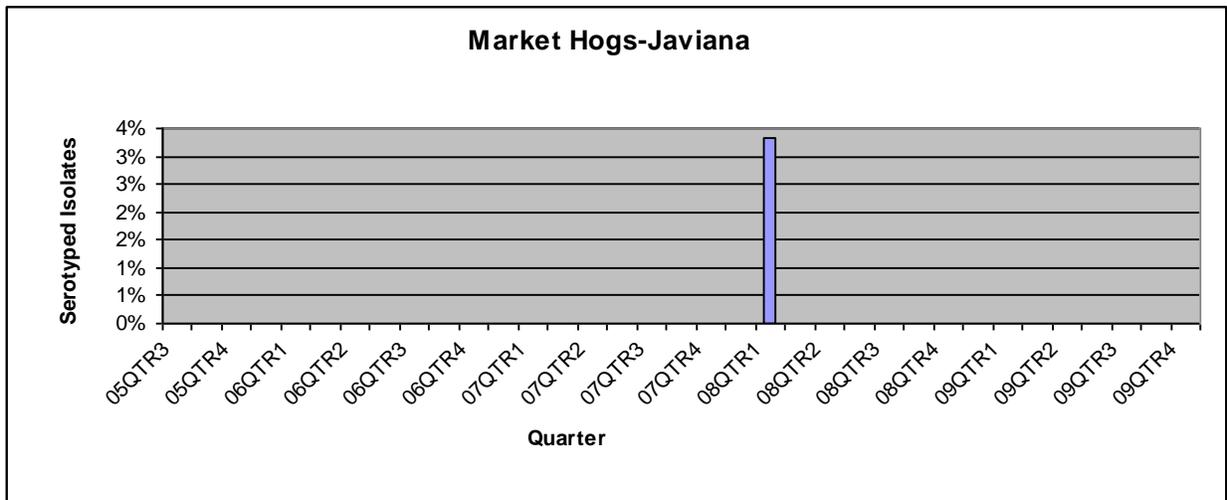
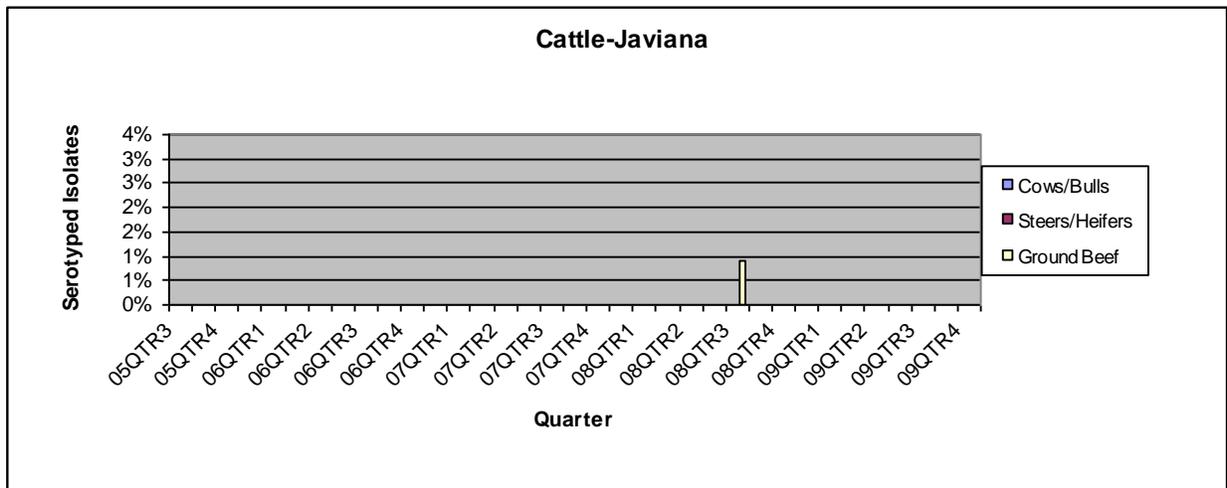
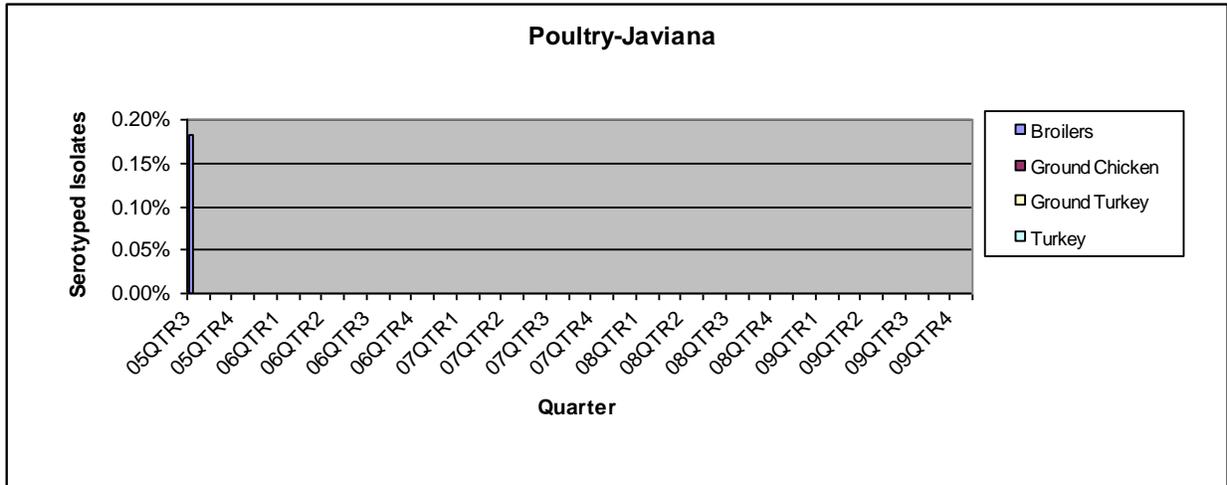
Figure 4  
Newport – USDA, FSIS, PR/HACCP Verification Sampling by Quarter\*  
All Samples



\*Please note that the y-axis % varies from graph to graph.



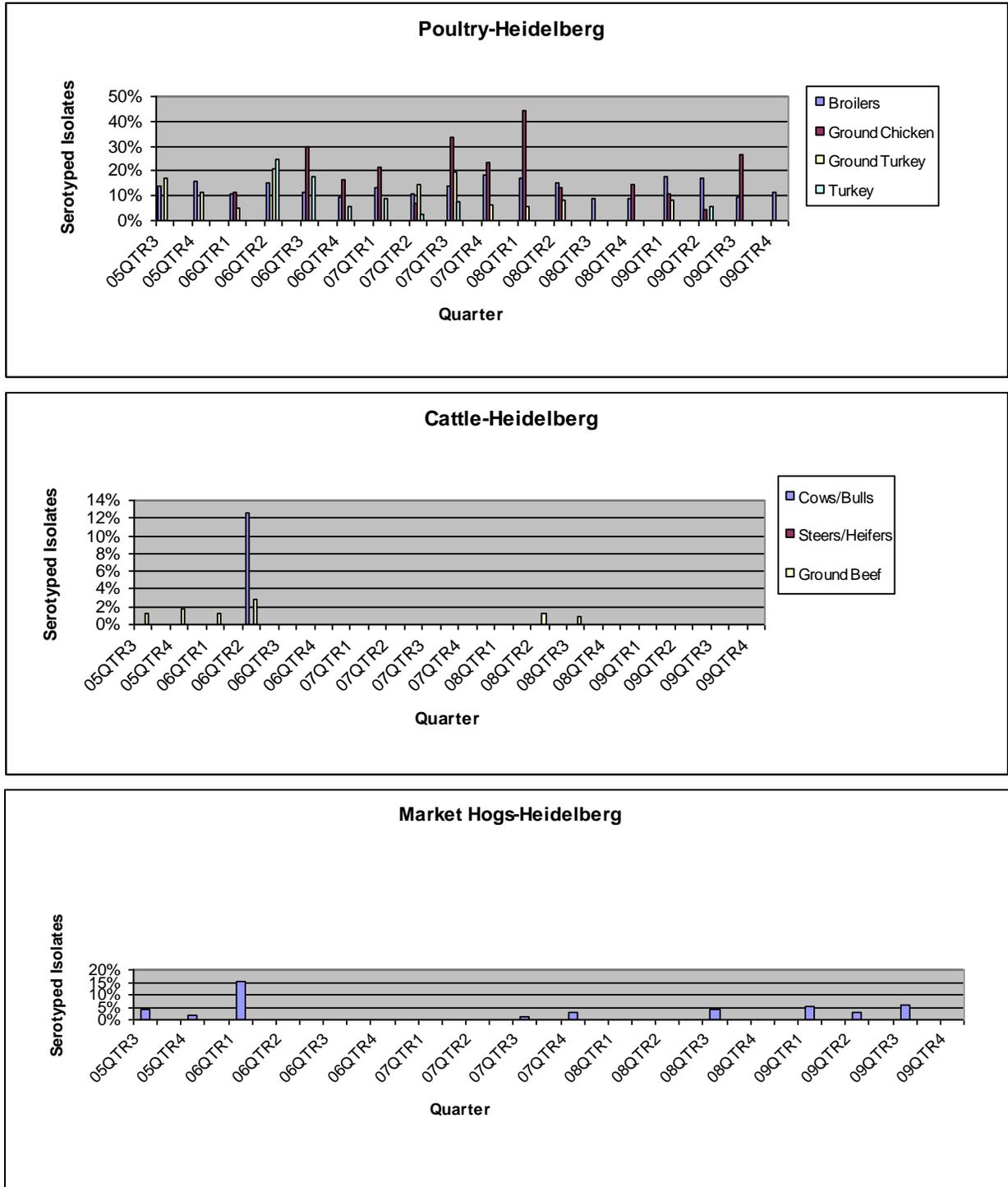
Figure 5  
Javiana – USDA, FSIS, PR/HACCP Verification Sampling by Quarter\*  
All Samples



\*Please note that the y-axis % varies from graph to graph



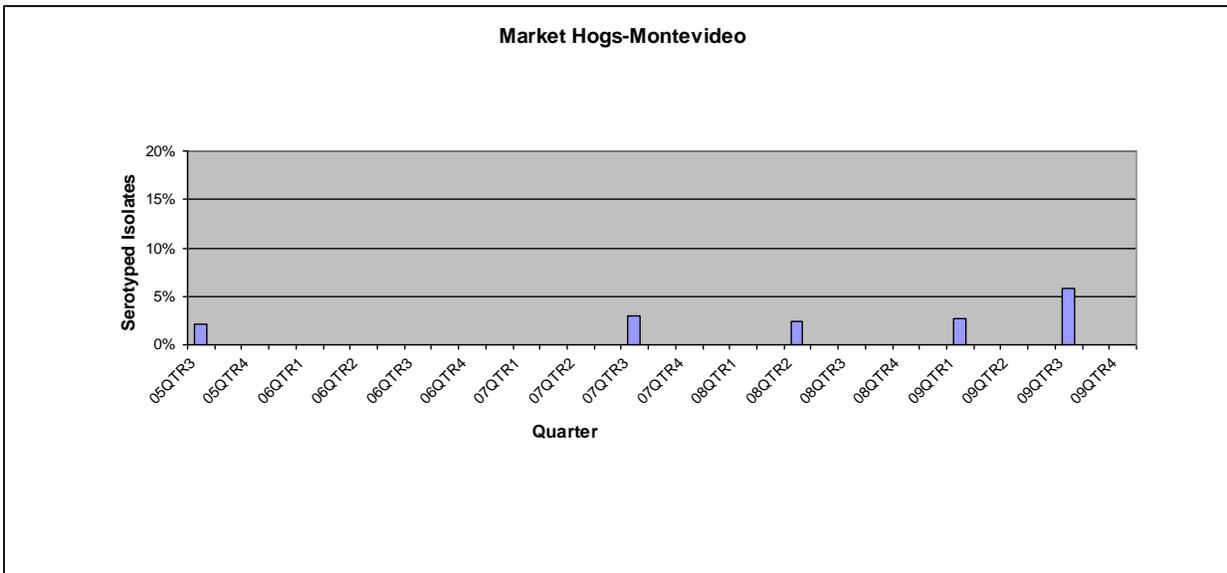
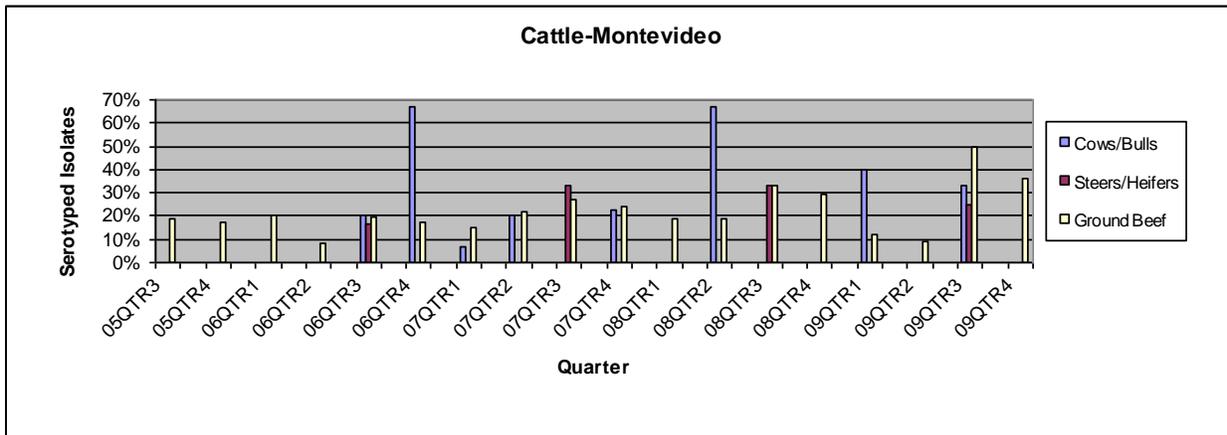
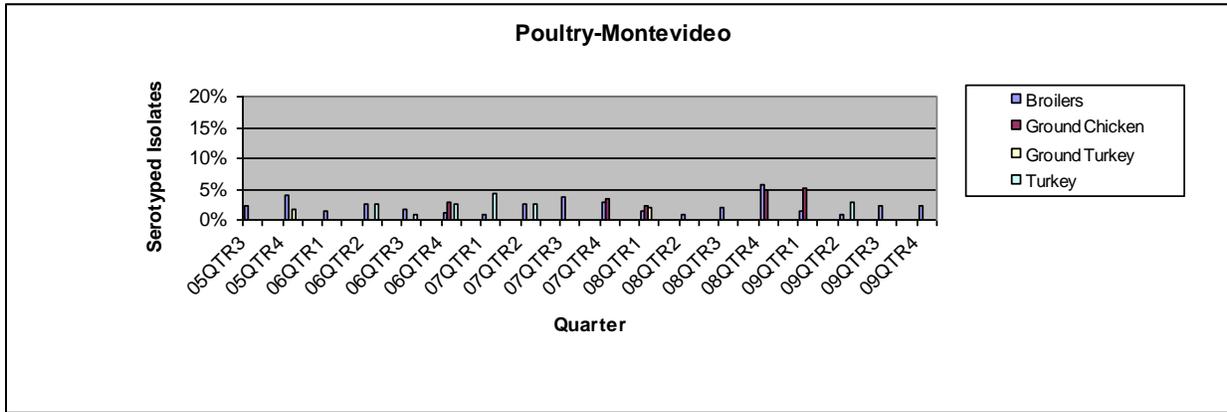
Figure 6  
Heidelberg – USDA, FSIS, PR/HACCP Verification Sampling by Quarter\*  
All Samples



\*Please note that the y-axis % varies from graph to graph.



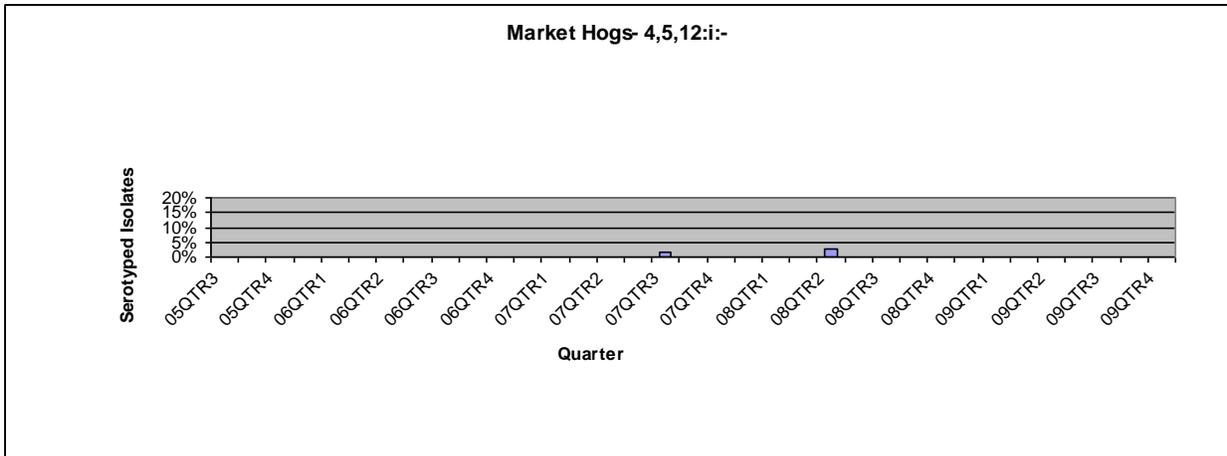
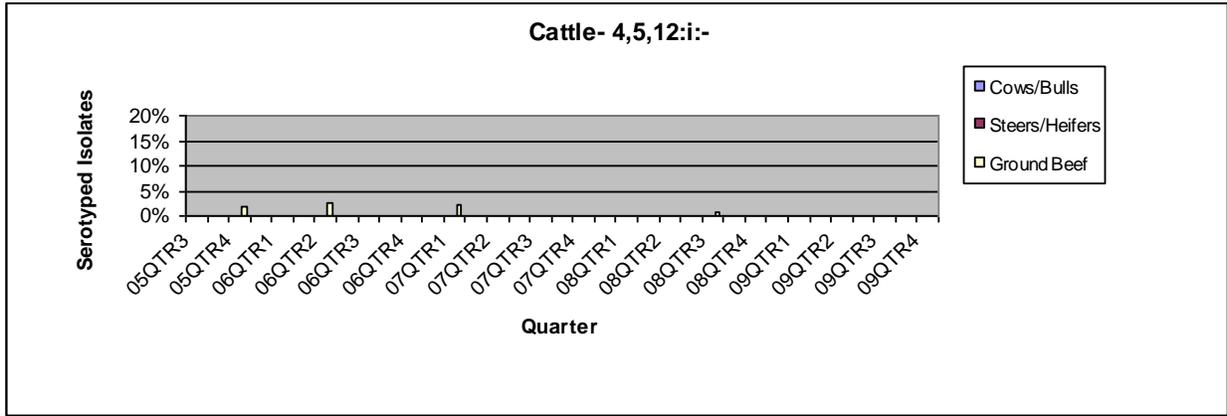
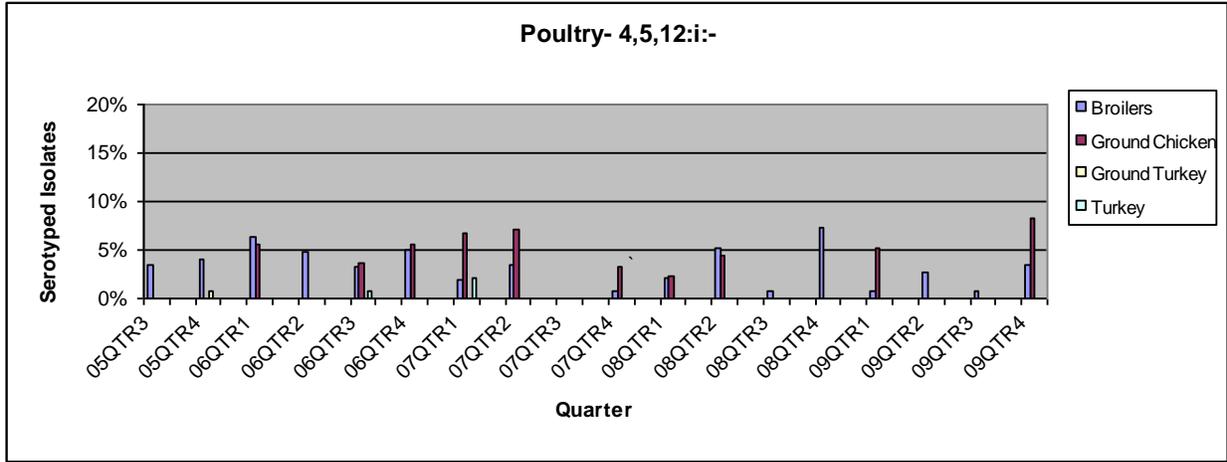
Figure 7  
Montevideo – USDA, FSIS, PR/HACCP Verification Sampling by Quarter\*  
All Samples



\*Please note that the y-axis % varies from graph to graph.



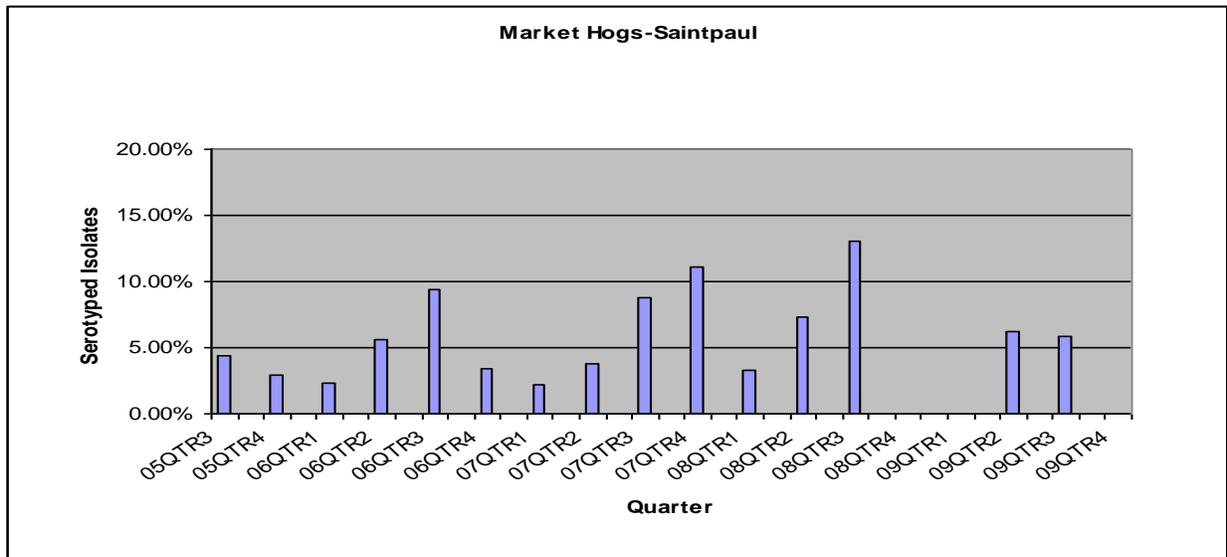
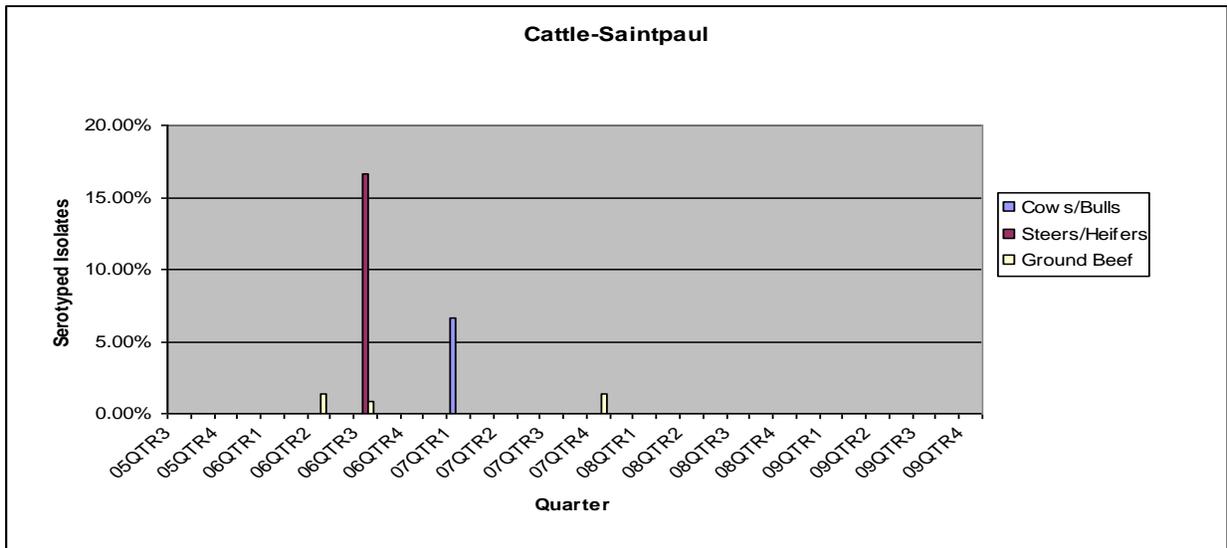
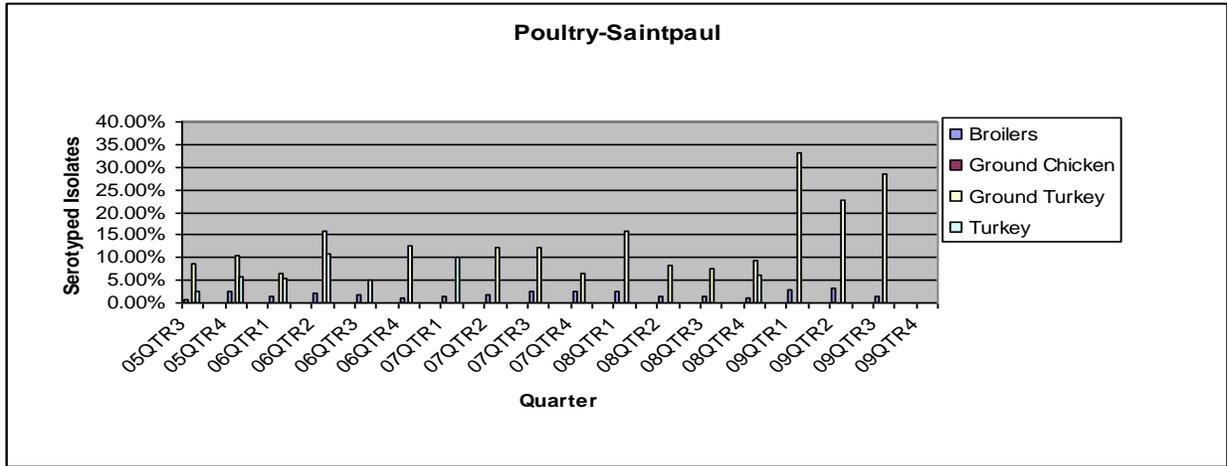
Figure 8  
4,5,12:1:- – USDA, FSIS, PR/HACCP Verification Sampling by Quarter\*  
All Samples



\*Please note that the y-axis % varies from graph to graph.



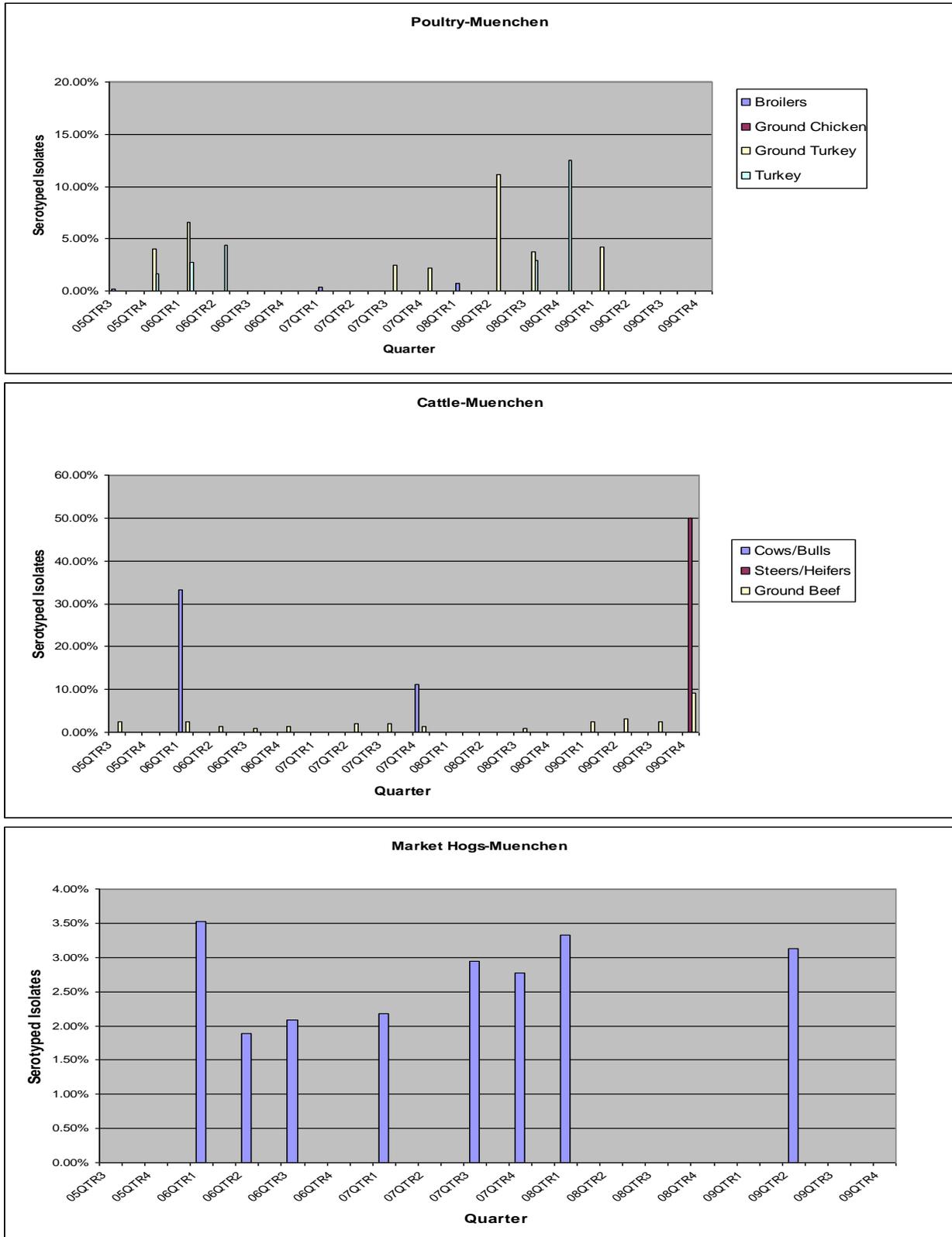
Figure 9  
Saintpaul – USDA, FSIS, PR/HACCP Verification Sampling by Quarter\*  
All Samples



\*Please note that the y-axis % varies from graph to graph.



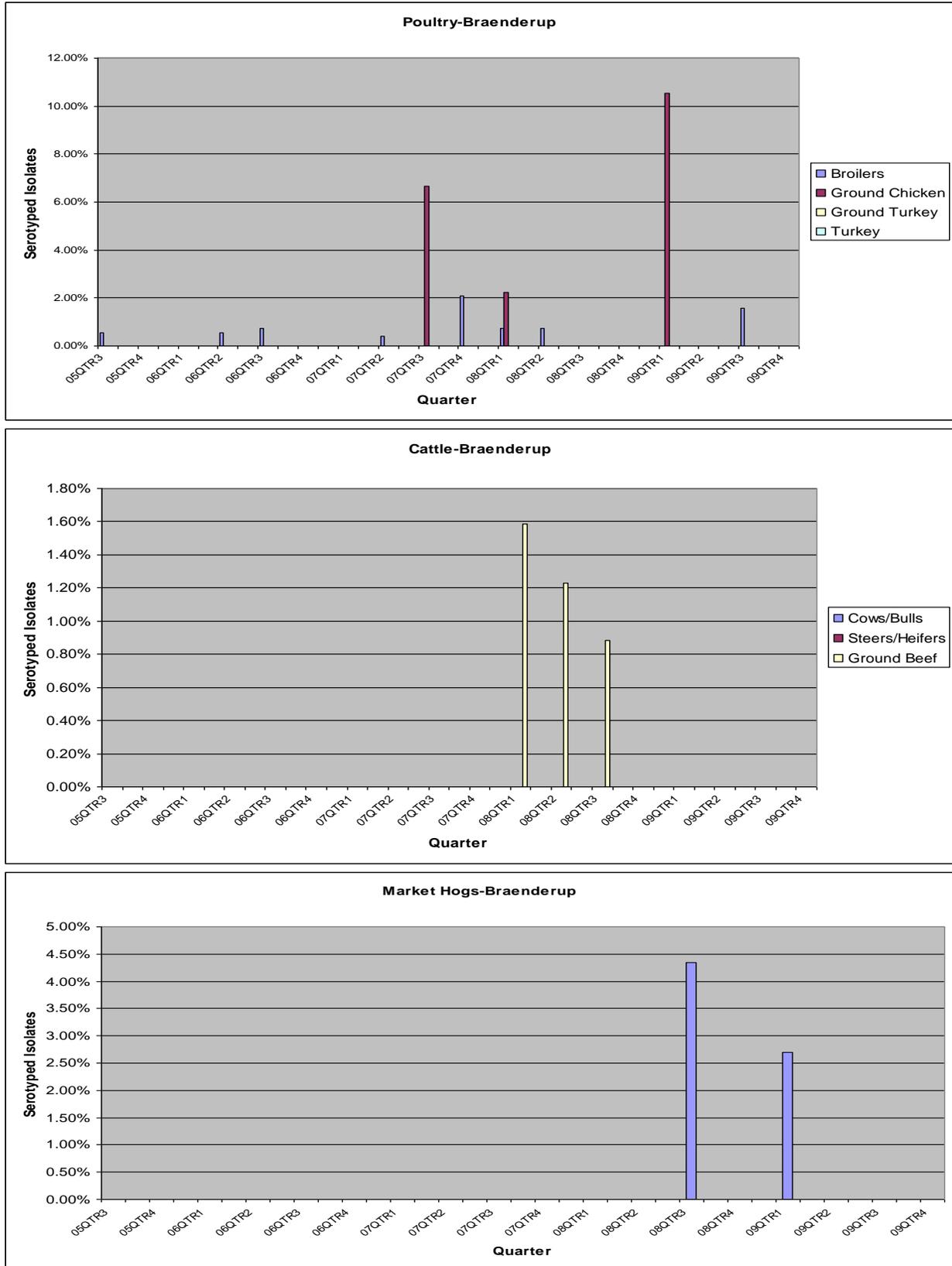
Figure 10  
Muenchen – USDA, FSIS, PR/HACCP Verification Sampling by Quarter\*  
All Samples



\*Please note that the y-axis % varies from graph to graph.



Figure 11  
Braenderup – USDA, FSIS, PR/HACCP Verification Sampling by Quarter\*  
All Samples



\*Please note that the y-axis % varies from graph to graph.