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**Toxicology of Smokeless Tobacco Products:  
Bacterial Reverse Mutagenicity**

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***Labstat International ULC  
Supplemental Analysis Report***



***Prepared for  
R.J. Reynolds Tobacco Corporation***

**Project Code: M97**

**Original Date: January 20, 2011  
Revision 1 Date: April 27, 2011  
Revision 2 Date: January 2, 2012**

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## 1 Use of Labstat's<sup>1</sup> Analytical Reports<sup>2</sup>

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<sup>3</sup> *Unless superseded by a specific contractual obligation or other written agreement.*

## 2 Administrative Information<sup>4</sup>

### 2.1 Quotation Reference

**Quotation Number:** T2645

**Date of Quotation:** August 28, 2008

**Recipient's Name:** Dr. Suzana Theophilus

### 2.2 Client Identification

R.J. Reynolds Tobacco Corporation  
950 Reynolds Boulevard  
Winston-Salem NC 27102-1487  
USA

### 2.3 Date of Sample Receipt

Five samples to be tested for M97 were received on September 16, 2008 via UPS.

### 2.4 Sample Characteristics

The shipment received on September 16, 2008 consisted of one Ziploc bag of one product, one plastic container for each of 2 products, 91 boxes of one product and 20 tins of one product. There was no physical damage to the containers, bag or tins. Individual sticks and strips were normal in appearance.

### 2.5 Test Article Identification

The following sample codes have been used to identify the products associated with the results in each of the tables that are part of this report.

Sample ID	Sample Description
084394	Camel SNUS Frost
084395	2S3 Research Moist smokeless tobacco
084396	Kentucky Reference 2R4F
084454	Fresh Strips
084455	Mellow Sticks
084456	Copenhagen Long Cut
084457	Ariva Wintergreen
084458	Fresh Orbs

### 2.6 Special Instructions

As requested by the client, "Camel Snus Frost" and "2S3 Research Moist smokeless tobacco" were removed from inventory remaining from projects M78L and M78M. Labstat International ULC supplied "Kentucky Reference 2R4F".

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<sup>4</sup> Provided in accord with International Standard ISO/IEC 17025 "General requirements for the competence of testing and calibration laboratories" Section 5.10



## 2.7 Date of Supplemental Report

Original: January 20, 2011

Revision 1: April 27, 2011

Revision 2: January 2, 2012

## 2.8 Revision History

### 2.8.1 Revision 1

This revision was required due to a client request for additional analysis following the submission of the original supplemental (client CRO # 2011-007-M97 Supplemental).

### 2.8.2 Revision 2

This revision was required due to an inquiry from the client (client CRO # 2011-012-M97 Supplemental).

## 3 Accreditation

### 3.1 Scope (refer to [appendix A](#))

Labstat International ULC has been accredited by the Standards Council of Canada to International Standard ISO/IEC 17025 "General requirements for the competence of testing and calibration laboratories" with a scope that includes all of the mandated tobacco-related Health Canada methods (see Tobacco Reporting Regulations dated 26 June 2000, Canada Gazette Part II, Vol. 134, No. 15 Schedules 1, 2 and 3 pages 1780 – 1785). The testing included in this report is within the scope of this accreditation, unless otherwise noted in Section 4.



### 3.2 International Recognition of Tests

Our accrediting organization, Standards Council of Canada, is one of a number of such member bodies participating in a global mutual recognition agreement (MRA), known as the ILAC (International Laboratory Accreditation Cooperation) Arrangement. The arrangement, effective January 31, 2001, requires acceptance of technical test data from accredited laboratories by member bodies in numerous international economies.

## 4 Methods

See the 'Methods' section of the test report for the M97 project.

## 5 Results

### 5.1 Data Files

Individual results and the corresponding sample statistics may be found on the compact disk (CD) that accompanies this report. The data files have been labeled *M97 Supplemental\_ames\_tpm\_dataCF.xls* (Ames results for TPM of tobacco brand 084396) and *M97 Supplemental\_ames\_wt\_dataCF.xls* (Ames results for smokeless tobacco products).

#### 5.1.1 'Unit of Use' Doses

Using the unit of use and 'per unit' as received weight of each smokeless tobacco product, as supplied by the client in the table below, the doses of smokeless tobacco reported in the *M97 Supplemental\_ames\_tpm\_dataCF.xls* data file were expressed 'per unit' and the calculated doses are part of the raw data and summary data sheets in the column labelled "Unit of Use Dose ('units'/plate)". The unit of use for sample 084396 (Kentucky Reference 2R4F) was defined as one cigarette and hence the 'unit of use' doses for this brand are 'cigarettes/plate'.

Sample ID	Sample Description	Unit of Use	Weight 'as rec'd' (grams)
084394	Camel SNUS Frost	1 pouch	0.6
084395	2S3	2.5 grams	2.5
084454	Fresh Strips	1	0.125
084455	Mellow Sticks	1 stick	0.516
084456	Copenhagen Long Cut	2.5 grams	2.5
084457	Ariva Wintergreen	1	0.28
084458	Fresh Orbs	1	0.225

## 6 'Unit of Use' Mutagenicity Comparisons

### 6.1 Data Files

Data files containing calculated specific activities (slope of the linear portion of the dose-response curve) may be found on the compact disk (CD) that accompanies this report. The data files have been labeled *M97 Supplemental\_ames\_wt\_stats\_Unit.xls* (dose-response curve analysis results for smokeless tobacco products on a 'unit of use' dose basis) and *M97 Supplemental\_ames\_tpm+wt\_stats\_Unit.xls* (dose-response curve analysis results for smoked and smokeless tobacco products on a 'unit of use' dose basis).

### 6.2 Methodology

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2.

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### 6.3 Specific Activity Determinations

(b) (4)

## 6.4 Comparisons Among Smokeless Tobacco Products

### 6.4.1 Replicate Specific Activity Slopes and Slope Statistics

Tables of results were obtained for the individual replicate slope estimates and the summary statistics over the three replicate slopes for each smokeless tobacco test sample under each tester strain and S9 activation. The table can be found on the 'Statistical Analysis' data sheet in the file *M97 Supplemental\_ames\_wt\_stats\_Unit.xls*.

### 6.4.2 Data Plots

Plots of all replicate smokeless tobacco test samples can be found in the file *M97 Supplemental\_ames\_wt\_stats\_Unit.xls* on the CD that accompanies this report. Box-and-Whisker plots of the calculated specific activities can also be found on the CD that accompanies this report.

### 6.4.3 One-Way ANOVA Results

One-way ANOVA comparisons of mean 'unit of use' slope estimates among test samples yielded the following:

Tester Strain & S9 Activation	Variation Source	Sum of Squares	d.f.	Mean Square	F Ratio	P value
TA98 (+S9)	Among Samples	116551558	6	19425260	9.277	< 0.001
	Within Samples	29314294	14	2093878.1		
	Total	145865852	20			
TA98 (-S9)	Among Samples	2382624.9	6	397104.15	1.145	0.388
	Within Samples	4856477	14	346891.22		

<sup>5</sup> Margolin BH, Kaplan N, Zeiger E. Statistical Analysis of the Ames *Salmonella*/microsome test. *Proc Natl Acad Sci USA* 1981;78: 3779-83.

Tester Strain & S9 Activation	Variation Source	Sum of Squares	d.f.	Mean Square	F Ratio	P value
	Total	7239101.9	20			
TA100 (+S9)	Among Samples	7.581E+09	6	1.264E+09	10.412	< 0.001
	Within Samples	1.699E+09	14	121352199		
	Total	9.28E+09	20			
TA100 (-S9)	Among Samples	1.228E+09	6	204653044	2.256	0.098
	Within Samples	1.27E+09	14	90728705		
	Total	2.498E+09	20			
TA102 (+S9)	Among Samples	8.453E+09	6	1.409E+09	3.173	0.035
	Within Samples	6.217E+09	14	444049557		
	Total	1.467E+10	20			
TA102 (-S9)	Among Samples	2.581E+09	6	430086256	1.502	0.248
	Within Samples	4.009E+09	14	286322478		
	Total	6.589E+09	20			
TA1535 (+S9)	Among Samples	433557.23	6	72259.539	0.367	0.888
	Within Samples	2755876.1	14	196848.3		
	Total	3189433.4	20			
TA1535 (-S9)	Among Samples	14932664	6	2488777.3	2.811	0.052
	Within Samples	12393809	14	885272.09		
	Total	27326473	20			
TA1537 (+S9)	Among Samples	181771266	6	30295211	2.128	0.115
	Within Samples	199293928	14	14235281		
	Total	381065194	20			
TA1537 (-S9)	Among Samples	34344668	6	5724111.3	7.562	0.001
	Within Samples	10597061	14	756932.91		
	Total	44941728	20			

One-way ANOVA analysis indicates significant differences, at  $\alpha = 0.05$ , among mean 'Unit of Use' slope estimates for test samples assayed with strains TA98 (+S9), TA100 (+S9), TA102 (+S9) and TA1537 (-S9).

#### 6.4.4 Contrasts of Interest

(b) (4)

## Method Applied for Contrasts: All Test Samples

(b) (4)

## Contrasts of Interest: All Test Samples

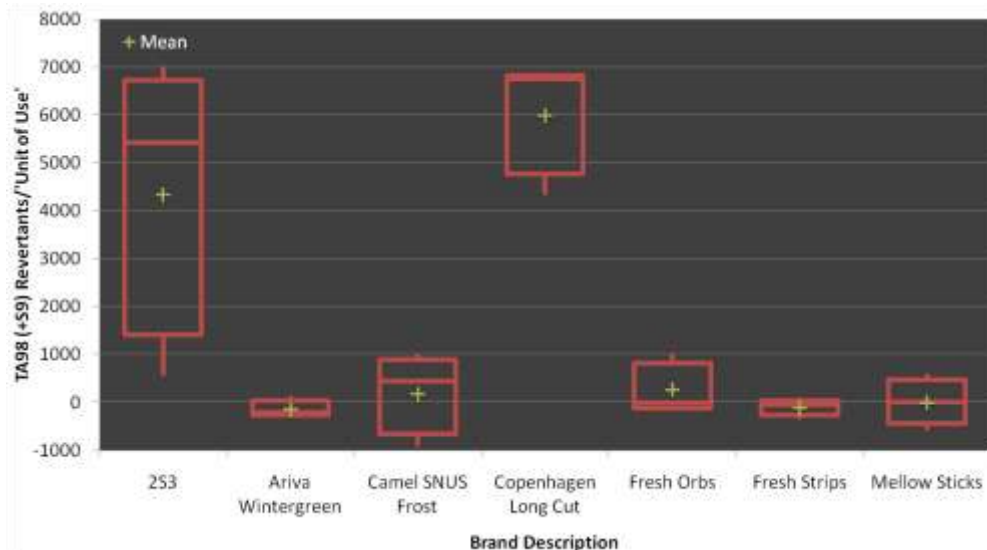
Contrast of Interest	TA98 (+S9)			TA102 (+S9)			TA98 (-S9)		
	t-statistic	p-value	significance at $\alpha = 0.05$	t-statistic	p-value	significance at $\alpha = 0.05$	t-statistic	p-value	significance at $\alpha = 0.05$
084394 vs. 084395	2.081184	0.1059	not significant	0.8923	0.4227	not significant	0.5689	0.5999	not significant
084394 vs. 084454	0.500942	0.6427	not significant	9.1329	0.0008	<b>significant</b>	0.3616	0.7359	not significant
084394 vs. 084455	0.275922	0.7963	not significant	8.6598	0.0010	<b>significant</b>	1.8183	0.1432	not significant
084394 vs. 084456	5.945519	0.0040	not significant	3.0233	0.0390	not significant	1.4945	0.2094	not significant
084394 vs. 084457	0.566645	0.6012	not significant	9.2649	0.0008	<b>significant</b>	0.0475	0.9644	not significant
084394 vs. 084458	0.14768	0.8897	not significant	9.2091	0.0008	<b>significant</b>	0.5361	0.6203	not significant
084395 vs. 084454	2.307061	0.0823	not significant	1.7845	0.1489	not significant	0.4805	0.6560	not significant
084395 vs. 084455	2.225823	0.0900	not significant	1.7407	0.1567	not significant	1.1844	0.3018	not significant
084395 vs. 084456	0.793137	0.4721	not significant	1.3957	0.2353	not significant	1.2420	0.2821	not significant
084395 vs. 084457	2.326134	0.0806	not significant	1.7964	0.1468	not significant	0.5709	0.5986	not significant
084395 vs. 084458	2.078826	0.1062	not significant	1.8264	0.1418	not significant	0.4258	0.6922	not significant
084454 vs. 084455	0.316338	0.7676	not significant	4.0742	0.0152	not significant	7.1179	0.0021	<b>significant</b>
084454 vs. 084456	7.468384	0.0017	<b>significant</b>	2.6971	0.0543	not significant	2.2419	0.0884	not significant
084454 vs. 084457	0.235137	0.8256	not significant	1.7902	0.1479	not significant	0.5469	0.6135	not significant
084454 vs. 084458	1.011974	0.3688	not significant	1.4881	0.2109	not significant	0.8197	0.4584	not significant
084455 vs. 084456	6.897674	0.0023	<b>significant</b>	2.3800	0.0760	not significant	0.3579	0.7385	not significant
084455 vs. 084457	0.425921	0.6921	not significant	5.6625	0.0048	not significant	3.1735	0.0337	not significant
084455 vs. 084458	0.570257	0.5990	not significant	2.9208	0.0432	not significant	7.9852	0.0013	<b>significant</b>
084456 vs. 084457	7.507229	0.0017	<b>significant</b>	2.7844	0.0496	not significant	1.8160	0.1435	not significant
084456 vs. 084458	6.468758	0.0029	not significant	2.9466	0.0421	not significant	2.3942	0.0748	not significant
084457 vs. 084458	1.107406	0.3302	not significant	1.0833	0.3396	not significant	0.8631	0.4367	not significant

Contrast of Interest	TA100 (-S9)		
	t-statistic	p-value	significance at $\alpha = 0.05$
084394 vs. 084395	6.5759	0.0028	not significant

Contrast of Interest	TA100 (-S9)		
	t-statistic	p-value	significance at $\alpha = 0.05$
084394 vs. 084454	3.5339	0.0241	not significant
084394 vs. 084455	0.7909	0.4732	not significant
084394 vs. 084456	1.2527	0.2785	not significant
084394 vs. 084457	1.9942	0.1169	not significant
084394 vs. 084458	4.3041	0.0126	not significant
084395 vs. 084454	9.9850	0.0006	<b>significant</b>
084395 vs. 084455	3.8327	0.0186	not significant
084395 vs. 084456	0.6240	0.5664	not significant
084395 vs. 084457	5.6787	0.0047	not significant
084395 vs. 084458	10.2340	0.0005	<b>significant</b>
084454 vs. 084455	0.2096	0.8442	not significant
084454 vs. 084456	1.4476	0.2213	not significant
084454 vs. 084457	0.7625	0.4883	not significant
084454 vs. 084458	1.9229	0.1269	not significant
084455 vs. 084456	1.3842	0.2385	not significant
084455 vs. 084457	0.6333	0.5609	not significant
084455 vs. 084458	0.6049	0.5779	not significant
084456 vs. 084457	1.5421	0.1979	not significant
084456 vs. 084458	1.5229	0.2025	not significant
084457 vs. 084458	0.2304	0.8291	not significant

Pairwise t-test comparison p-values less than the Bonferroni-adjusted  $\alpha = 0.05$  indicate that significant differences in mean slope, for smokeless tobacco extracts expressed per 'unit of use', were detected in strain TA98 (+S9) between **Copenhagen Long Cut (084456)** and each of {**Fresh Strips (084454)**, **Mellow Sticks (084455)**, Ariva Wintergreen (084457)}.

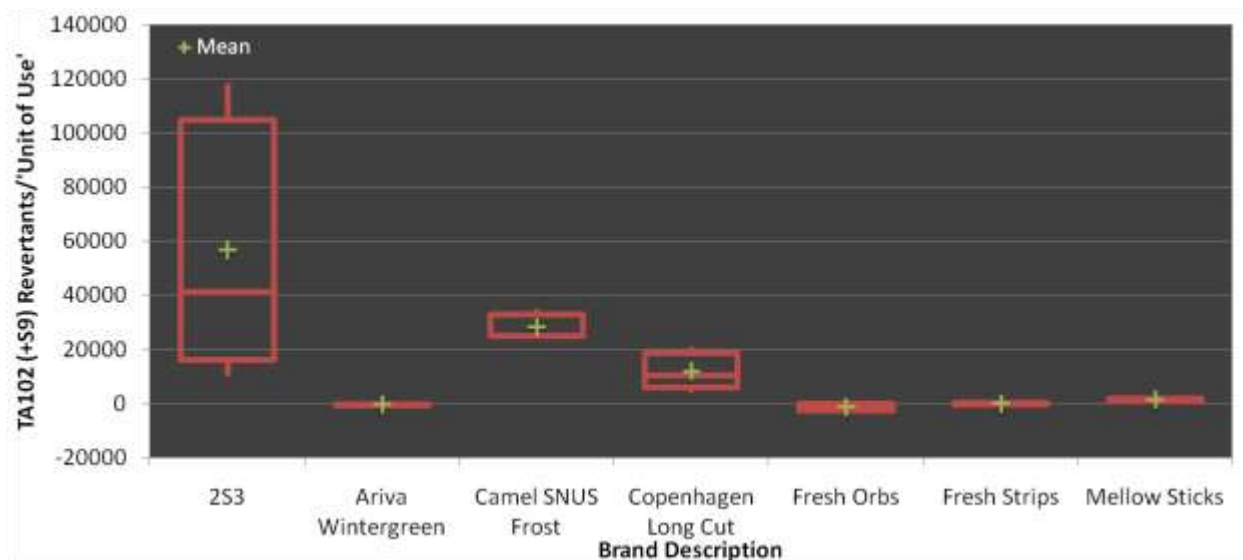
### Box-and-Whisker Plot: TA98 (+S9) Replicate Specific Activity Estimates



Report prepared by Labstat International ULC

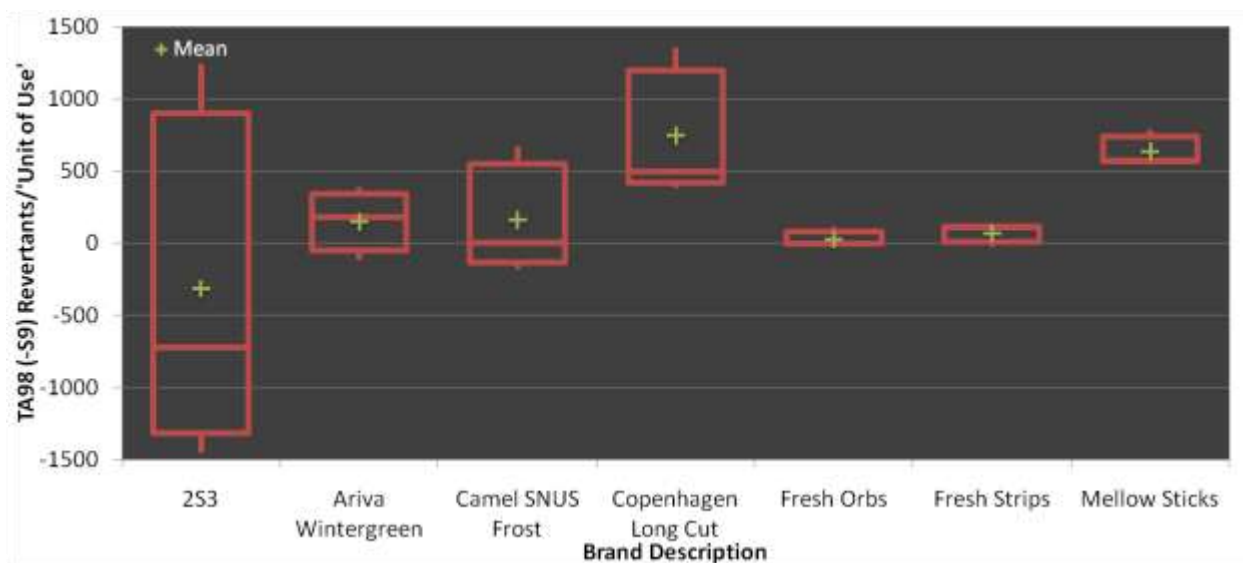
Pairwise t-test comparison p-values less than the Bonferroni-adjusted  $\alpha = 0.05$  indicate that significant differences in mean slope, for smokeless tobacco extracts expressed per 'unit of use', were detected in strain TA102 (+S9) between **Camel SNUS Frost (084394)** and each of {**Fresh Strips (084454)**, **Mellow Sticks (084455)**, **Ariva Wintergreen (084457)**, **Fresh Orbs (084458)**}.

### Box-and-Whisker Plot: TA102 (+S9) Replicate Specific Activity Estimates



Pairwise t-test comparison p-values less than the Bonferroni-adjusted  $\alpha = 0.05$  indicate that significant differences in mean slope, for smokeless tobacco extracts expressed per 'unit of use', were detected in strain TA98 (-S9) between **Mellow Sticks (084455)** and each of {**Fresh Strips (084454)**, **Fresh Orbs (084458)**}.

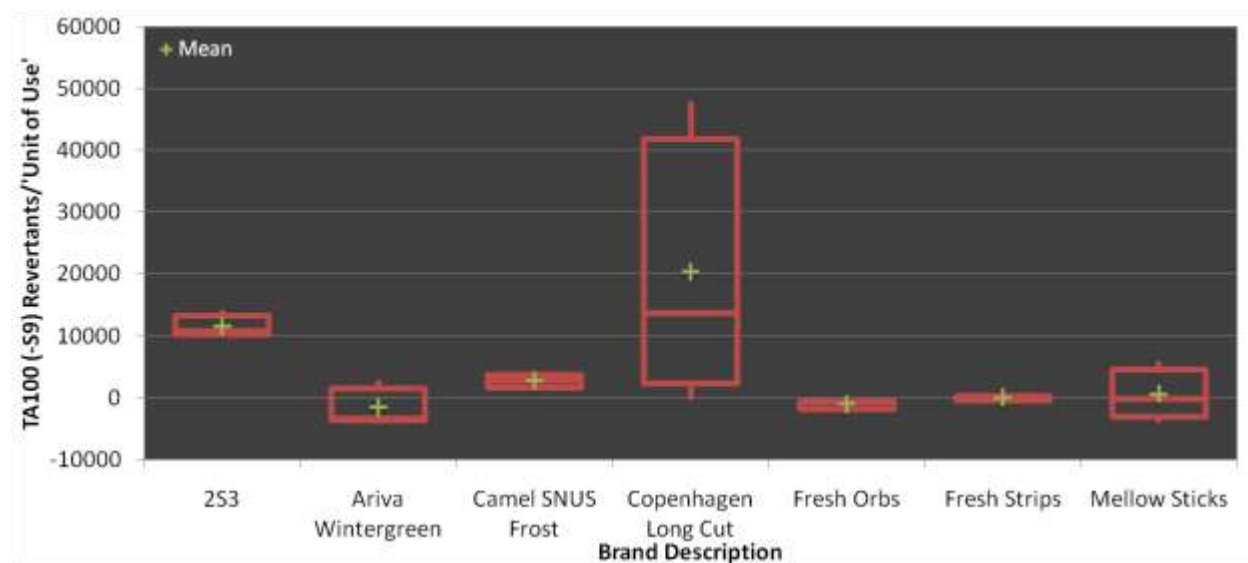
### Box-and-Whisker Plot: TA98 (-S9) Replicate Specific Activity Estimates





Pairwise t-test comparison p-values less than the Bonferroni-adjusted  $\alpha = 0.05$  indicate that significant differences in mean slope, for smokeless tobacco extracts expressed per 'unit of use', were detected in strain TA100 (-S9) between **2S3 (084395)** and each of {**Fresh Strips (084454)**, **Fresh Orbs (084458)**}.

### Box-and-Whisker Plot: TA100 (-S9) Replicate Specific Activity Estimates



### Number of Significant Slopes and Method Applied for Contrasts: Significant Test Samples Only

Strain and S9 Activation	# of Significant Mean Slopes	Number of Comparisons	Std. Dev. Ratio (Max ÷ Min)	Type of Comparison
TA98 (+S9)	1	0	28.8	Pairwise T-test (unequal variance)
TA98 (-S9)	1	0		
TA100 (+S9)	3	3		
TA100 (-S9)	1	0		
TA102 (+S9)	2	1	10.6	ANOVA (equal variance)
TA102 (-S9)	0	0		
TA1535 (+S9)	0	0		
TA1535 (-S9)	0	0		
TA1537 (+S9)	1	0		
TA1537 (-S9)	0	0		

### Contrasts of Interest: Significant Test Samples Only

Pairwise T-test Comparison	TA100 (+S9)		
	t-statistic	p-value	significance at $\alpha = 0.05$
084454 vs. 084455	3.19	0.0334	not significant
084454 vs. 084456	5.41	0.0056	significant
084455 vs. 084456	4.76	0.0089	significant

For significant smokeless tobacco extract slopes expressed on a 'unit of use' dose basis, pairwise t-test comparisons detected significant differences in strain TA100 (+S9) between **Copenhagen Long Cut (084456)** and each of {**Fresh Strips (084454)**, **Mellow Sticks (084455)**}.



ANOVA-Based Comparison	TA102 (+S9)		
	f-ratio	p-value	significance at $\alpha = 0.05$
084394 vs. 084455	74.99	0.0010	significant

For significant smokeless tobacco extract slopes expressed on a 'unit of use' dose basis, ANOVA-based comparisons detected significant differences in strain TA102 (+S9) between **Camel SNUS Frost (084394)** and **Mellow Sticks (084455)**.

## 6.5 Comparisons Between Smoked and Smokeless Tobacco Products

### 6.5.1 Replicate Specific Activity Slopes and Slope Statistics

Tables of results were obtained for the individual replicate slope estimates and the summary statistics over the three replicate slopes for each smoked and smokeless tobacco test sample under each tester strain and S9 activation. The file *M97 Supplemental\_ames\_tpm+wt\_stats\_Unit.xls* gives tables of results for all the smokeless tobacco samples plus the tobacco smoke CSC of the KR 2R4F (084396) samples on a 'unit of use' dose basis (see table in section 5.1.1 for defined units).

### 6.5.2 Data Plots

Plots of all replicate smokeless and smoked tobacco test samples can be found in the file *M97 Supplemental\_ames\_tpm+wt\_stats\_Unit.xls* on the CD that accompanies this report. Box-and-Whisker plots of the calculated specific activities can also be found on the CD that accompanies this report.

### 6.5.3 One-Way ANOVA Results

One-way ANOVA comparisons of mean 'unit of use' slope estimates among all 7 smokeless and one smoked test samples yielded the following:

Tester Strain & S9 Activation	Variation Source	Sum of Squares	d.f.	Mean Square	F Ratio	P value
TA98 (+S9)	Among Samples	1.15E+09	7	164236019	26.0	< 0.001
	Within Samples	100919640	16	6307477.5		
	Total	1.251E+09	23			
TA98 (-S9)	Among Samples	3177507.3	7	453929.61	1.5	0.252
	Within Samples	4989783.2	16	311861.45		
	Total	8167290.4	23			
TA100 (+S9)	Among Samples	7.753E+09	7	1.108E+09	10.40	< 0.001
	Within Samples	1.704E+09	16	106495298		
	Total	9.457E+09	23			
TA100 (-S9)	Among Samples	1.238E+09	7	176815919	2.22	0.088
	Within Samples	1.272E+09	16	79505680		
	Total	2.51E+09	23			
TA102 (+S9)	Among Samples	8.899E+09	7	1.271E+09	3.27	0.024
	Within Samples	6.218E+09	16	388619210		
	Total	1.512E+10	23			
TA102 (-S9)	Among Samples	2.682E+09	7	383200269	1.53	0.228
	Within Samples	4.012E+09	16	250761897		
	Total	6.695E+09	23			
TA1535 (+S9)	Among Samples	433925.52	7	61989.36	0.359	0.913
	Within Samples	2759764.8	16	172485.3		
	Total	3193690.3	23			

Tester Strain & S9 Activation	Variation Source	Sum of Squares	d.f.	Mean Square	F Ratio	P value
TA1535 (-S9)	Among Samples	15819651	7	2259950.2	2.92	<b>0.036</b>
	Within Samples	12398058	16	774878.65		
	Total	28217710	23			
TA1537 (+S9)	Among Samples	187495082	7	26785012	2	0.097
	Within Samples	199498105	16	12468632		
	Total	386993187	23			
TA1537 (-S9)	Among Samples	34956603	7	4993800.4	7.51	<b>&lt; 0.001</b>
	Within Samples	10645728	16	665357.99		
	Total	45602331	23			

One-way ANOVA analysis indicates significant differences, at  $\alpha = 0.05$ , among mean 'unit of use' slope estimates for smoked and smokeless tobacco samples assayed with strains TA98(+S9), TA100(+S9), TA102(+S9), TA1535(-S9) and TA1537(-S9).

#### 6.5.4 Contrasts of Interest

(b) (4)

Method Applied for Contrasts: All Test Samples with KR 2R4F

(b) (4)

Contrasts of Interest: All Test Samples with KR 2R4F

Contrast of Interest	TA98 (+S9)			TA100 (+S9)			TA102 (+S9)		
	t-statistic	p-value	significance at $\alpha = 0.05$	t-statistic	p-value	significance at $\alpha = 0.05$	t-statistic	p-value	significance at $\alpha = 0.05$
084394 vs. 084396	6.051	0.0038	<b>significant</b>	0.451	0.6755	not significant	8.821	0.0009	<b>significant</b>
084395 vs. 084396	4.305	0.0126	not significant	2.556	0.0629	not significant	1.762	0.1529	not significant
084454 vs. 084396	6.204	0.0034	<b>significant</b>	6.575	0.0028	<b>significant</b>	1.488	0.2110	not significant
084455 vs. 084396	6.151	0.0035	<b>significant</b>	0.729	0.5064	not significant	1.245	0.2811	not significant
084456 vs. 084396	4.330	0.0124	not significant	4.660	0.0096	not significant	2.523	0.0651	not significant
084457 vs. 084396	6.215	0.0034	<b>significant</b>	1.594	0.1861	not significant	2.368	0.0770	not significant
084458 vs. 084396	6.066	0.0037	<b>significant</b>	4.695	0.0093	not significant	2.076	0.1066	not significant

Contrast of Interest	TA1537 (+S9)			TA100 (-S9)		
	t-statistic	p-value	significance at $\alpha = 0.05$	t-statistic	p-value	significance at $\alpha = 0.05$
084394 vs. 084396	6.299	0.0032	<b>significant</b>	0.007	0.9951	not significant
084395 vs. 084396	0.839	0.4485	not significant	7.003	0.0022	<b>significant</b>
084454 vs. 084396	18.712	0.0000	<b>significant</b>	4.441	0.0113	not significant
084455 vs. 084396	14.604	0.0001	<b>significant</b>	0.805	0.4661	not significant
084456 vs. 084396	0.921	0.4094	not significant	1.253	0.2785	not significant
084457 vs. 084396	17.120	0.0001	<b>significant</b>	2.046	0.1102	not significant
084458 vs. 084396	15.698	0.0001	<b>significant</b>	5.075	0.0071	<b>significant</b>

Pairwise t-test comparison p-values less than the Bonferroni-adjusted  $\alpha = 0.05$  indicate that significant differences in mean specific activity slope were detected between smokeless tobacco extracts and the cigarette smoke condensate of KR 2R4F (084396) on a 'Unit of Use' dose basis in the following instances:

Strains **TA98(+S9)** and **TA1537 (+S9)**

- **KR 2R4F (084396)** specific activity (revertants/cigarette) is significantly different from each of {**Camel SNUS Frost (084394)**, **Fresh Strips (084454)**, **Mellow Sticks (084455)**, **Ariva Wintergreen (084457)**, **Fresh Orbs (084458)**}.

Strain **TA100(+S9)**

- KR 2R4F (084396) specific activity is significantly different from Fresh Strips (084454)

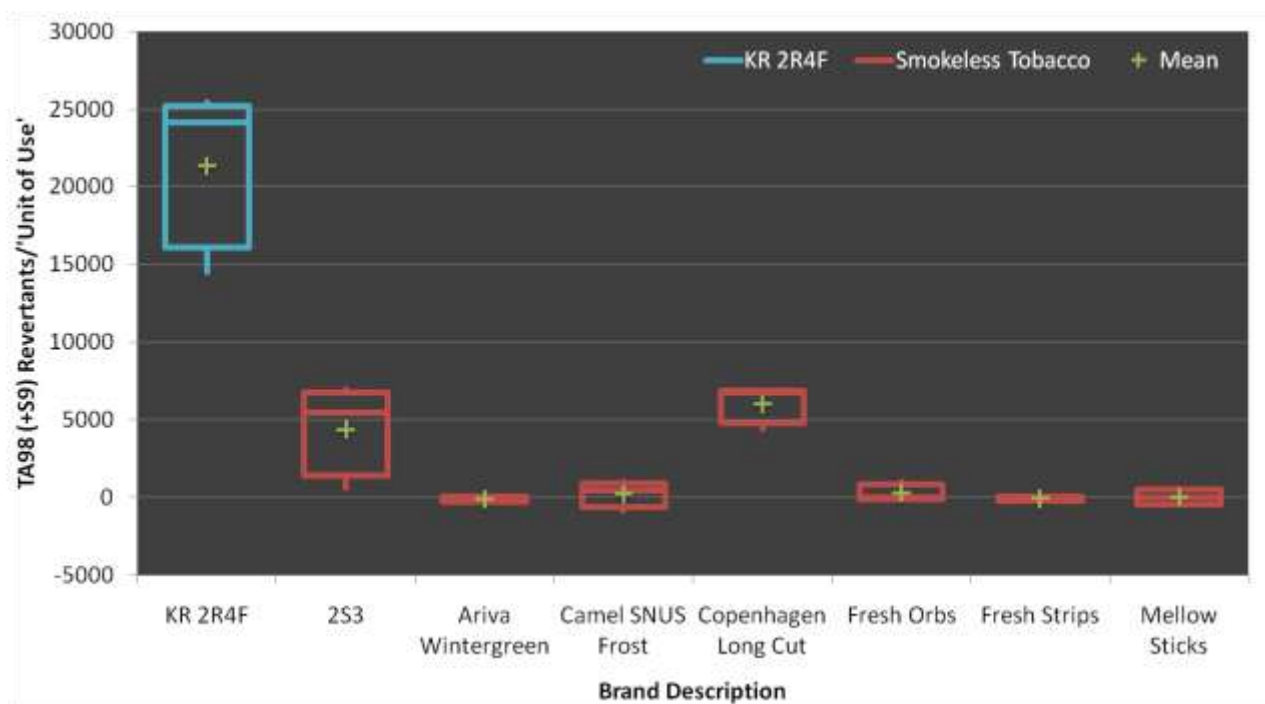
Strain **TA102(+S9)**

- KR 2R4F (084396) specific activity is significantly different from Camel SNUS Frost (084394)

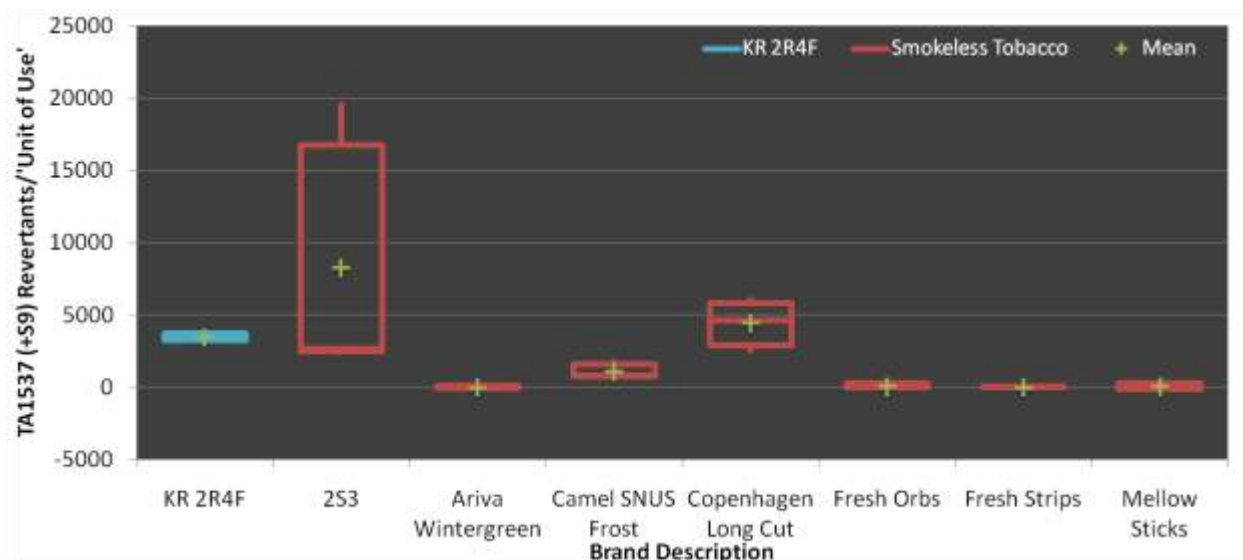
Strain **TA100(-S9)**

- KR 2R4F (084396) specific activity is significantly different from each of {**2S3 (084395)**, **Fresh Orbs (084458)**}.

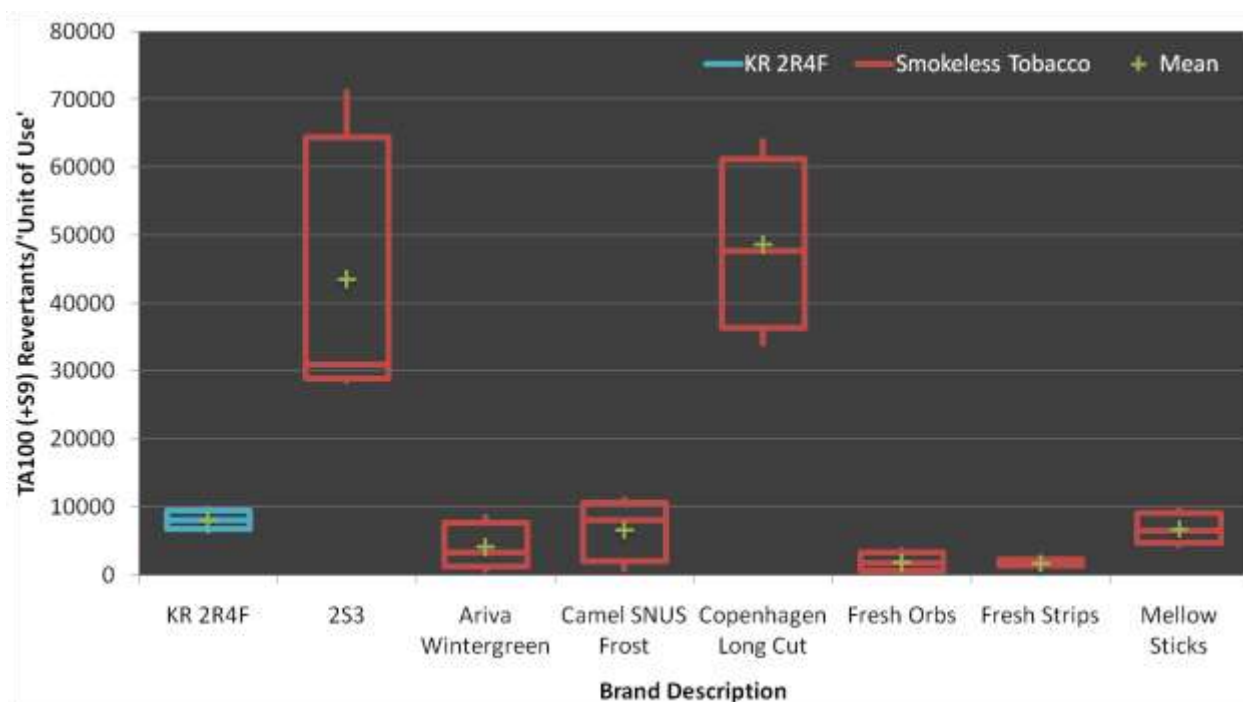
### Box-and-Whisker Plot: TA98 (+S9) Replicate Specific Activity Estimates



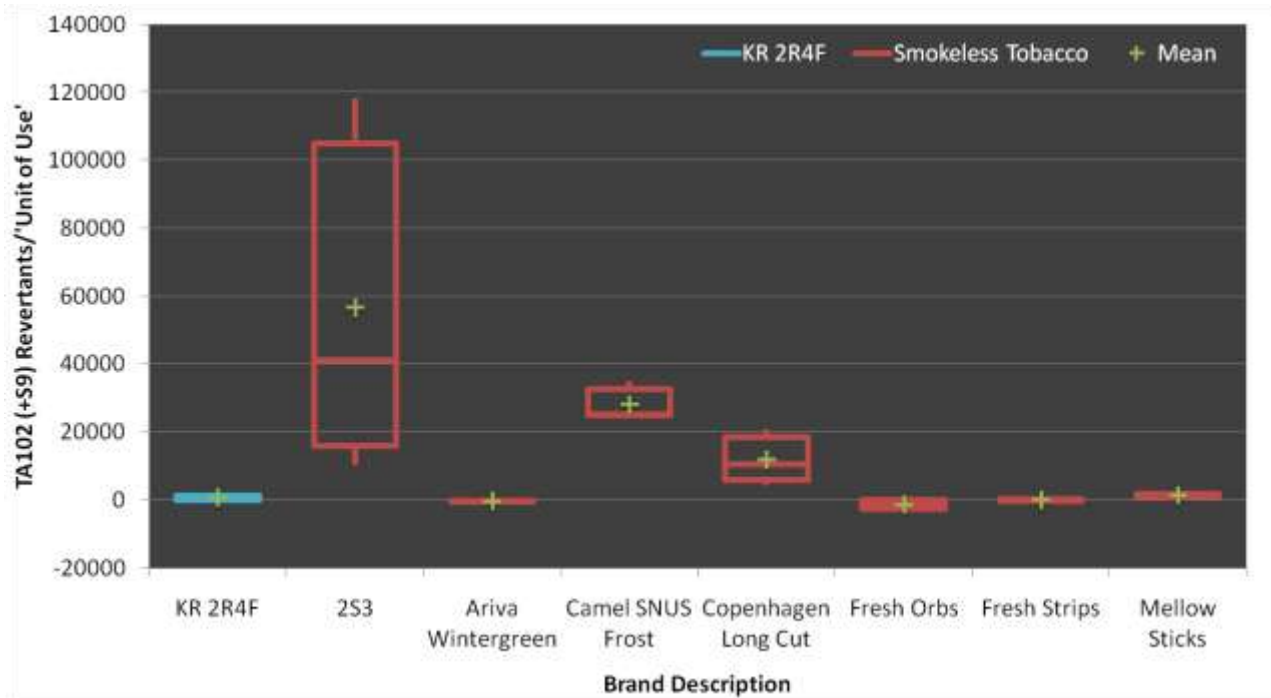
**Box-and-Whisker Plot: TA1537 (+S9) Replicate Specific Activity Estimates**



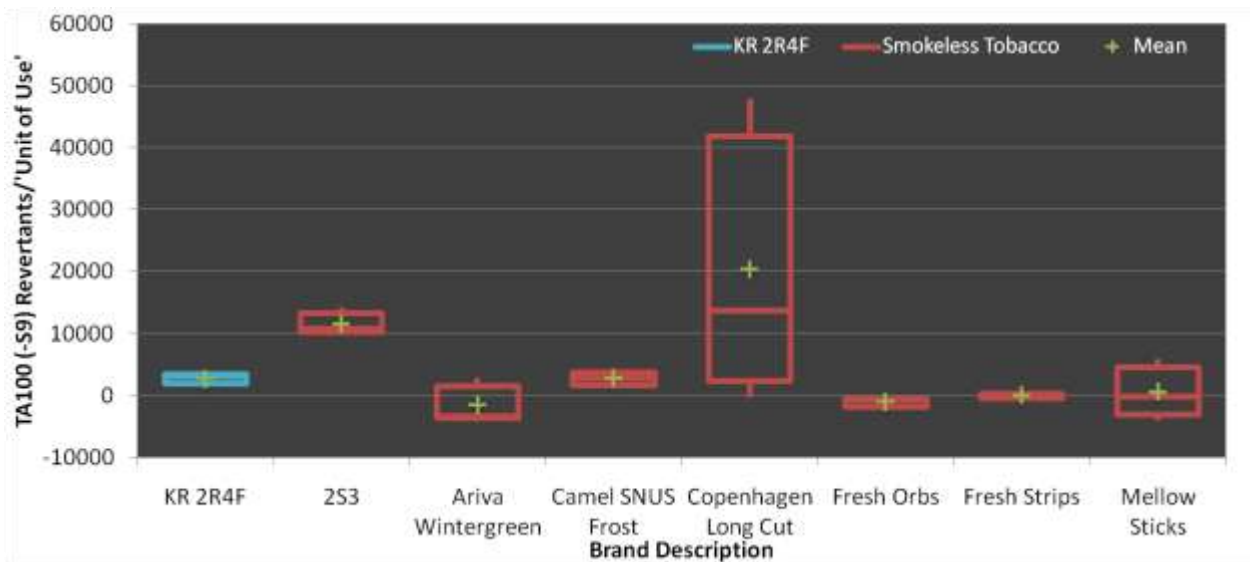
**Box-and-Whisker Plot: TA100 (+S9) Replicate Specific Activity Estimates**



**Box-and-Whisker Plot: TA102 (+S9) Replicate Specific Activity Estimates**



**Box-and-Whisker Plot: TA100 (-S9) Replicate Specific Activity Estimates**



**Number of Significant Slopes and Method Applied for Contrasts:** Significant Test Samples and KR 2R4F Only

Strain and S9 Activation	# Significant Slopes (Including KR 2R4F)	Number of Comparisons	Std. Dev. Ratio (Max ÷ Min)	Type of Comparison
TA98 (+S9)	2	1	4.3	ANOVA (equal variance)
TA98 (-S9)	2	1	2.2	ANOVA (equal variance)
TA100 (+S9)	4	3	28.8	Pairwise T-test (unequal variance)
TA100 (-S9)	2	1	2.0	ANOVA (equal variance)
TA102 (+S9)	0	0		
TA102 (-S9)	0	0		
TA1535 (+S9)	0	0		
TA1535 (-S9)	0	0		
TA1537 (+S9)	2	1	5.5	ANOVA (equal variance)
TA1537 (-S9)	0	0		

**Contrasts of Interest:** Significant Test Samples and KR 2R4F Only

	TA98 (+S9)		
ANOVA-Based Comparison	f-ratio	p-value	significance at $\alpha = 0.05$
084456 vs. 084396	18.75	0.0124	significant

For significant smokeless tobacco extract and KR 2R4F slopes expressed on a 'unit of use' dose basis, **Copenhagen Long Cut (084456)** was significantly different from **KR 2R4F (084396)** in TA98 (+S9) by ANOVA-based comparisons.

	TA98 (-S9)		
ANOVA-Based Comparison	f-ratio	p-value	significance at $\alpha = 0.05$
084455 vs. 084396	0.604	0.4806	not significant

For significant smokeless tobacco extract and KR 2R4F slopes expressed on a 'unit of use' dose basis, no significant difference was detected between Mellow Sticks (084455) and KR 2R4F (084396) in TA98 (-S9) by ANOVA-based comparisons.

	TA100 (+S9)		
Pairwise T-test Comparison	t-statistic	p-value	significance at $\alpha = 0.05$
084454 vs. 084396	6.57	0.0028	significant
084455 vs. 084396	0.729	0.5064	not significant
084456 vs. 084396	4.66	0.0096	significant

For significant smokeless tobacco extract and KR 2R4F slopes expressed on a 'unit of use' dose basis, each of **{Fresh Strips (084454), Copenhagen Long Cut (084456)}** was significantly different from **KR 2R4F (084396)** in TA100 (+S9) by pairwise t-test comparisons.



ANOVA-Based Comparison	TA100 (-S9)		
	f-ratio	p-value	significance at $\alpha = 0.05$
084395 vs. 084396	49.0	0.0022	significant

For significant smokeless tobacco extract and KR 2R4F slopes expressed on a 'unit of use' dose basis, **2S3 (084395)** was significantly different from **KR 2R4F (084396)** in TA100 (-S9) by ANOVA-based comparisons.

ANOVA-Based Comparison	TA1537 (+S9)		
	f-ratio	p-value	significance at $\alpha = 0.05$
084456 vs. 084396	0.847	0.4094	not significant

For significant smokeless tobacco extract and KR 2R4F slopes expressed on a 'unit of use' dose basis, **Copenhagen Long Cut (084456)** was significantly different from **KR 2R4F (084396)** in TA1537 (+S9) by ANOVA-based comparisons.

## 7 Attribution

### 7.1 Original

This supplemental report has been reviewed by me and is certified, to the best of my knowledge, to be a true and accurate description of the statistical analysis methodologies used to arrive at the findings that accompany this report.

Dated: January 20, 2011



Wendy Wagstaff  
Senior Statistician  
Labstat International ULC

### 7.2 Revision 1

This supplemental report has been reviewed by me and is certified, to the best of my knowledge, to be a true and accurate description of the statistical analysis methodologies used to arrive at the findings that accompany this report.

Dated: April 27, 2011



Wendy Wagstaff  
Senior Statistician  
Labstat International ULC



**7.3 Revision 2**

This supplemental report has been reviewed by me and is certified, to the best of my knowledge, to be a true and accurate description of the statistical analysis methodologies used to arrive at the findings that accompany this report.

Dated: January 2, 2012

A handwritten signature in black ink that reads "Wendy Wagstaff". The signature is written in a cursive, flowing style.

Wendy Wagstaff  
Senior Statistician  
Labstat International ULC

# **Appendix A**

## **Scope of Accreditation**



Standards Council of Canada  
Conseil canadien des normes

200-270, rue Albert St.  
Ottawa, ON (Canada)  
K1P 6N7

Canada

Tel.: +1 613 238-3222

Fax: +1 613 569 7808

E-mail/Courriel: info@scc.ca

Internet: <http://www.scc.ca>

## SCOPE OF ACCREDITATION

LABSTAT INTERNATIONAL ULC  
262 Manitou Drive, Unit 5  
Kitchener, ON  
N2C 1L3

Accredited Laboratory No. 368  
(Conforms with requirements of CAN-P-4E (ISO/IEC 17025:2005))

CONTACT: Mr. Lucian Hirtie  
TEL: (519) 748-5409  
FAX: (519) 748-1654  
EMAIL: [lhirtie@labstat.com](mailto:lhirtie@labstat.com)

CLIENTS SERVED: All interested parties

FIELDS OF TESTING: Biological, Chemical/Physical

ISSUED ON: 2007-03-08

VALID TO: 2012-01-22

**Remarque:** La présente portée d'accréditation existe également en français, sous la forme d'un document distinct.

**Note:** This scope of accreditation is also available in French as a separately issued document.

### ANIMAL AND PLANTS (AGRICULTURE)

#### Agricultural products: (except food and chemicals)

##### **Tobacco**

AOAC 966.02	Moisture in Tobacco
ASTM E2187	Standard Test Method for Measuring the Ignition Strength of Cigarettes
ISO 10315	Cigarettes – Determination of Nicotine in Smoke
	Condensates Gas-Chromatographic Method
ISO 10362-1	Cigarettes – Determination of Water in Smoke Condensates –

The approved and most recent version of this document can be viewed on the SCC website at <http://pactm.scc.ca/SpecsSearch/QLSearchForm.do>

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Standards Council of Canada Accredited Laboratory No. 368

	Part I: Gas-Chromatographic Method
ISO 3308	Routine Analytical Cigarette-Smoking Machine- Definitions and Standard Conditions
ISO 3402	Tobacco and Tobacco Products – Atmosphere for Conditioning and Testing
ISO 4387	Cigarettes – Determination of Total and Nicotine-Free Dry Particulate Matter Using a Routine Analytical Smoking Machine
ISO 6565	Tobacco and Tobacco Products – Draw Resistance of Cigarettes and Pressure Drop of Filter Rods-Standard Conditions and Measurement
ISO 8454	Cigarettes – Determination of Carbon Monoxide in the Vapour Phase of Cigarette Smoke – NDIR method
TMS-118	Determination of Volatile Nitrosamines in Mainstream Tobacco Smoke
TMS-120	Determination of Selected Polynuclear Aromatic Hydrocarbons (PAHs) in Mainstream Tobacco Smoke
TMS-127	Determination of Selected Polynuclear Aromatic Hydrocarbons (PAHs) And Aza-Arenes in the Particulate Phase of Mainstream Tobacco Smoke
TMS-128	Determination of Aromatic Amines in Mainstream Tobacco smoke (Expanded list: Aniline, o-Toluidine, m-Toluidine, p-Toluidine, o-Anisidine, 1- and 2-Aminonaphthalene and 3- and 4-Aminobiphenyl)
TMS-132	Determination of Gas Phase and Particulate Phase Free Radicals in Mainstream Smoke
TMS-133	Determination of Heterocyclic Aromatic Amines (HAAs) in Mainstream Tobacco Smoke
TMS-135	Determination of Tobacco Specific Nitrosamines in Mainstream Smoke by High-Performance Liquid Chromatography-ESI-Tandem Mass Spectrometry
TSS-219	Determination of Selected Polynuclear Aromatic Hydrocarbons (PAHs) in Sidestream Smoke
TWT-303	Determination of Carbonyls in Whole Tobacco
TWT-315	Determination of N-Methyl Carbamate Pesticides in Tobacco
TWT-316	Determination of Organophosphate Pesticides in Tobacco
TWT-317	Determination of Organochlorine Pesticides in Process Tobacco
TWT-318	Determination of Ethylene-Bis-Dithiocarbamate (EBDC) in Whole Tobacco
TWT-319	Determination of Benomyl Carbendazim in Tobacco
TWT-321	Determination Of Nicotine Alkaloids And Reducing Sugars In Whole Tobacco
TWT-322	Determination of Chlorophenoxy Acid Herbicides in Process Tobacco
TWT-323	Determination of Isovaleric Acid and 3-Methylvaleric Acid in Tobacco

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Standards Council of Canada Accredited Laboratory No. 368

TWT-324	Determination of Nicotine in Whole Tobacco (CDC method)
TWT-325	Determination of Pectin in Tobacco
TWT-333	Determination of Tobacco Specific Nitrosamines in Whole Tobacco by High-Performance Liquid Chromatography-ESI-Tandem Mass Spectrometry

**(Health Canada Tobacco Reporting Regulations Official Methods)**

T-101	Determination of Ammonia in Mainstream Tobacco Smoke
T-102	Determination of 1- and 2- Aminonaphthalene and 3- and 4- Aminobiphenyl in Mainstream Tobacco Smoke
T-103	Determination of Benzo[a]pyrene in Mainstream Tobacco Smoke
T-104	Determination of Selected Carbonyls in Mainstream Tobacco Smoke
T-105	Determination of Eugenol in Mainstream Tobacco Smoke
T-106	Determination of Filter Efficiency in Mainstream Tobacco Smoke
T-107	Determination of Hydrogen Cyanide in Mainstream Tobacco Smoke
T-108	Determination of Mercury in Mainstream Tobacco Smoke
T-109	Determination of Ni, Pb, Cd, Cr, As and Se in Mainstream Tobacco Smoke
T-110	Determination of Oxides of Nitrogen in Mainstream Tobacco Smoke
T-111	Determination of Nitrosamines in Mainstream Tobacco Smoke
T-112	Determination of Pyridine, Quinoline and Styrene in Mainstream Tobacco Smoke
T-113	Determination of Mainstream Tobacco Smoke pH
T-114	Determination of Phenolic Compounds in Mainstream Tobacco Smoke
T-115	Determination of Tar, Nicotine and Carbon Monoxide in Mainstream Tobacco Smoke
T-116	Determination of 1,3- Butadiene, Isoprene, Acrylonitrile, Benzene and Toluene in Mainstream Tobacco Smoke
T-201	Determination of Ammonia in Sidestream Tobacco Smoke
T-202	Determination of 1- and 2- Aminonaphthalene and 3- and 4- Aminobiphenyl in Sidestream Tobacco Smoke
T-203	Determination of Benzo[a]pyrene in Sidestream Tobacco Smoke
T-203A	Determination of Benzo[a]pyrene in Sidestream Tobacco Smoke (GC/MS)
T-204	Determination of Selected Carbonyls in Sidestream Tobacco Smoke
T-205	Determination of Hydrogen Cyanide in Sidestream Tobacco Smoke
T-206	Determination of Mercury in Sidestream Tobacco Smoke

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Standards Council of Canada Accredited Laboratory No. 368

T-207	Determination of Toxic Trace Metals in Sidestream Smoke
T-208	Determination of Oxides of Nitrogen in Sidestream Tobacco Smoke
T-209	Determination of Nitrosamines in Sidestream Tobacco Smoke
T-210	Determination of Pyridine and Quinoline in Sidestream Tobacco Smoke
T-211	Determination of Phenolic Compounds in Sidestream Tobacco Smoke
T-212	Determination of "Tar" and Nicotine in Sidestream Tobacco Smoke
T-213	Determination of 1,3 Butadiene, Isoprene, Acrylonitrile, Benzene, Toluene and Styrene in Sidestream Tobacco Smoke
T-214	Determination of Carbon Monoxide (CO) in Sidestream Tobacco Smoke
T-301	Determination of Alkaloids in Whole Tobacco
T-302	Determination of Ammonia in Whole Tobacco
T-304	Determination of Humectants in Whole Tobacco
T-306	Determination of Ni, Pb, Cd, Cr, As, Se and Hg in Whole Tobacco
T-307	Determination of Benzo[a]pyrene in Whole Tobacco
T-308	Determination of Nitrate in Whole Tobacco
T-309	Determination of Nitrosamines in Whole Tobacco
T-310	Determination of Whole Tobacco pH
T-311	Determination of Triacetin in Whole Tobacco
T-312	Determination of Sodium Propionate in Whole Tobacco
T-313	Determination of Sorbic Acid in Whole Tobacco
T-314	Determination of Eugenol in Whole Tobacco
T-401	Preparation of Cigarettes from Packaged Leaf Tobacco for Testing
T-402	Preparation of Cigarettes, Cigarette Tobacco, Cigars, Kreteks, Bidis, Packaged Leaf Tobacco, Pipe Tobacco and Smokeless Tobacco for testing

**(Microbiology Tests)**

T-501	Bacterial Reverse Mutation Assay for Mainstream Tobacco Smoke
T-502	Neutral Red Uptake Assay for Mainstream Tobacco Smoke
T-503	In Vitro Micronucleus Assay for Mainstream Tobacco Smoke
TBA-504	<i>In vitro</i> Sister Chromatid Exchange (SCE) Assay for Mainstream Tobacco Smoke

**(Other: Measures of Exposure)**

TME-001	Determination of Nicotine, Cotinine and Caffeine in Human Physiological Fluid Samples
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TME-002	Determination of Creatinine in Urine
TME-003	Determination of 3-Hydroxycotinine in Human Physiological Fluid Samples
TME-004	<i>Salmonella Typhimurium</i> Reverse Mutation Assay: Microsuspension Method For Testing Urine Mutagenicity
TME-005	Determination of Nicotine and Major Metabolites in Human Urine Using LC-MS-MS

**Notes:**

**AOAC:** Association of Official Analytical Chemists

**ASTM:** American Society for Testing and Materials

**CAN-P-4E (ISO/IEC 17025):** General Requirements for the Competence of Testing and Calibration Laboratories (ISO/IEC 17025-2005)

**ISO:** International Organization for Standardization

**T:** Health Canada Tobacco Reporting Regulations Official Methods

**TBA:** Test Method, Biological Activity

**TME:** Test Method, Measures of Exposure

**TMS:** Test method, Mainstream Smoke

**TSS:** Test method, Sidestream Smoke

**TWT:** Test method, Whole Tobacco

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P. Paladino, P. Eng., Director, Conformity Assessment

Date: 2007-03-08

Number of Scope Listings: 83

SCC 1003-15/420

Partner File #0

Partner: None

# **Appendix B**

## **“Raw” Data and Analysis Results (See Enclosed CD)**



## Use of Labstat's<sup>1</sup> Analytical Reports<sup>2</sup>

Labstat International ULC is a recognized centre of analytical excellence related to tobacco and tobacco products. Our clients include major international tobacco manufacturers, various Governments and Government agencies such as the Canadian Federal Department of Health and the Massachusetts Department of Public Health, agricultural interests, university researchers and private research interests. Normally our contractual obligations extend **only** to the provision of data and related reports.

It should be noted<sup>3</sup>, in this regard, that

***All analytical data and reports, provided by Labstat International ULC, are for the exclusive use of the person, partnership, or corporation to whom it is addressed, and neither the data, the report nor the name of the laboratory (Labstat International ULC) nor any member of its staff may be used in connection with the advertising or sale of any product or process without written authorization from the CEO of the company or his designate. Labstat International ULC is not responsible for unauthorized use of test reports.***

The following also applies to reported data.

***All Labstat reports on testing relate only to the sample received and tested by it at the time of testing. Labstat warrants that all samples submitted were tested in accordance with its standard test procedures. Except as stated herein, there is no warranty expressed or implied, statutory or other wise, as to the results of Labstat tests. Labstat does not warrant or guarantee the fitness of the materials from which the samples have been drawn for any particular purpose including without limitation for consumption as cigarettes, cigars, smokeless tobacco or any other form of tobacco or tobacco-related product.***

<sup>1</sup>. Labstat International ULC,  
262 Manitou Drive, Kitchener, ON Canada N2C 1L3  
Phone: (519) 748-5409; Fax: (519) 748-1654; Email: labstat@labstat.com

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<sup>3</sup>. Unless superseded by a specific contractual obligation or other written agreement.

### **Attribution Policy**

Labstat International ULC ("Labstat") is a private independent analytical laboratory whose services are generally limited to the analysis of tobacco and tobacco related products ("product") provided by clients. Neither Labstat, as a company, nor its personnel, as individuals, participate in product development, product preparation or the design of experiments related to product characteristics. It is for this reason that the company does not allow the use of its name (Labstat International ULC), any part of its name, its address (262 Manitou Drive, Kitchener, Ontario Canada), or any part of its address, its logo (as shown below) or the name of any of its employees to be used in either indirect or direct product marketing or advertising including but not limited to press releases, advertisements in the print media, or public statements regarding product attributes based on test results.



Sample ID	Sample Description
084396	Kentucky Reference 2R4F

**LABSTAT INTERNATIONAL ULC**

262 Manitou Drive, Kitchener, Ontario, Canada N2C 1L3

Phone (519) 748-5409 FAX (519) 748-1654

Project: M97

Period: September 15, 2008

**Smoking Data<sup>†</sup> for Ames Assay analysis:  
Mutagenesis in *Salmonella typhimurium***

Set Number	Run Number	Sample ID	Replicate Number	Smoking Date	Cigarettes Smoked	Puff Count (per cig)	Weight of MS TPM (mg)**	Smoking Machine
1	2	084396	1	15-Sep-08	20	10.1	213	Borgwaldt Rotary
1	3	084396	2	15-Sep-08	20	9.2	215	Borgwaldt Rotary
1	4	084396	3	15-Sep-08	20	9.1	225	Borgwaldt Rotary

<sup>†</sup> Samples generated under 'ISO' smoking conditions:

35mL puff volume; 60 second interval; 2 second duration; no vent blocking.

\*\* Samples extracted in DMSO to give a final concentration of 10.0 mg/mL.

**Mutagenesis in *Salmonella typhimurium* with (+) S9 Metabolic Activation  
(Revertants per plate)**

Set Number	Run Number	Sample ID	Replicate Number	TPM Dose (µg/plate)	Unit of Use Dose (cigs/plate)	TA98 (+S9)			TA100 (+S9)			TA1535 (+S9)			TA1537 (+S9)			TA102 (+S9)		
						P1	P2	P3	P1	P2	P3	P1	P2	P3	P1	P2	P3	P1	P2	P3
1	2	084396	1	0	0	46	42	39	158	153	141	14	18	9	7	6	11	321	312	316
1	2	084396	1	25	0.002	90	73	74	158	150	148	10	19	10	15	18	14	320	322	313
1	2	084396	1	50	0.005	124	102	121	180	154	184	7	12	13	27	24	35	346	289	302
1	2	084396	1	75	0.007	166	141	178	197	190	209	16	19	14	32	34	31	287	280	287
1	2	084396	1	100	0.009	191	188	186	213	221	223	13	12	16	34	36	32	283	313	294
1	2	084396	1	125	0.012	206	199	211	230	203	198	9	20	8	52	42	55	295	308	306
1	2	084396	1	250	0.023	369	352	332	296	303	302	23	12	17	88	77	86	318	304	320
1	2	084396	1	500	0.047	483	490	509	351	376	352	16	22	20	100	88	96	305	299	291
1	3	084396	2	0	0	48	48	36	181	161	157	11	17	9	7	6	5	263	294	268
1	3	084396	2	25	0.002	77	83	81	176	171	191	14	11	10	21	17	19	295	317	312
1	3	084396	2	50	0.005	150	139	162	182	186	213	12	9	8	32	35	40	286	326	326
1	3	084396	2	75	0.007	173	154	188	250	232	242	14	13	7	43	37	42	292	322	310
1	3	084396	2	100	0.009	273	293	268	251	242	246	12	20	11	42	47	39	334	302	315
1	3	084396	2	125	0.012	358	324	326	260	251	254	10	14	8	45	50	43	311	332	304
1	3	084396	2	250	0.023	528	499	498	334	357	362	11	16	11	69	67	68	305	290	321
1	3	084396	2	500	0.047	509	533	536	362	347	334	22	12	9	66	74	67	333	313	371
1	4	084396	3	0	0	49	47	33	153	172	168	14	11	12	6	5	7	274	315	294
1	4	084396	3	25	0.002	64	59	89	160	163	181	16	18	16	18	20	19	317	328	349
1	4	084396	3	50	0.004	151	153	173	197	186	166	17	17	11	32	30	42	351	285	336
1	4	084396	3	75	0.007	186	212	202	200	219	236	10	20	17	30	41	42	352	346	355
1	4	084396	3	100	0.009	271	263	269	246	249	268	14	12	12	37	57	32	300	324	320
1	4	084396	3	125	0.011	299	288	291	258	260	286	17	10	12	53	55	45	325	315	318
1	4	084396	3	250	0.022	339	309	331	368	352	382	11	14	16	86	75	64	374	353	330
1	4	084396	3	500	0.045	447	448	482	NA	368	397	20	15	22	90	87	78	372	364	380

**N/A** - data not available due to lack of bacterial growth or assay plate contamination

**NOTE:** TPM, Moisture and Nicotine contents of sample 084396 (Kentucky Reference 2R4F) were estimated based on existing historical data:

TPM = 10 mg/cigarette

Moisture = 0.75 mg/cigarette

Nicotine = 0.75 mg/cigarette

**Mutagenesis in *Salmonella typhimurium* without (-) S9 Metabolic Activation  
(Revertants per plate)**

Set Number	Run Number	Sample ID	Replicate Number	TPM Dose (µg/plate)	Unit of Use Dose (cigs/plate)	TA98 (-S9)			TA100 (-S9)			TA1535 (-S9)			TA1537 (-S9)			TA102 (-S9)		
						P1	P2	P3	P1	P2	P3	P1	P2	P3	P1	P2	P3	P1	P2	P3
1	2	084396	1	0	0	34	31	28	136	148	154	18	16	10	5	6	7	278	289	306
1	2	084396	1	25	0.002	30	28	29	161	151	168	11	17	16	8	9	12	273	257	266
1	2	084396	1	50	0.005	31	30	38	173	160	184	19	20	16	9	10	7	293	294	292
1	2	084396	1	75	0.007	28	28	29	185	164	183	10	13	19	11	7	9	306	294	288
1	2	084396	1	100	0.009	47	36	37	186	177	169	18	17	12	11	9	8	280	282	291
1	2	084396	1	125	0.012	26	27	37	186	193	200	20	14	19	7	9	10	296	294	282
1	2	084396	1	250	0.023	36	40	40	210	208	211	14	10	14	9	13	12	266	268	266
1	2	084396	1	500	0.047	66	57	62	232	223	231	23	12	16	7	8	6	264	256	266
1	3	084396	2	0	0	29	27	20	151	153	153	20	19	16	6	7	5	271	286	270
1	3	084396	2	25	0.002	23	24	25	174	154	160	17	19	19	8	7	6	317	306	301
1	3	084396	2	50	0.005	30	23	26	170	192	179	22	20	14	9	7	6	290	298	301
1	3	084396	2	75	0.007	28	29	27	174	180	170	17	22	18	7	8	9	298	281	286
1	3	084396	2	100	0.009	31	33	30	183	186	196	20	14	14	11	10	7	319	321	308
1	3	084396	2	125	0.012	39	22	29	177	193	189	14	25	17	9	7	8	296	313	311
1	3	084396	2	250	0.023	32	31	24	194	174	201	16	20	13	10	13	9	310	306	298
1	3	084396	2	500	0.047	86	79	66	209	197	211	28	19	24	7	8	6	294	294	283
1	4	084396	3	0	0	26	27	48	154	153	149	14	18	17	5	6	7	279	285	271
1	4	084396	3	25	0.002	29	21	26	158	148	167	15	18	10	6	8	7	291	277	276
1	4	084396	3	50	0.004	36	27	30	146	157	141	19	17	17	9	12	10	285	288	285
1	4	084396	3	75	0.007	26	23	31	147	173	162	19	16	13	9	10	8	302	303	294
1	4	084396	3	100	0.009	33	33	30	154	144	160	11	14	14	10	9	11	289	274	293
1	4	084396	3	125	0.011	29	34	32	191	184	176	17	13	12	10	11	13	297	294	287
1	4	084396	3	250	0.022	39	32	46	178	187	189	14	14	13	21	19	20	295	278	288
1	4	084396	3	500	0.045	48	62	51	186	190	200	14	18	20	8	9	7	299	304	306

**N/A** - data not available due to lack of bacterial growth or assay plate contamination

**NOTE:** TPM, Moisture and Nicotine contents of sample 084396 (Kentucky Reference 2R4F) were estimated based on existing historical data:

TPM = 10 mg/cigarette

Moisture = 0.75 mg/cigarette

Nicotine = 0.75 mg/cigarette

**Mutagenesis in *Salmonella typhimurium* with (+) S9 Metabolic Activation**  
**(Average No. of Revertants per plate)\***

Set Number	Run Number	Sample ID	Replicate Number	TPM Dose (µg/plate)	Unit of Use Dose (cigs/plate)	TA98 (+S9)		TA100 (+S9)		TA1535 (+S9)		TA1537 (+S9)		TA102 (+S9)	
						Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD
1	2	084396	1	0	0	42	4	151	9	14	5	8	3	316	5
1	2	084396	1	25	0.002	79	10	152	5	13	5	16	2	318	5
1	2	084396	1	50	0.005	116	12	173	16	11	3	29	6	312	30
1	2	084396	1	75	0.007	162	19	199	10	16	3	32	2	285	4
1	2	084396	1	100	0.009	188	3	219	5	14	2	34	2	297	15
1	2	084396	1	125	0.012	205	6	210	17	12	7	50	7	303	7
1	2	084396	1	250	0.023	351	19	300	4	17	6	84	6	314	9
1	2	084396	1	500	0.047	494	13	360	14	19	3	95	6	298	7
1	3	084396	2	0	0	44	7	166	13	12	4	6	1	275	17
1	3	084396	2	25	0.002	80	3	179	10	12	2	19	2	308	12
1	3	084396	2	50	0.005	150	12	194	17	10	2	36	4	313	23
1	3	084396	2	75	0.007	172	17	241	9	11	4	41	3	308	15
1	3	084396	2	100	0.009	278	13	246	5	14	5	43	4	317	16
1	3	084396	2	125	0.012	336	19	255	5	11	3	46	4	316	15
1	3	084396	2	250	0.023	508	17	351	15	13	3	68	1	305	16
1	3	084396	2	500	0.047	526	15	348	14	14	7	69	4	339	29
1	4	084396	3	0	0	43	9	164	10	12	2	6	1	294	21
1	4	084396	3	25	0.002	71	16	168	11	17	1	19	1	331	16
1	4	084396	3	50	0.004	159	12	183	16	15	3	35	6	324	35
1	4	084396	3	75	0.007	200	13	218	18	16	5	38	7	351	5
1	4	084396	3	100	0.009	268	4	254	12	13	1	42	13	315	13
1	4	084396	3	125	0.011	293	6	268	16	13	4	51	5	319	5
1	4	084396	3	250	0.022	326	16	367	15	14	3	75	11	352	22
1	4	084396	3	500	0.045	459	20	383	21	19	4	85	6	372	8

\*Values represent the mean number of revertants (average of three plates)

**Mutagenesis in *Salmonella typhimurium* without (-) S9 Metabolic Activation**  
**(Average No. of Revertants per plate)\***

Set Number	Run Number	Sample ID	Replicate Number	TPM Dose (µg/plate)	Unit of Use Dose (cigs/plate)	TA98 (-S9)		TA100 (-S9)		TA1535 (-S9)		TA1537 (-S9)		TA102 (-S9)	
						Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD
1	2	084396	1	0	0	31	3	146	9	15	4	6	1	291	14
1	2	084396	1	25	0.002	29	1	160	9	15	3	10	2	265	8
1	2	084396	1	50	0.005	33	4	172	12	18	2	9	2	293	1
1	2	084396	1	75	0.007	28	1	177	12	14	5	9	2	296	9
1	2	084396	1	100	0.009	40	6	177	9	16	3	9	2	284	6
1	2	084396	1	125	0.012	30	6	193	7	18	3	9	2	291	8
1	2	084396	1	250	0.023	39	2	210	2	13	2	11	2	267	1
1	2	084396	1	500	0.047	62	5	229	5	17	6	7	1	262	5
1	3	084396	2	0	0	25	5	152	1	18	2	6	1	276	9
1	3	084396	2	25	0.002	24	1	163	10	18	1	7	1	308	8
1	3	084396	2	50	0.005	26	4	180	11	19	4	7	2	296	6
1	3	084396	2	75	0.007	28	1	175	5	19	3	8	1	288	9
1	3	084396	2	100	0.009	31	2	188	7	16	3	9	2	316	7
1	3	084396	2	125	0.012	30	9	186	8	19	6	8	1	307	9
1	3	084396	2	250	0.023	29	4	190	14	16	4	11	2	305	6
1	3	084396	2	500	0.047	77	10	206	8	24	5	7	1	290	6
1	4	084396	3	0	0	34	12	152	3	16	2	6	1	278	7
1	4	084396	3	25	0.002	25	4	158	10	14	4	7	1	281	8
1	4	084396	3	50	0.004	31	5	148	8	18	1	10	2	286	2
1	4	084396	3	75	0.007	27	4	161	13	16	3	9	1	300	5
1	4	084396	3	100	0.009	32	2	153	8	13	2	10	1	285	10
1	4	084396	3	125	0.011	32	3	184	8	14	3	11	2	293	5
1	4	084396	3	250	0.022	39	7	185	6	14	1	20	1	287	9
1	4	084396	3	500	0.045	54	7	192	7	17	3	8	1	303	4

\*Values represent the mean number of revertants (average of three plates)



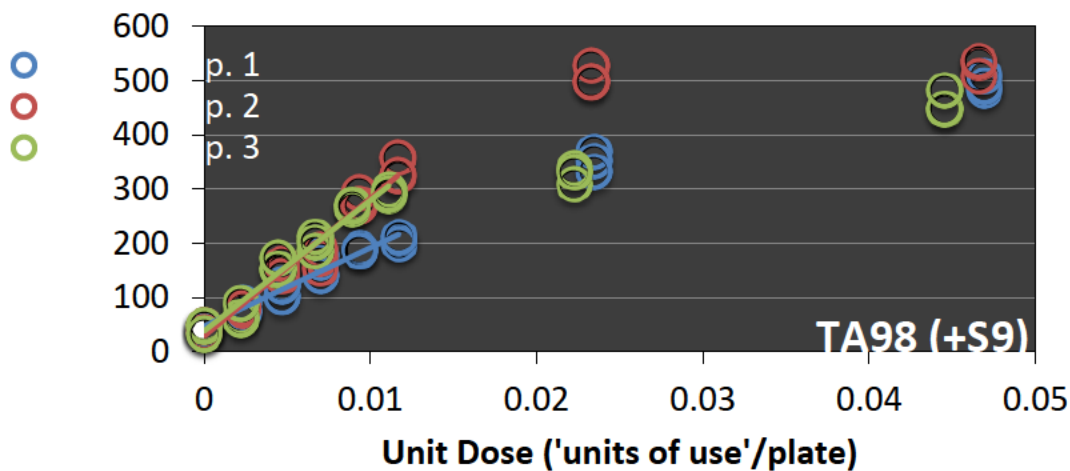
**Slope Analysis of the Linear Portion of the Dose-Response Curve  
(Revertant Colonies/'Unit of Use')**

Strain and S9 Activation	Sample ID	Sample Description	Number of Revertant Colonies/'Unit of Use'										
			Replicate 1		Replicate 2		Replicate 3		Statistics for Replicate Slope Estimates				
			Dose Range (unit/plate)		Dose Range (unit/plate)		Dose Range (unit/plate)		Standard		t-test p-value (H <sub>0</sub> : mean= 0)		
				slope		slope		slope	Mean	Error	95% C.I.	p-value	significance
TA98 (+S9)	084396	KR 2R4F	0 - 0.012	14479	0 - 0.012	25437	0 - 0.011	24122	21346	3455	6482 - 36210	0.025	significant
TA98 (-S9)	084396	KR 2R4F	0 - 0.047	663	0 - 0.047	1054	0 - 0.045	567	761	149	120 - 1403	0.036	significant
TA100 (+S9)	084396	KR 2R4F	0 - 0.023	6559	0 - 0.023	8026	0 - 0.022	9716	8100	912	4175 - 12026	0.012	significant
TA100 (-S9)	084396	KR 2R4F	0 - 0.012	3556	0 - 0.012	2959	0 - 0.022	1655	2724	561	309 - 5138	0.040	significant
TA102 (+S9)	084396	KR 2R4F	0 - 0.047	-198	0 - 0.047	829	0 - 0.045	1330	654	450	0* - 2589	0.283	not significant
TA102 (-S9)	084396	KR 2R4F	0 - 0.047	-584	0 - 0.012	2097	0 - 0.045	408	640	783	0* - 4008	0.499	not significant
TA1535 (+S9)	084396	KR 2R4F	0 - 0.047	149	0 - 0.047	61.7	0 - 0.045	92.6	101	25	0* - 211	0.058	not significant
TA1535 (-S9)	084396	KR 2R4F	0 - 0.047	13.8	0 - 0.047	97.5	0 - 0.045	22.1	44.4	26.6	0* - 159	0.237	not significant
TA1537 (+S9)	084396	KR 2R4F	0 - 0.023	3184	0 - 0.012	3385	0 - 0.011	3810	3460	184	2666 - 4253	0.003	significant
TA1537 (-S9)	084396	KR 2R4F	0 - 0.023	157	0 - 0.023	186	0 - 0.011	440	261	90	0* - 649	0.101	not significant

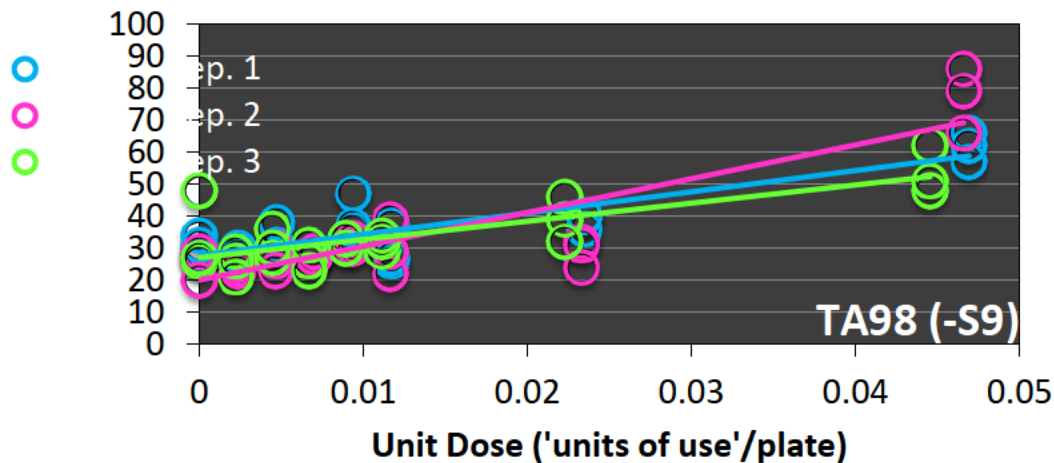
t-test analysis indicates mean specific activity 'unit of use' slope is greater than zero at a = 0.05 for strains TA98 (+S9), TA98 (-S9), TA100 (+S9), TA100 (-S9) and TA1537 (+S9).

0\*: Lower bound of the 95% confidence interval has been truncated at 0.

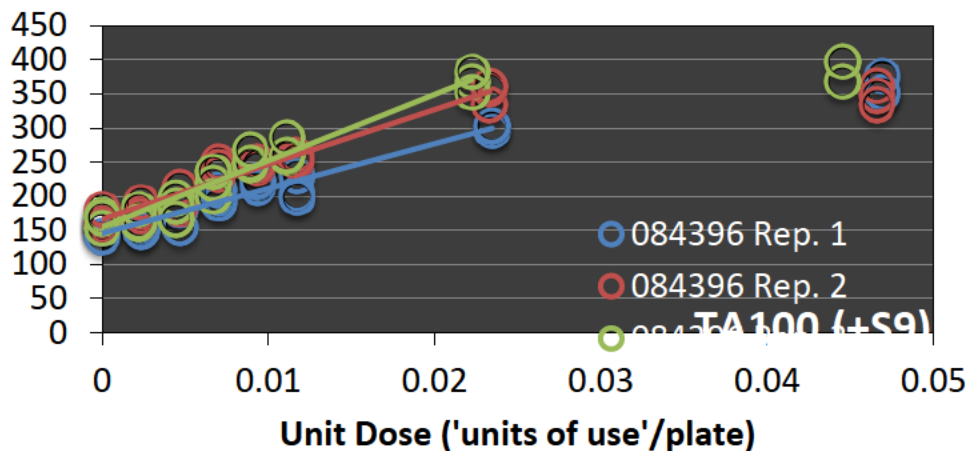
TA98 (+S9) Revertants/plate



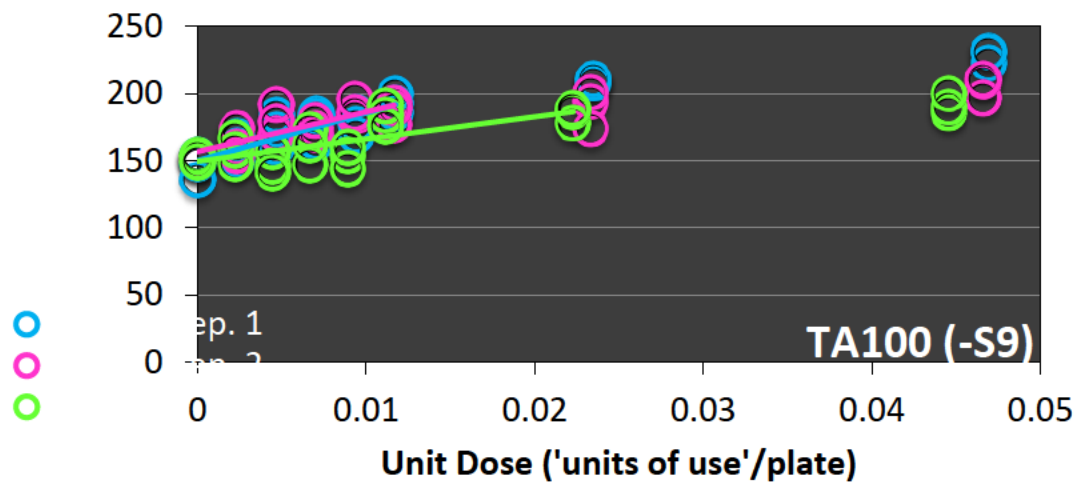
TA98 (-S9) Revertants/plate



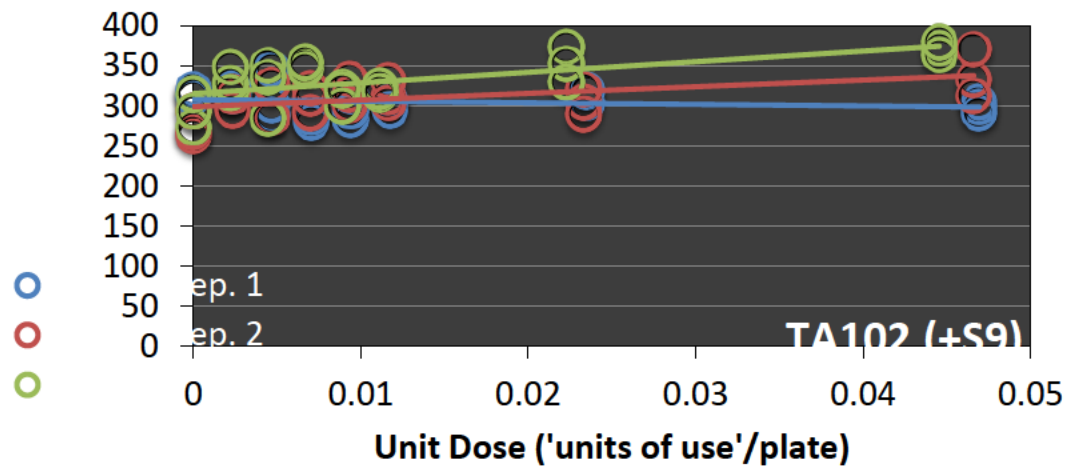
TA100 (+S9) Revertants/plate



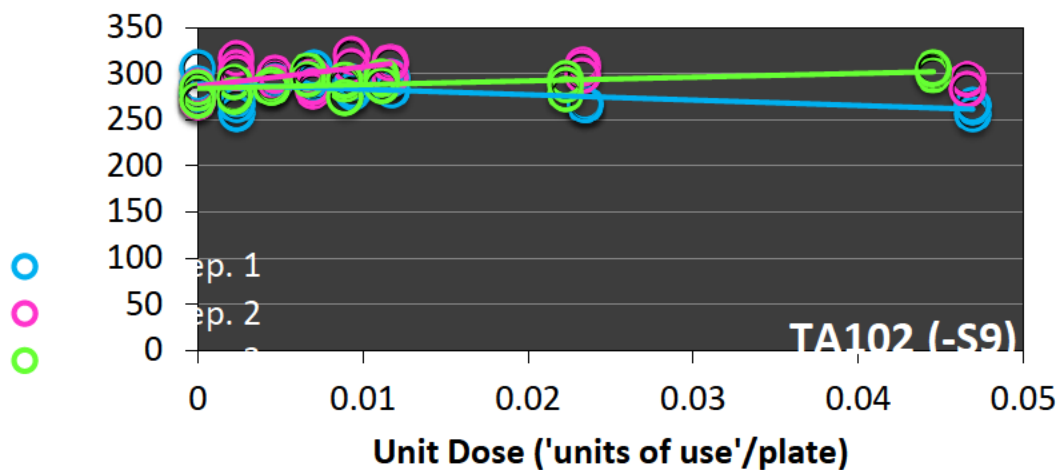
TA100 (-S9) Revertants/plate

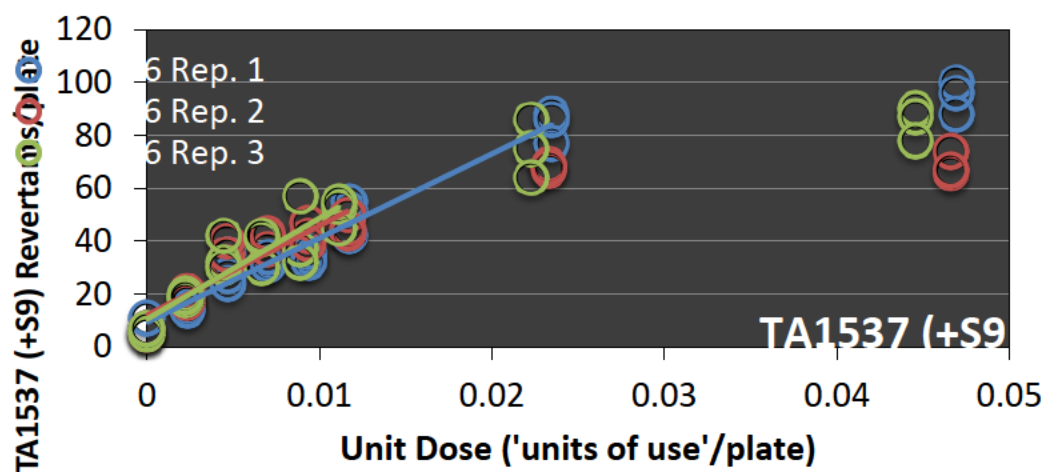
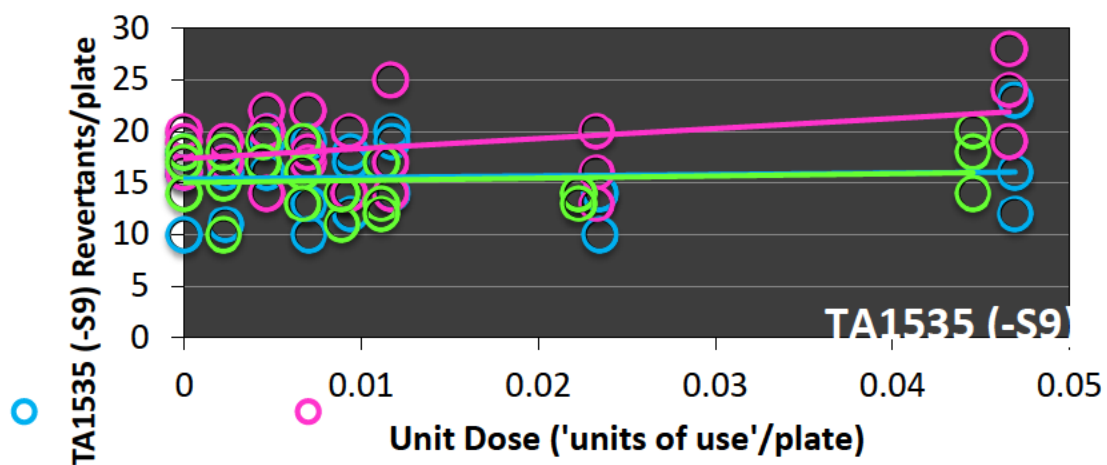
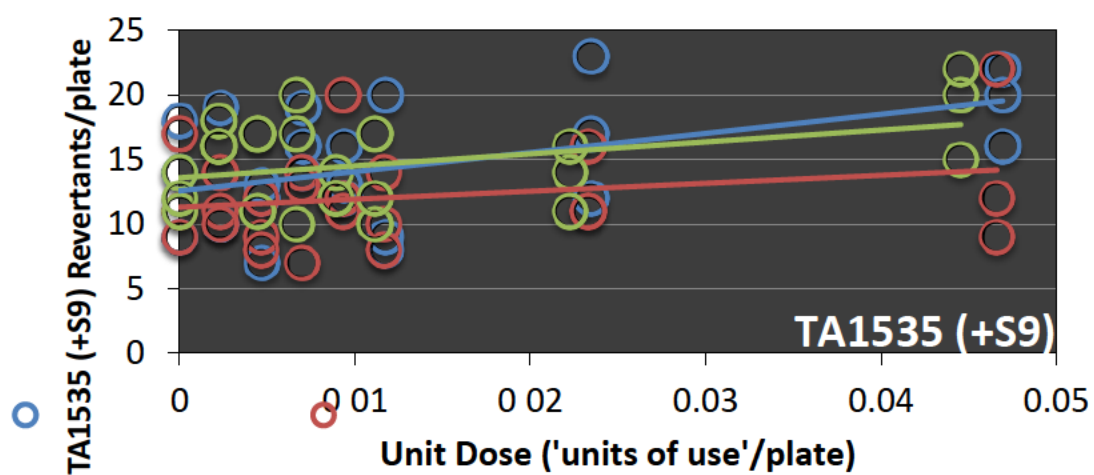


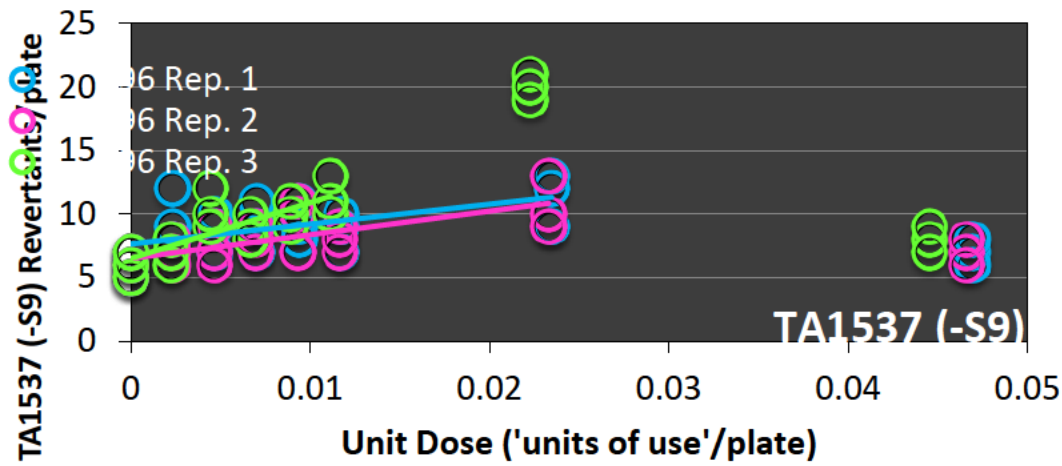
TA102 (+S9) Revertants/plate



TA102 (-S9) Revertants/plate







<b>Sample ID</b>	<b>Sample Description</b>
084394	Camel SNUS Frost
084395	2S3 Research Moist smokeless tobacco
084396	Kentucky Reference 2R4F
084454	Fresh Strips
084455	Mellow Sticks
084456	Copenhagen Long Cut
084457	Ariva Wintergreen
084458	Fresh Orbs

**Slope Analysis of the Linear Portion of the Dose-Response Curve  
(Revertant Colonies/Unit of Use)**

			Number of Revertant Colonies/Unit of Use											
Strain and S9 Activation	Sample ID	Sample Description	Replicate 1		Replicate 2		Replicate 3		Statistics for Replicate 'Unit' Slope Estimates					
			Dose Range		Dose Range		Dose Range		Standard			t-test p-value (H <sub>0</sub> : mean = 0)		
			(units/plate)	slope	(units/plate)	slope	(units/plate)	slope	Mean	Error	95% C.I.	p-value	significance	
TA98 (+S9)	084396	KR 2R4F	0 - 0.012	14479	0 - 0.012	25437	0 - 0.011	24122	21346	3455	6482 - 36210	0.025	significant	
TA98 (+S9)	084394	Camel SNUS Frost	0 - 0.009	435	0 - 0.009	980	0 - 0.009	-870	182	549	0* - 2543	0.772	not significant	
TA98 (+S9)	084395	2S3	0 - 0.002	6976	0 - 0.002	603	0 - 0.002	5426	4335	1919	0* - 12590	0.152	not significant	
TA98 (+S9)	084454	Fresh Strips	0 - 0.044	-48	0 - 0.044	60	0 - 0.022	-309	0*	110	0* - 373	0.463	not significant	
TA98 (+S9)	084455	Mellow Sticks	0 - 0.011	-539	0 - 0.011	5	0 - 0.011	555	7	316	0* - 1365	0.984	not significant	
TA98 (+S9)	084456	Copenhagen Long Cut	0 - 0.002	6841	0 - 0.002	6745	0 - 0.002	4372	5986	807	2512 - 9459	0.018	significant	
TA98 (+S9)	084457	Ariva Wintergreen	0 - 0.02	91	0 - 0.02	-216	0 - 0.02	-283	0*	115	0* - 360	0.359	not significant	
TA98 (+S9)	084458	Fresh Orbs	0 - 0.025	-8	0 - 0.025	-144	0 - 0.012	986	278	356	0* - 1810	0.516	not significant	
TA100 (+S9)	084396	KR 2R4F	0 - 0.023	6559	0 - 0.023	8026	0 - 0.022	9716	8100	912	4175 - 12026	0.012	significant	
TA100 (+S9)	084394	Camel SNUS Frost	0 - 0.002	802	0 - 0.002	8102	0 - 0.002	11086	6663	3055	0* - 19806	0.161	not significant	
TA100 (+S9)	084395	2S3	0 - 0	30885	0 - 0	71069	0 - 0	28491	43482	13811	0* - 102905	0.088	not significant	
TA100 (+S9)	084454	Fresh Strips	0 - 0.011	2360	0 - 0.022	1348	0 - 0.011	1649	1786	300	495 - 3077	0.027	significant	
TA100 (+S9)	084455	Mellow Sticks	0 - 0.005	6503	0 - 0.003	9600	0 - 0.005	4278	6794	1543	154 - 13433	0.048	significant	
TA100 (+S9)	084456	Copenhagen Long Cut	0 - 0.001	34043	0 - 0.001	63912	0 - 0.001	47710	48555	8633	11411 - 85700	0.030	significant	
TA100 (+S9)	084457	Ariva Wintergreen	0 - 0.004	8499	0 - 0.02	773	0 - 0.005	3311	4195	2274	0* - 13978	0.206	not significant	
TA100 (+S9)	084458	Fresh Orbs	0 - 0.012	334	0 - 0.006	1712	0 - 0.006	3633	1893	957	0* - 6010	0.186	not significant	
TA102 (+S9)	084396	KR 2R4F	0 - 0.047	-198	0 - 0.047	829	0 - 0.045	1330	654	450	0* - 2589	0.283	not significant	
TA102 (+S9)	084394	Camel SNUS Frost	0 - 0.002	25056	0 - 0.002	34260	0 - 0.002	24989	28102	3079	14853 - 41350	0.012	significant	
TA102 (+S9)	084395	2S3	0 - 0	117544	0 - 0.002	10948	0 - 0.001	41130	56540	31722	0* - 193027	0.217	not significant	
TA102 (+S9)	084454	Fresh Strips	0 - 0.044	139	0 - 0.044	-421	0 - 0.044	83.7	0*	178	0* - 700	0.746	not significant	
TA102 (+S9)	084455	Mellow Sticks	0 - 0.011	1787	0 - 0.011	789	0 - 0.011	1383	1320	290	73 - 2567	0.045	significant	
TA102 (+S9)	084456	Copenhagen Long Cut	0 - 0.002	20085	0 - 0.002	5003	0 - 0.002	10430	11839	4411	0* - 30816	0.115	not significant	
TA102 (+S9)	084457	Ariva Wintergreen	0 - 0.02	-628	0 - 0.02	-234	0 - 0.02	-474	0*	115	0* - 49	0.061	not significant	
TA102 (+S9)	084458	Fresh Orbs	0 - 0.025	-2683	0 - 0.025	303	0 - 0.025	-1880	0*	892	0* - 2418	0.252	not significant	
TA1535 (+S9)	084396	KR 2R4F	0 - 0.047	149	0 - 0.047	62	0 - 0.045	93	101	25	0* - 211	0.058	not significant	
TA1535 (+S9)	084394	Camel SNUS Frost	0 - 0.009	51.0	0 - 0.009	313	0 - 0.009	-624	0*	279	0* - 1114	0.785	not significant	
TA1535 (+S9)	084395	2S3	0 - 0.002	924	0 - 0.002	376	0 - 0.002	-129	390	304	0* - 1698	0.328	not significant	
TA1535 (+S9)	084454	Fresh Strips	0 - 0.044	45.4	0 - 0.044	41.6	0 - 0.044	-45.2	14	30	0* - 141	0.684	not significant	
TA1535 (+S9)	084455	Mellow Sticks	0 - 0.011	-33.8	0 - 0.011	-409	0 - 0.005	777	111	350	0* - 1617	0.781	not significant	
TA1535 (+S9)	084456	Copenhagen Long Cut	0 - 0.002	428	0 - 0.002	540	0 - 0.002	-582	129	357	0* - 1665	0.753	not significant	
TA1535 (+S9)	084457	Ariva Wintergreen	0 - 0.02	341	0 - 0.02	221	0 - 0.02	-262	100	184	0* - 893	0.642	not significant	
TA1535 (+S9)	084458	Fresh Orbs	0 - 0.025	55.0	0 - 0.025	6.8	0 - 0.025	-163	0*	66	0* - 250	0.661	not significant	
TA1537 (+S9)	084396	KR 2R4F	0 - 0.023	3184	0 - 0.012	3385	0 - 0.011	3810	3460	184	2666 - 4253	0.003	significant	
TA1537 (+S9)	084394	Camel SNUS Frost	0 - 0.005	1751	0 - 0.009	758	0 - 0.009	789	1099	326	0* - 2503	0.078	not significant	
TA1537 (+S9)	084395	2S3	0 - 0.001	19533	0 - 0.002	2666	0 - 0.002	2440	8213	5661	0* - 32568	0.284	not significant	
TA1537 (+S9)	084454	Fresh Strips	0 - 0.044	23.3	0 - 0.044	-9.6	0 - 0.044	-38.4	0*	18	0* - 69	0.690	not significant	
TA1537 (+S9)	084455	Mellow Sticks	0 - 0.011	-189	0 - 0.011	122	0 - 0.011	290	75	140	0* - 679	0.648	not significant	
TA1537 (+S9)	084456	Copenhagen Long Cut	0 - 0.001	6042	0 - 0.001	4635	0 - 0.002	2550	4409	1014	44 - 8774	0.049	significant	
TA1537 (+S9)	084457	Ariva Wintergreen	0 - 0.02	-101	0 - 0.02	163	0 - 0.02	-62.6	0*	83	0* - 355	0.999	not significant	
TA1537 (+S9)	084458	Fresh Orbs	0 - 0.025	310	0 - 0.025	-42.9	0 - 0.025	13.7	93	109	0* - 564	0.483	not significant	

0\*: Mean or lower bound of the 95% confidence interval has been truncated at 0.

Cigarette smoke condensate (CSC) test sample with cigarettes/plate dose basis

Statistical Analysis (Unit)

Revision: 1

Labstat International ULC

**Slope Analysis of the Linear Portion of the Dose-Response Curve  
(Revertant Colonies/Unit of Use)**

Strain and S9 Activation	Sample ID	Sample Description	Number of Revertant Colonies/Unit of Use										
			Replicate 1		Replicate 2		Replicate 3		Statistics for Replicate 'Unit' Slope Estimates				
			Dose Range		Dose Range		Dose Range		Standard		t-test p-value (H <sub>0</sub> : mean = 0)		
			(units/plate)	slope	(units/plate)	slope	(units/plate)	slope	Mean	Error	95% C.I.	p-value	significance
TA98 (-S9)	084396	KR 2R4F	0 - 0.047	663	0 - 0.047	1054	0 - 0.045	567	761	149	120 - 1403	0.036	<b>significant</b>
TA98 (-S9)	084394	Camel SNUS Frost	0 - 0.009	-165	0 - 0.009	654	0 - 0.005	0.00	163	250	0* - 1239	0.581	not significant
TA98 (-S9)	084395	2S3	0 - 0.002	1225	0 - 0.002	-1435	0 - 0.001	-724	0*	795	0* - 3111	0.733	not significant
TA98 (-S9)	084454	Fresh Strips	0 - 0.044	110	0 - 0.044	-10.1	0 - 0.044	114	71.5	40.8	0* - 247	0.222	not significant
TA98 (-S9)	084455	Mellow Sticks	0 - 0.011	770	0 - 0.011	571	0 - 0.011	562	634	68	343 - 926	0.011	<b>significant</b>
TA98 (-S9)	084456	Copenhagen Long Cut	0 - 0.002	401	0 - 0.002	494	0 - 0.002	1334	743	297	0* - 2020	0.129	not significant
TA98 (-S9)	084457	Ariva Wintergreen	0 - 0.02	-100	0 - 0.01	372	0 - 0.02	177	150	137	0* - 739	0.389	not significant
TA98 (-S9)	084458	Fresh Orbs	0 - 0.025	-6.15	0 - 0.025	96	0 - 0.025	-7.04	27.8	34.4	0* - 176	0.504	not significant
TA100 (-S9)	084396	KR 2R4F	0 - 0.012	3556	0 - 0.012	2959	0 - 0.022	1655	2724	561	309 - 5138	0.040	<b>significant</b>
TA100 (-S9)	084394	Camel SNUS Frost	0 - 0.009	1445	0 - 0.009	2737	0 - 0.009	3970	2718	729	0* - 5854	0.065	not significant
TA100 (-S9)	084395	2S3	0 - 0.001	10169	0 - 0.002	10733	0 - 0.002	13812	11571	1132	6701 - 16442	0.009	<b>significant</b>
TA100 (-S9)	084454	Fresh Strips	0 - 0.044	-499	0 - 0.044	141	0 - 0.022	334	0*	252	0* - 1076	0.977	not significant
TA100 (-S9)	084455	Mellow Sticks	0 - 0.005	5462	0 - 0.011	-216	0 - 0.011	-3601	548	2644	0* - 11924	0.855	not significant
TA100 (-S9)	084456	Copenhagen Long Cut	0 - 0.001	47463	0 - 0.001	78.2	0 - 0.001	13634	20392	14090	0* - 81016	0.285	not significant
TA100 (-S9)	084457	Ariva Wintergreen	0 - 0.02	2469	0 - 0.02	-3393	0 - 0.02	-3748	0*	2016	0* - 7116	0.521	not significant
TA100 (-S9)	084458	Fresh Orbs	0 - 0.025	-664	0 - 0.025	-2067	0 - 0.025	-504	0*	496	0* - 1058	0.162	not significant
TA102 (-S9)	084396	KR 2R4F	0 - 0.047	-584	0 - 0.012	2097	0 - 0.045	408	640	783	0* - 4008	0.499	not significant
TA102 (-S9)	084394	Camel SNUS Frost	0 - 0.009	-1464	0 - 0.005	3297	0 - 0.009	-850	327	1495	0* - 6761	0.847	not significant
TA102 (-S9)	084395	2S3	0 - 0.002	4454	0 - 0.002	13498	0 - 0.002	30871	16274	7751	0* - 49625	0.171	not significant
TA102 (-S9)	084454	Fresh Strips	0 - 0.044	-100	0 - 0.044	730	0 - 0.011	5916	2182	1882	0* - 10282	0.366	not significant
TA102 (-S9)	084455	Mellow Sticks	0 - 0.005	1956	0 - 0.011	1603	0 - 0.011	117	1226	564	0* - 3651	0.162	not significant
TA102 (-S9)	084456	Copenhagen Long Cut	0 - 0.002	-54.6	0 - 0.002	12173	0 - 0.001	78723	30280	24477	0* - 135596	0.342	not significant
TA102 (-S9)	084457	Ariva Wintergreen	0 - 0.02	-1294	0 - 0.02	-2174	0 - 0.02	-244	0*	558	0* - 1163	0.157	not significant
TA102 (-S9)	084458	Fresh Orbs	0 - 0.025	-4105	0 - 0.025	543	0 - 0.025	681	0*	1573	0* - 5808	0.604	not significant
TA1535 (-S9)	084396	KR 2R4F	0 - 0.047	14	0 - 0.047	97	0 - 0.045	22	44	27	0* - 159	0.237	not significant
TA1535 (-S9)	084394	Camel SNUS Frost	0 - 0.009	41.1	0 - 0.009	575	0 - 0.009	-337	93	264	0* - 1230	0.758	not significant
TA1535 (-S9)	084395	2S3	0 - 0.002	-674	0 - 0.002	735	0 - 0.002	2332	798	868	0* - 4534	0.455	not significant
TA1535 (-S9)	084454	Fresh Strips	0 - 0.022	83.8	0 - 0.022	205	0 - 0.022	137	142	35	0* - 293	0.056	not significant
TA1535 (-S9)	084455	Mellow Sticks	0 - 0.011	-410	0 - 0.011	34.1	0 - 0.011	-32.6	0*	138	0* - 458	0.429	not significant
TA1535 (-S9)	084456	Copenhagen Long Cut	0 - 0.002	981	0 - 0.002	2292	0 - 0.001	4445	2573	1010	0* - 6917	0.126	not significant
TA1535 (-S9)	084457	Ariva Wintergreen	0 - 0.005	1142	0 - 0.02	218	0 - 0.02	-87.1	424	370	0* - 2014	0.370	not significant
TA1535 (-S9)	084458	Fresh Orbs	0 - 0.006	925	0 - 0.012	492	0 - 0.025	41.6	486	255	0* - 1584	0.197	not significant
TA1537 (-S9)	084396	KR 2R4F	0 - 0.023	157	0 - 0.023	186	0 - 0.011	440	261	90	0* - 649	0.101	not significant
TA1537 (-S9)	084394	Camel SNUS Frost	0 - 0.002	2489	0 - 0.009	524	0 - 0.005	1321	1445	571	0* - 3900	0.127	not significant
TA1537 (-S9)	084395	2S3	0 - 0.002	4651	0 - 0.001	4733	0 - 0.001	1519	3634	1058	0* - 8186	0.075	not significant
TA1537 (-S9)	084454	Fresh Strips	0 - 0.044	-10.6	0 - 0.044	33.6	0 - 0.044	13.8	12	13	0* - 67	0.438	not significant
TA1537 (-S9)	084455	Mellow Sticks	0 - 0.011	35.6	0 - 0.011	-142	0 - 0.011	-126	0*	57	0* - 167	0.305	not significant
TA1537 (-S9)	084456	Copenhagen Long Cut	0 - 0.002	318	0 - 0.002	-924	0 - 0.002	961	118	553	0* - 2498	0.850	not significant
TA1537 (-S9)	084457	Ariva Wintergreen	0 - 0.02	9.2	0 - 0.02	-132	0 - 0.02	102	0*	68	0* - 286	0.925	not significant
TA1537 (-S9)	084458	Fresh Orbs	0 - 0.012	240	0 - 0.025	65.6	0 - 0.025	-57.4	83	86	0* - 454	0.439	not significant

0\*: Mean or lower bound of the 95% confidence interval has been truncated at 0.

Cigarette smoke condensate (CSC) test sample with cigarettes/plate dose basis

Statistical Analysis (Unit)

Revision: 1

Labstat International ULC



### One-Way ANOVA of Mean 'Unit of Use' Slope Estimates Among Test Samples

TA98 (+S9)

Source	Sum of Squares	Df	Mean Square	F-Ratio	P-Value
Among Samples	1.15E+09	7	164236019	26.0	<b>0.000</b>
Within Samples	100919640	16	6307477.5		
Total (Corr.)	827542003	23			

TA98 (-S9)

Source	Sum of Squares	Df	Mean Square	F-Ratio	P-Value
Among Samples	3177507.3	7	453929.61	1.5	0.252
Within Samples	4989783.2	16	311861.45		
Total (Corr.)	8167290.4	23			

TA100 (+S9)

Source	Sum of Squares	Df	Mean Square	F-Ratio	P-Value
Among Samples	7.753E+09	7	1.108E+09	10.40	<b>0.000</b>
Within Samples	1.704E+09	16	106495298		
Total (Corr.)	9.426E+09	23			

TA100 (-S9)

Source	Sum of Squares	Df	Mean Square	F-Ratio	P-Value
Among Samples	1.238E+09	7	176815919	2.22	0.088
Within Samples	1.272E+09	16	79505680		
Total (Corr.)	2.51E+09	23			

TA102 (+S9)

Source	Sum of Squares	Df	Mean Square	F-Ratio	P-Value
Among Samples	8.899E+09	7	1.271E+09	3.27	<b>0.024</b>
Within Samples	6.218E+09	16	388619210		
Total (Corr.)	1.5E+10	23			

TA102 (-S9)

Source	Sum of Squares	Df	Mean Square	F-Ratio	P-Value
Among Samples	2.682E+09	7	383200269	1.53	0.228
Within Samples	4.012E+09	16	250761897		
Total (Corr.)	6.695E+09	23			

TA1535 (+S9)

Source	Sum of Squares	Df	Mean Square	F-Ratio	P-Value
Among Samples	433925.52	7	61989.36	0.359	0.913
Within Samples	2759764.8	16	172485.3		
Total (Corr.)	3193686.2	23			

TA1535 (-S9)

Source	Sum of Squares	Df	Mean Square	F-Ratio	P-Value
Among Samples	15819651	7	2259950.2	2.92	<b>0.036</b>
Within Samples	12398058	16	774878.65		
Total (Corr.)	28217710	23			

TA1537 (+S9)

Source	Sum of Squares	Df	Mean Square	F-Ratio	P-Value
Among Samples	187495082	7	26785012	2	0.097
Within Samples	199498105	16	12468632		
Total (Corr.)	384178223	23			

TA1537 (-S9)

Source	Sum of Squares	Df	Mean Square	F-Ratio	P-Value
Among Samples	34956603	7	4993800.4	7.51	<b>0.000</b>
Within Samples	10645728	16	665357.99		
Total (Corr.)	45602331	23			

One-way ANOVA analysis indicates significant differences (at  $\alpha = 0.05$ ) among mean 'Unit of Use' specific activity slope estimates for test samples with TA98 (+S9), TA100 (+S9), TA102 (+S9), TA1535 (-S9) and TA1537 (-S9).

**Evaluation of Ratio (Max ÷ Min) in Standard  
Deviations of 'Unit of Use' Slope Estimates and  
Corresponding Method of Comparison**

<b>Strain and S9 Activation</b>	<b>Std. Dev. Ratio (Max ÷ Min)</b>	<b>Method of Comparison</b>
TA98 (+S9)	31.5	Pairwise T-test (unequal variance)
TA98 (-S9)	23.2	Pairwise T-test (unequal variance)
TA100 (+S9)	46.0	Pairwise T-test (unequal variance)
TA100 (-S9)	55.9	Pairwise T-test (unequal variance)
TA102 (+S9)	276.1	Pairwise T-test (unequal variance)
TA102 (-S9)	43.9	Pairwise T-test (unequal variance)
TA1535 (+S9)	14.0	ANOVA (equal variance)
TA1535 (-S9)	37.9	Pairwise T-test (unequal variance)
TA1537 (+S9)	317.2	Pairwise T-test (unequal variance)
TA1537 (-S9)	82.7	Pairwise T-test (unequal variance)

**ANOVA-Based Comparisons of Smokeless Tobacco Mean Revertants/'Unit of Use' Slope to Control Brand KR 2R4F (084396) Mean Revertants/cigarette Slope using Bonferroni-adjusted p-values**

ANOVA-Based Comparison	TA98 (+S9)			TA100 (+S9)			TA102 (+S9)			TA1535 (+S9)			TA1537 (+S9)		
	f-ratio	p-value	significance at $\alpha = 0.05$	f-ratio	p-value	significance at $\alpha = 0.05$	f-ratio	p-value	significance at $\alpha = 0.05$	f-ratio	p-value	significance at $\alpha = 0.05$	f-ratio	p-value	significance at $\alpha = 0.05$
084394 vs. 084396	106.5	1.8E-08	significant	0.029	8.7E-01	not significant	2.9080	0.1075	not significant	0.3065	0.5875	not significant	0.67	4.2E-01	not significant
084395 vs. 084396	68.8	3.5E-07	significant	17.63	6.8E-04	significant	12.06	0.0031	significant	0.7279	0.4062	not significant	2.72	1.2E-01	not significant
084454 vs. 084396	109.4	1.5E-08	significant	0.562	4.6E-01	not significant	0.0020	0.9649	not significant	0.0659	0.8007	not significant	1.45	2.5E-01	not significant
084455 vs. 084396	108.3	1.6E-08	significant	0.024	8.8E-01	not significant	0.0017	0.9675	not significant	0.0009	0.9761	not significant	1.38	2.6E-01	not significant
084456 vs. 084396	56.1	1.3E-06	significant	23.05	2.0E-04	significant	0.4829	0.4971	not significant	0.0067	0.9358	not significant	0.11	7.5E-01	not significant
084457 vs. 084396	109.7	1.4E-08	significant	0.215	6.5E-01	not significant	0.0047	0.9464	not significant	0.0000	0.9976	not significant	1.44	2.5E-01	not significant
084458 vs. 084396	105.6	1.9E-08	significant	0.543	4.7E-01	not significant	0.017	0.8991	not significant	0.1575	0.6968	not significant	1.36	2.6E-01	not significant

ANOVA-Based Comparison	TA98 (-S9)			TA100 (-S9)			TA102 (-S9)			TA1535 (-S9)			TA1537 (-S9)		
	f-ratio	p-value	significance at $\alpha = 0.05$	f-ratio	p-value	significance at $\alpha = 0.05$	f-ratio	p-value	significance at $\alpha = 0.05$	f-ratio	p-value	significance at $\alpha = 0.05$	f-ratio	p-value	significance at $\alpha = 0.05$
084394 vs. 084396	1.722	2.1E-01	not significant	0.0000	0.9994	not significant	0.0006	0.9810	not significant	0.0046	0.9469	not significant	3.158	0.0946	not significant
084395 vs. 084396	5.534	3.2E-02	not significant	1.4769	0.2419	not significant	1.4621	0.2442	not significant	1.0983	0.3102	not significant	25.65	0.0001	significant
084454 vs. 084396	2.290	1.5E-01	not significant	0.141	0.7124	not significant	0.0142	0.9066	not significant	0.0184	0.8937	not significant	0.140	0.7136	not significant
084455 vs. 084396	0.078	7.8E-01	not significant	0.0893	0.7690	not significant	0.0020	0.9645	not significant	0.0630	0.8050	not significant	0.258	0.6181	not significant
084456 vs. 084396	0.002	9.7E-01	not significant	5.8895	0.0274	not significant	5.2552	0.0358	not significant	12.37	0.0029	significant	0.046	0.8329	not significant
084457 vs. 084396	1.801	2.0E-01	not significant	0.346	0.5648	not significant	0.0211	0.8864	not significant	0.2795	0.6043	not significant	0.162	0.6923	not significant
084458 vs. 084396	2.589	1.3E-01	not significant	0.273	0.6087	not significant	0.0153	0.9030	not significant	0.3782	0.5472	not significant	0.072	0.7923	not significant

Some ANOVA-based comparison p-values for tester strains TA98(+S9), TA100(+S9), TA102(+S9), TA1535(-S9) and TA1537(-S9) were significant at  $\alpha = 0.05$ .

Significant differences between the mean 'Unit of Use' specific activity slope of the KR 2R4F control sample and the various smokeless tobacco test samples are summarized below:

**TA98(+S9)**

- KR 2R4F (084396) specific activity is significantly different from that of each of the 7 smokeless tobacco test samples

**TA100(+S9)**

- KR 2R4F (084396) and each of {2S3 (084395), Copenhagen Long Cut (084456)}

**TA102(+S9), TA1537(-S9)**

- KR 2R4F (084396) and 2S3 (084395)

**TA1535(-S9)**

- KR 2R4F (084396) and Copenhagen Long Cut (084456)

**Pairwise T-test Comparisons of 'Smokeless Tobacco Mean Revertants/Unit of Use' Slope to Control Brand KR 2R4F (084396) Mean Revertants/cigarette Slope using Bonferroni-adjusted p-values**

Pairwise T-test Comparison	TA98 (+S9)			TA100 (+S9)			TA102 (+S9)			TA1535 (+S9)			TA1537 (+S9)		
	t-statistic	p-value	significance at $\alpha = 0.05$	t-statistic	p-value	significance at $\alpha = 0.05$	t-statistic	p-value	significance at $\alpha = 0.05$	t-statistic	p-value	significance at $\alpha = 0.05$	t-statistic	p-value	significance at $\alpha = 0.05$
<b>084394 vs. 084396</b>	6.051	0.0038	<b>significant</b>	0.451	0.6755	not significant	8.821	0.0009	<b>significant</b>				6.299	0.0032	<b>significant</b>
084395 vs. 084396	4.305	0.0126	not significant	2.556	0.0629	not significant	1.762	0.1529	not significant				0.839	0.4485	not significant
<b>084454 vs. 084396</b>	6.204	0.0034	<b>significant</b>	6.575	0.0028	<b>significant</b>	1.488	0.2110	not significant				18.712	0.0000	<b>significant</b>
<b>084455 vs. 084396</b>	6.151	0.0035	<b>significant</b>	0.729	0.5064	not significant	1.245	0.2811	not significant				14.604	0.0001	<b>significant</b>
084456 vs. 084396	4.330	0.0124	not significant	4.660	0.0096	not significant	2.523	0.0651	not significant				0.921	0.4094	not significant
<b>084457 vs. 084396</b>	6.215	0.0034	<b>significant</b>	1.594	0.1861	not significant	2.368	0.0770	not significant				17.120	0.0001	<b>significant</b>
<b>084458 vs. 084396</b>	6.066	0.0037	<b>significant</b>	4.695	0.0093	not significant	2.076	0.1066	not significant				15.698	0.0001	<b>significant</b>

Pairwise T-test Comparison	TA98 (-S9)			TA100 (-S9)			TA102 (-S9)			TA1535 (-S9)			TA1537 (-S9)		
	t-statistic	p-value	significance at $\alpha = 0.05$	t-statistic	p-value	significance at $\alpha = 0.05$	t-statistic	p-value	significance at $\alpha = 0.05$	t-statistic	p-value	significance at $\alpha = 0.05$	t-statistic	p-value	significance at $\alpha = 0.05$
084394 vs. 084396	2.055	0.1091	not significant	0.007	0.9951	not significant	0.185	0.8619	not significant	0.183	0.8637	not significant	2.049	0.1099	not significant
<b>084395 vs. 084396</b>	1.326	0.2556	not significant	7.003	0.0022	<b>significant</b>	2.007	0.1152	not significant	0.867	0.4349	not significant	3.177	0.0336	not significant
084454 vs. 084396	4.465	0.0111	not significant	4.441	0.0113	not significant	0.756	0.4916	not significant	2.211	0.0915	not significant	2.735	0.0521	not significant
084455 vs. 084396	0.777	0.4806	not significant	0.805	0.4661	not significant	0.607	0.5767	not significant	1.283	0.2688	not significant	3.181	0.0335	not significant
084456 vs. 084396	0.055	0.9589	not significant	1.253	0.2785	not significant	1.210	0.2928	not significant	2.503	0.0666	not significant	0.255	0.8114	not significant
084457 vs. 084396	3.024	0.0390	not significant	2.046	0.1102	not significant	1.954	0.1225	not significant	1.026	0.3631	not significant	2.377	0.0762	not significant
<b>084458 vs. 084396</b>	4.797	0.0087	not significant	5.075	0.0071	<b>significant</b>	0.911	0.4139	not significant	1.723	0.1600	not significant	1.430	0.2259	not significant

Some pairwise t-test comparison p-values for tester strains TA98(+S9), TA100(+S9), TA102(+S9), TA1537 (+S9) and TA100(-S9) were significant at  $\alpha = 0.05$ .

Significant differences between the mean 'Unit of Use' specific activity slope of the KR 2R4F control sample and the various smokeless tobacco test samples are summarized below:

**TA98(+S9) and TA1537 (+S9)**

- KR 2R4F (084396) specific activity is significantly different from that of {Camel SNUS Frost (084394), Fresh Strips (084454), Mellow Sticks (084455), Ariva Wintergreen (084457), Fresh Orbs (084458)}

**TA100(+S9)**

- KR 2R4F (084396) specific activity is significantly different from that of Fresh Strips (084454)

**TA102(+S9)**

- KR 2R4F (084396) specific activity is significantly different from that of Camel SNUS Frost (084394)

**TA100(-S9)**

- KR 2R4F (084396) specific activity is significantly different from that of {2S3 (084395), Fresh Orbs (084458)}

**Number of Mean 'Nicotine' Slope Estimates (Including Control Brand KR 2R4F)  
Significantly Greater than Zero (0), the Corresponding Number of Paired  
Comparisons and Comparison Method**

<b>Strain and S9 Activation</b>	<b># Significant Slopes (Including KR 2R4F)</b>	<b>Number of Comparisons</b>	<b>Std. Dev. Ratio (Max ÷ Min)</b>	<b>Method of Comparison</b>
TA98 (+S9)	2	1	4.3	ANOVA (equal variance)
TA98 (-S9)	2	1	2.2	ANOVA (equal variance)
TA100 (+S9)	4	3	28.8	Pairwise T-test (unequal variance)
TA100 (-S9)	2	1	2.0	ANOVA (equal variance)
TA102 (+S9)	0	0		
TA102 (-S9)	0	0		
TA1535 (+S9)	0	0		
TA1535 (-S9)	0	0		
TA1537 (+S9)	2	1	5.5	ANOVA (equal variance)
TA1537 (-S9)	0	0		

**One-Way ANOVA and ANOVA-Based Comparisons of Mean 'Unit of Use' Slope Estimates  
Between KR 2R4F and Smokeless Tobacco Samples that are Significantly Greater than Zero (0)**

**TA98 (+S9)**

Source	Sum of Squares	Df	Mean Square	F-Ratio	P-Value
Among Samples	353901768	1	353901768	18.7	<b>0.012</b>
Within Samples	75515579	4	18878895		

TA98 (+S9)			
ANOVA-Based Comparison	f-ratio	p-value	significance at $\alpha = 0.05$
084456 vs. 084396	18.75	0.0124	<b>significant</b>

**TA98 (-S9)**

Source	Sum of Squares	Df	Mean Square	F-Ratio	P-Value
Among Samples	24268	1	24268	0.604	<b>0.481</b>
Within Samples	160839	4	40210		

TA98 (-S9)			
ANOVA-Based Comparison	f-ratio	p-value	significance at $\alpha = 0.05$
084455 vs. 084396	0.604	0.4806	not significant

**TA100 (+S9)**

Source	Sum of Squares	Df	Mean Square	F-Ratio	P-Value
Among Samples	4225958976	3	1408652992	24.1	<b>0.000</b>
Within Samples	466988742	8	58373593		

TA100 (+S9)			
Pairwise T-test Comparison	t-statistic	p-value	significance at $\alpha = 0.05$
084454 vs. 084396	6.57	0.0028	<b>significant</b>
084455 vs. 084396	0.729	0.5064	not significant
084456 vs. 084396	4.66	0.0096	<b>significant</b>

**TA100 (-S9)**

Source	Sum of Squares	Df	Mean Square	F-Ratio	P-Value
Among Samples	117424652	1	117424652	49.0	<b>0.002</b>
Within Samples	9577359	4	2394340		

TA100 (-S9)			
ANOVA-Based Comparison	f-ratio	p-value	significance at $\alpha = 0.05$
084395 vs. 084396	49.0	0.0022	<b>significant</b>

**TA1537 (+S9)**

Source	Sum of Squares	Df	Mean Square	F-Ratio	P-Value
Among Samples	1351365	1	1351365	0.847	<b>0.409</b>
Within Samples	6378464	4	1594616		

TA1537 (+S9)			
ANOVA-Based Comparison	f-ratio	p-value	significance at $\alpha = 0.05$
084456 vs. 084396	0.847	0.4094	not significant

Each of TA98 (+S9), TA98 (-S9), TA100 (+S9), TA100 (-S9) and TA1537 (+S9) strains have the mean 'revertants/cigarette' specific activity slope of the KR 2R4F and at least one smokeless tobacco test sample mean 'revertants/unit of use' specific activity slope estimate being greater than zero (0) .

**TA98 (+S9):**

A significant difference between mean 'unit of use' specific activity slope estimates was detected in TA98 (+S9) between **KR 2R4F** and **084456 (Copenhagen Long Cut)**

**TA98 (-S9):**

No significant difference was detected between mean 'unit of use' specific activity slope estimates in TA98 (-S9) between KR 2R4F and 084455 (Mellow Sticks)

**TA100 (+S9)**

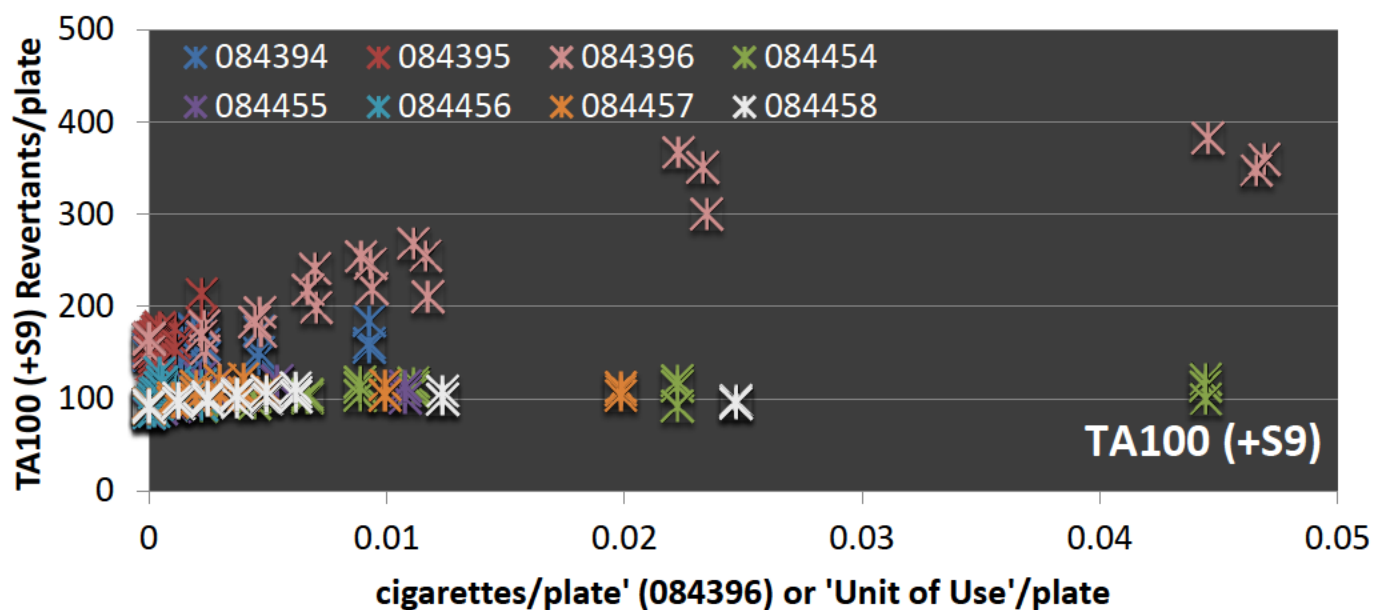
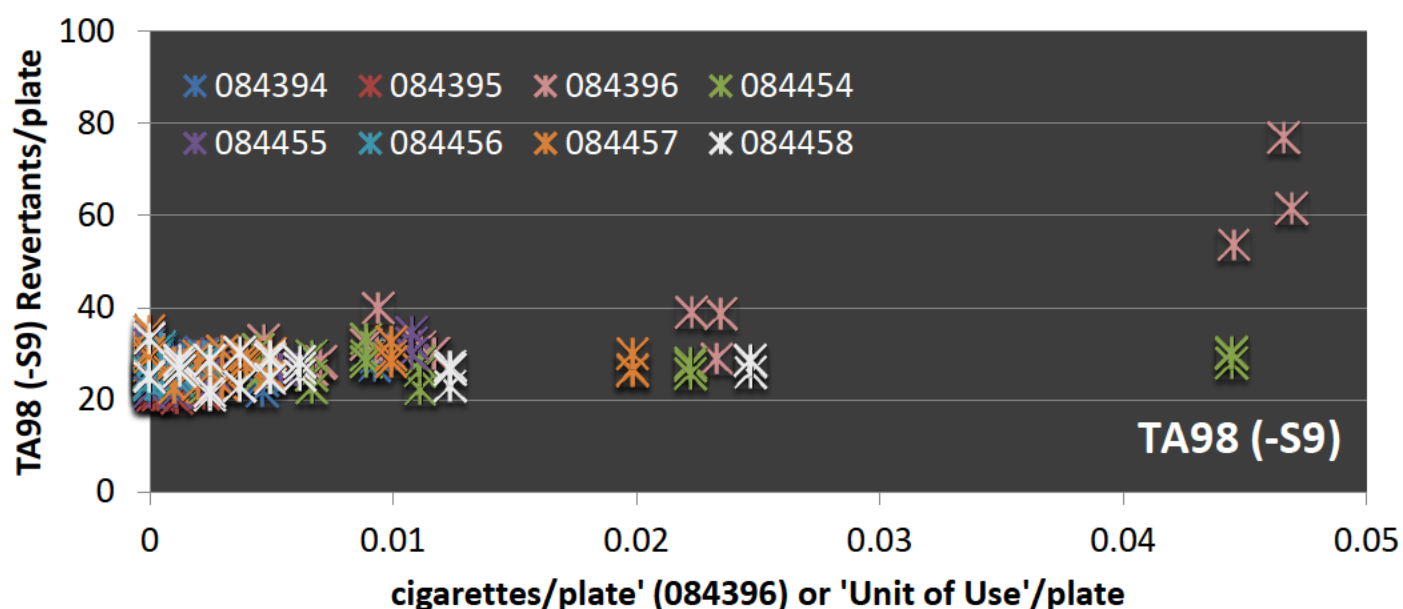
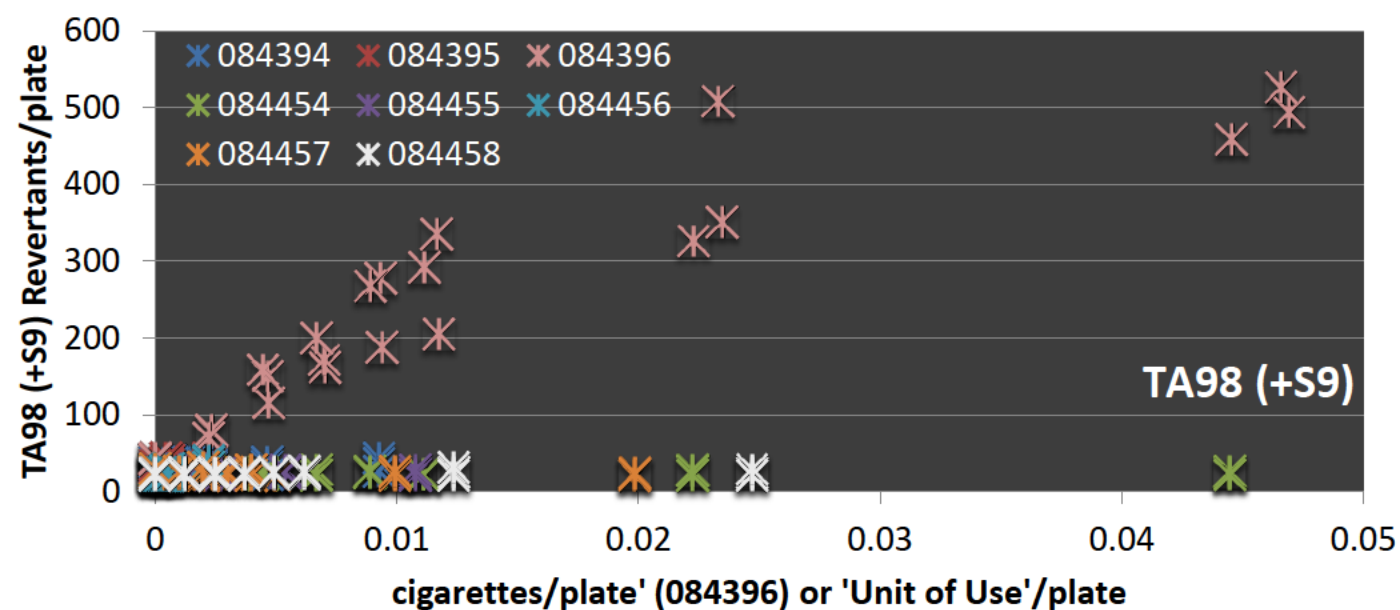
A significant difference between mean 'unit of use' specific activity slope estimates was detected in TA100 (+S9) between **KR 2R4F** and each of **{084454 (Fresh Strips), 084456 (Copenhagen Long Cut)}**

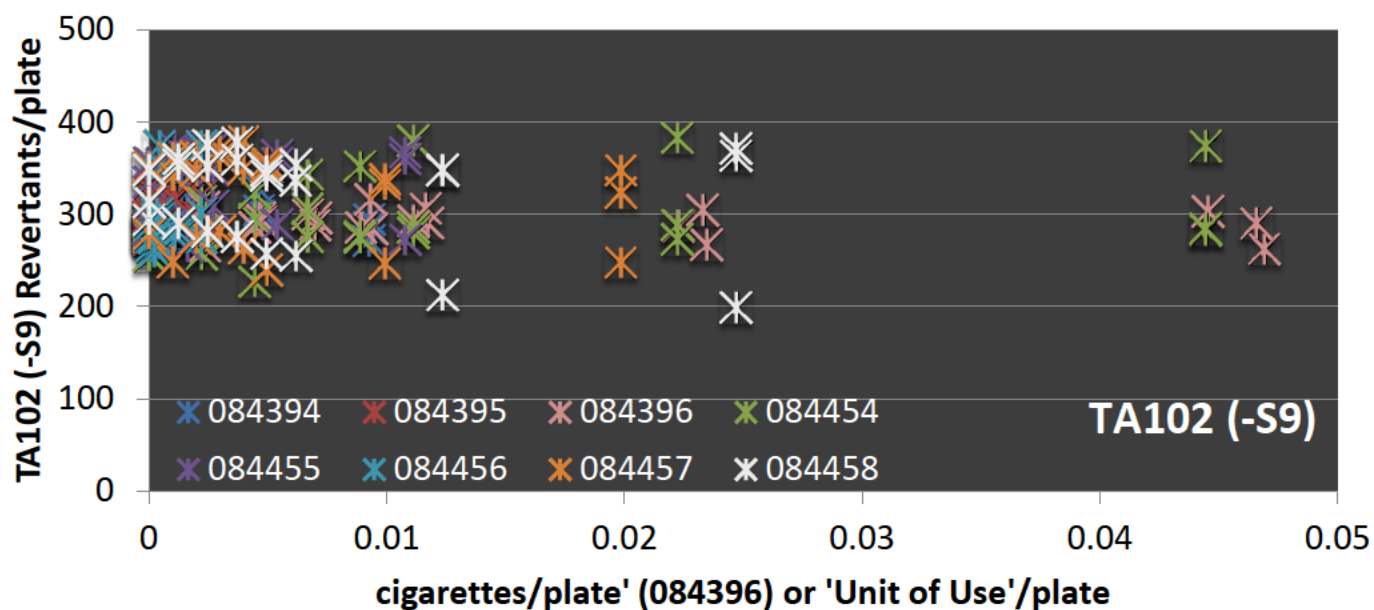
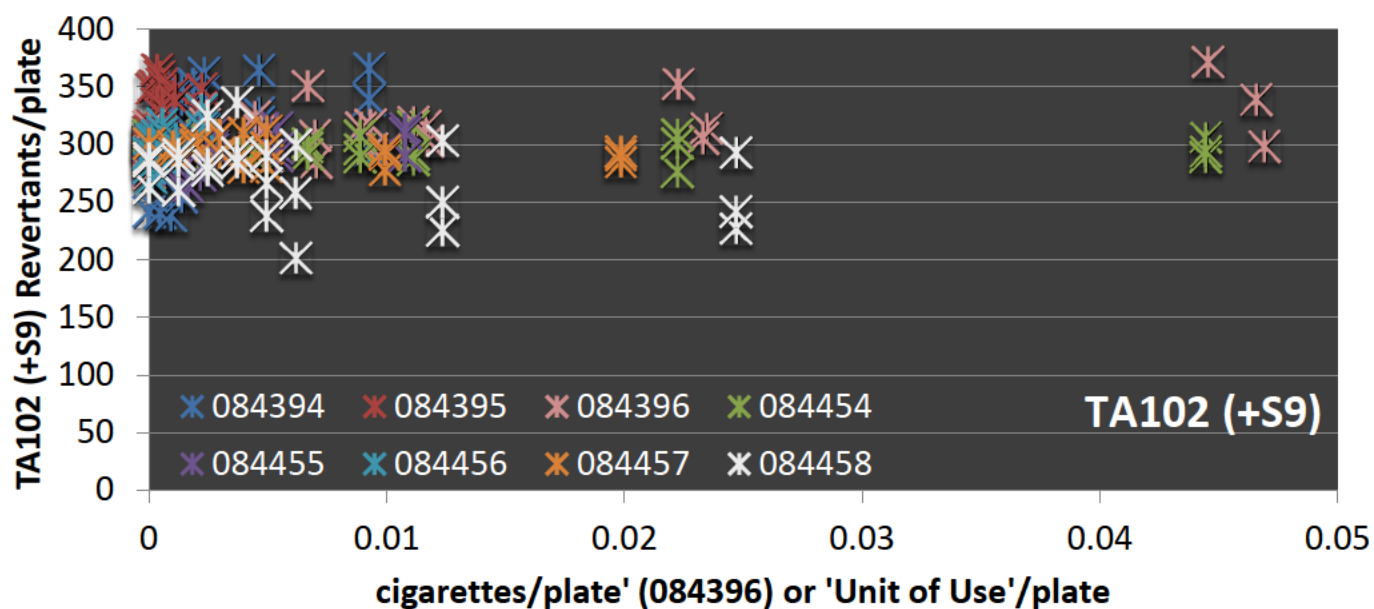
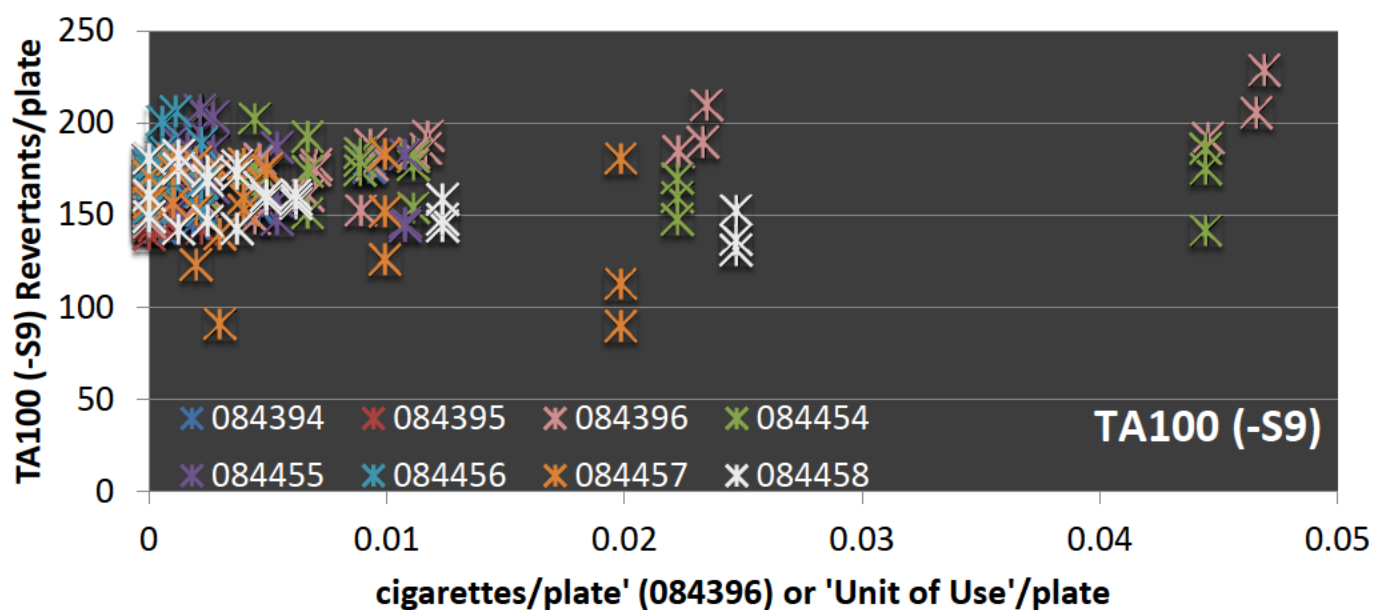
**TA100 (-S9)**

A significant difference between mean 'unit of use' specific activity slope estimates was detected in TA100 (-S9) between **KR 2R4F** and **084395 (2S3)**

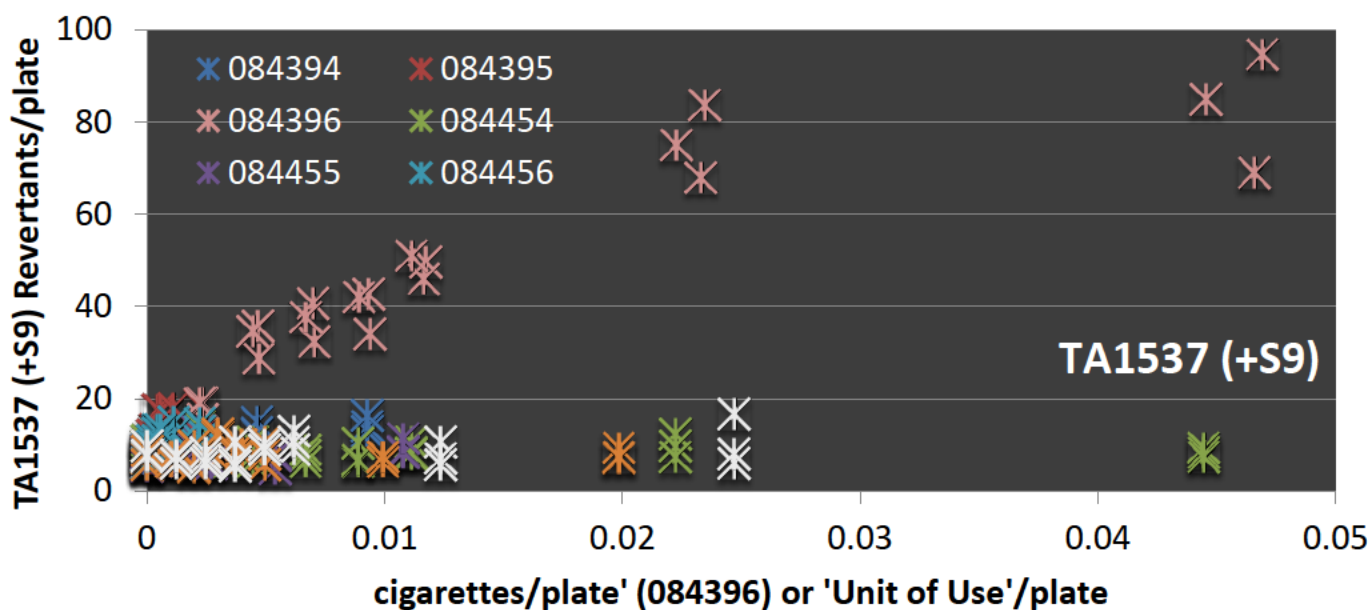
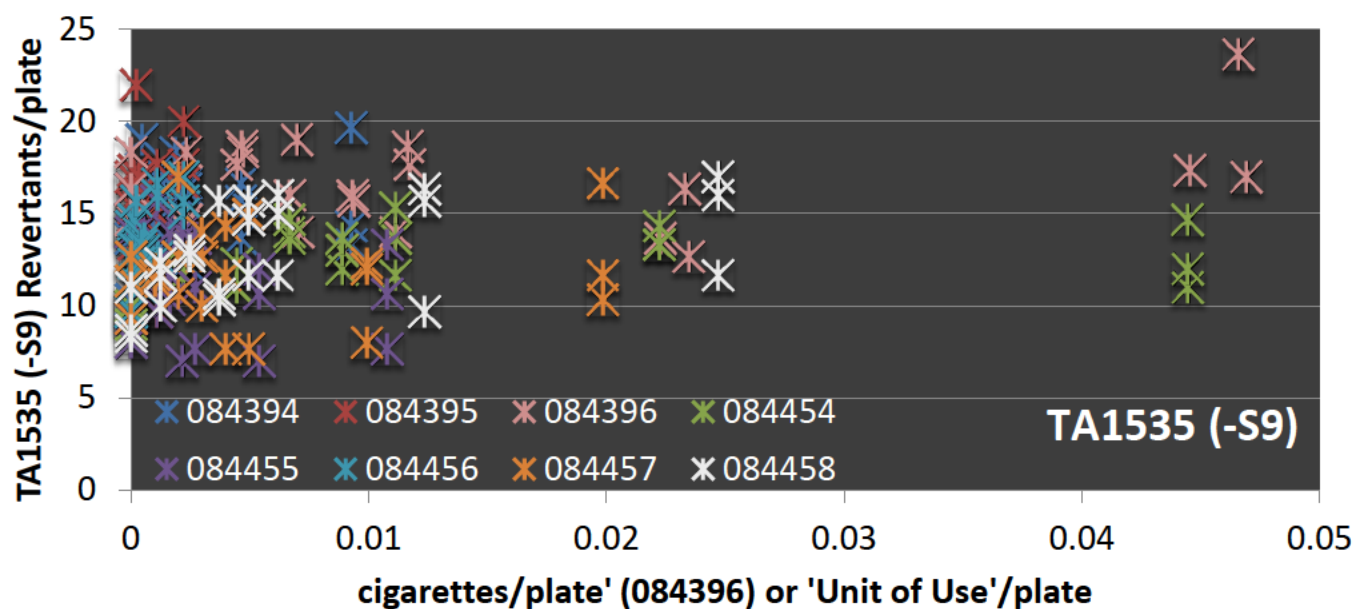
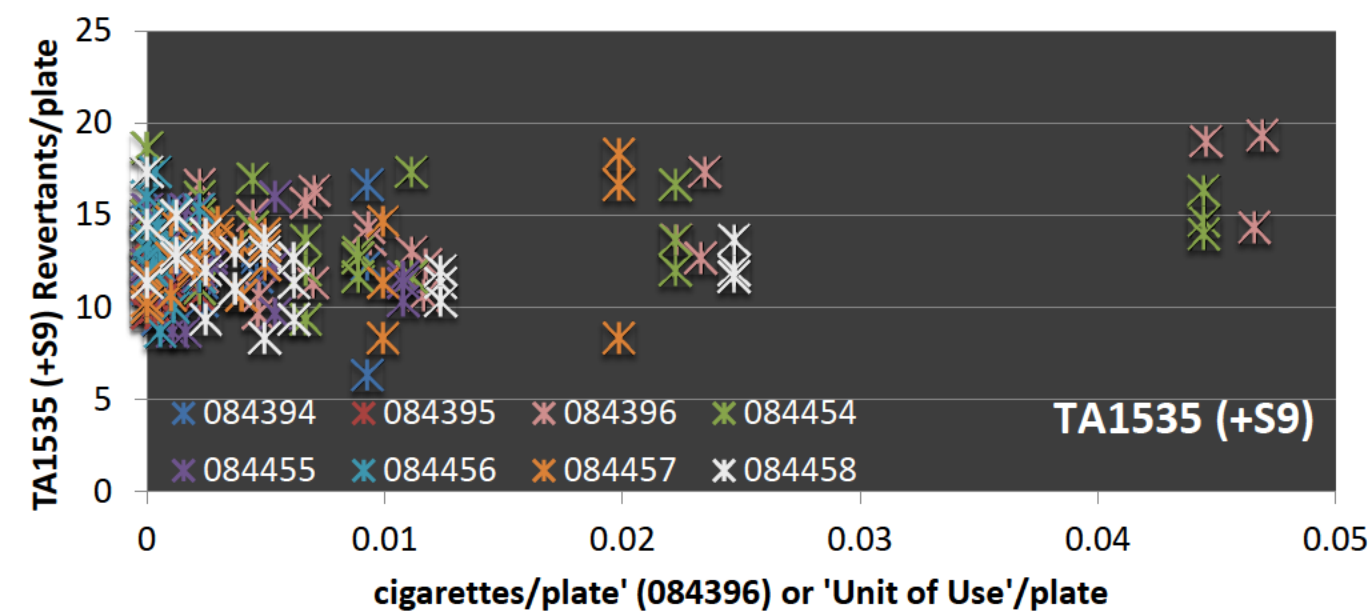
**TA1537 (+S9)**

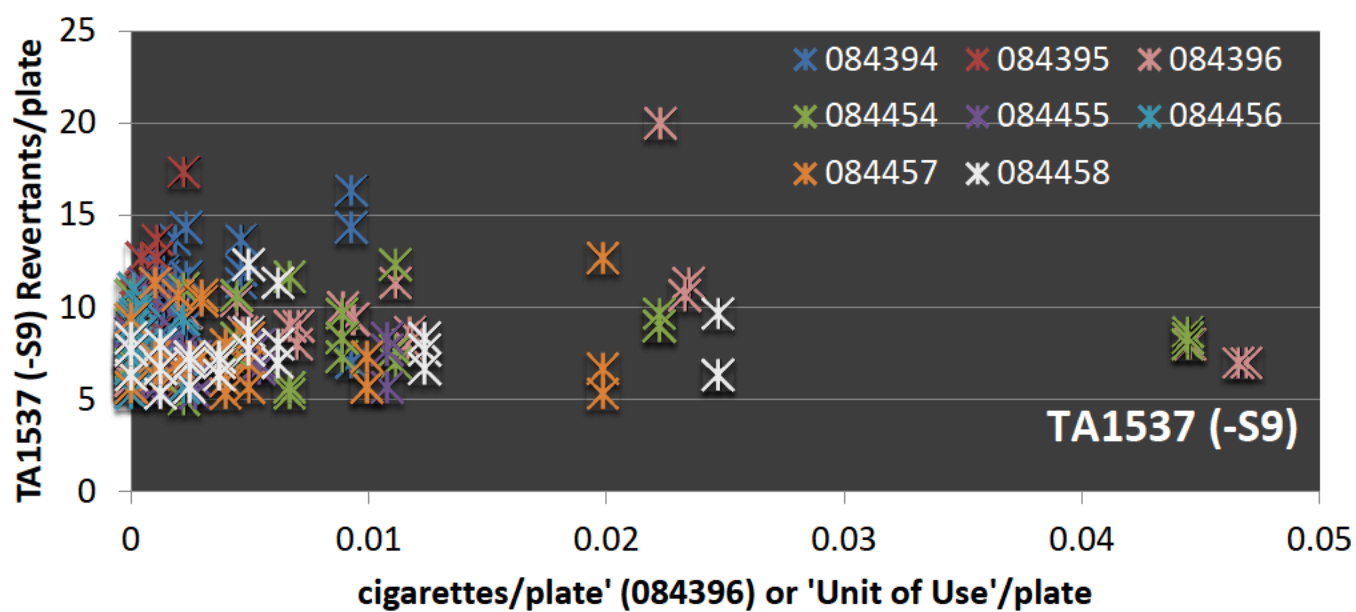
No significant difference was detected between mean 'unit of use' specific activity slope estimates in TA1537 (+S9) between KR 2R4F and 084456 (Copenhagen Long Cut)











**LABSTAT INTERNATIONAL ULC**

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Project: M97

Period: September 15 - 19, 2008

**Sample Generation and Extraction Data for Ames Assay analysis:  
Mutagenesis in *Salmonella typhimurium***

Set Number	Run Number	Sample ID	Replicate Number	Extraction Date	Tobacco Weight (g)	DMSO Solvent Volume (mL)	mg Tobacco per mL DMSO	Dry Matter (%)	mg (Tobacco-H <sub>2</sub> O) per mL DMSO	mg Nicotine per mL DMSO	Nicotine in WT Equivalent (mg/g)	Units of Use		
												Unit	Weight (g)	Units per mL DMSO
1	3	084394	1	15-Sep-08	2.5000	22.5	111.111	68.27	75.861	1.28	11.5	1 pouch	0.6	0.185
1	4	084394	2	15-Sep-08	2.5009	22.5	111.151		75.888	1.43	12.9	1 pouch	0.6	0.185
1	7	084394	3	15-Sep-08	2.5005	22.5	111.133		75.876	1.34	12.1	1 pouch	0.6	0.185
1	2	084395	1	15-Sep-08	2.5012	22.5	111.164	45.98	51.116	1.56	14.0	2.5 g	2.5	0.044
1	5	084395	2	15-Sep-08	2.5011	22.5	111.160		51.115	1.59	14.3	2.5 g	2.5	0.044
1	6	084395	3	15-Sep-08	2.5008	22.5	111.147		51.109	1.49	13.4	2.5 g	2.5	0.044
2	4	084454	1	19-Sep-08	2.5010	22.5	111.156	88.90	98.814	0.400	3.60	1	0.125	0.889
2	6	084454	2	19-Sep-08	2.5008	22.5	111.147		98.806	0.433	3.89	1	0.125	0.889
2	14	084454	3	19-Sep-08	2.5010	22.5	111.156		98.814	0.443	3.98	1	0.125	0.889
2	5	084455	1	19-Sep-08	2.5011	22.5	111.160	93.93	104.409	0.614	5.52	1 stick	0.516	0.215
2	13	084455	2	19-Sep-08	2.5017	22.5	111.187		104.434	0.581	5.23	1 stick	0.516	0.215
2	17	084455	3	19-Sep-08	2.5000	22.5	111.111		104.363	0.618	5.56	1 stick	0.516	0.215
2	3	084456	1	19-Sep-08	2.5015	22.5	111.178	44.63	49.622	1.29	11.6	2.5 g	2.5	0.044
2	7	084456	2	19-Sep-08	2.5012	22.5	111.164		49.616	1.33	11.9	2.5 g	2.5	0.044
2	9	084456	3	19-Sep-08	2.5017	22.5	111.187		49.626	1.35	12.2	2.5 g	2.5	0.044
2	8	084457	1	19-Sep-08	2.5004	22.5	111.129	96.32	107.044	0.589	5.30	1	0.28	0.397
2	12	084457	2	19-Sep-08	2.5000	22.5	111.111		107.027	0.616	5.54	1	0.28	0.397
2	15	084457	3	19-Sep-08	2.5004	22.5	111.129		107.044	0.636	5.72	1	0.28	0.397
2	2	084458	1	19-Sep-08	2.5009	22.5	111.151	94.86	105.437	0.263	2.36	1	0.225	0.494
2	10	084458	2	19-Sep-08	2.5006	22.5	111.138		105.425	0.289	2.60	1	0.225	0.494
2	16	084458	3	19-Sep-08	2.5000	22.5	111.111		105.399	0.306	2.76	1	0.225	0.494

**Mutagenesis in *Salmonella typhimurium* with (+) S9 Metabolic Activation  
(Revertants per plate)**

Set Number	Run Number	Sample ID	Replicate Number	Unit of Use Dose ('units'/plate)	TA98 (+S9)			TA100 (+S9)			TA1535 (+S9)			TA1537 (+S9)			TA102 (+S9)		
					P1	P2	P3	P1	P2	P3	P1	P2	P3	P1	P2	P3	P1	P2	P3
1	3	084394	1	0	44	32	41	147	142	152	11	18	12	5	6	8	296	311	292
1	3	084394	1	0.0005	44	32	39	163	149	141	10	12	6	8	7	6	328	325	327
1	3	084394	1	0.0009	32	43	38	149	133	167	13	13	8	10	8	11	331	328	327
1	3	084394	1	0.0014	36	39	41	168	159	140	14	9	11	7	8	10	345	341	330
1	3	084394	1	0.0019	38	39	37	169	150	156	17	11	13	12	11	9	348	352	355
1	3	084394	1	0.0023	34	34	31	130	153	149	11	10	18	10	8	9	354	345	341
1	3	084394	1	0.0046	41	30	32	141	144	143	8	16	11	16	17	12	365	373	356
1	3	084394	1	0.0093	40	48	43	163	157	148	10	14	13	15	14	10	366	369	364
1	4	084394	2	0	43	24	22	163	149	144	13	14	17	7	6	5	220	246	259
1	4	084394	2	0.0005	43	29	20	134	158	137	12	14	12	11	9	8	231	236	255
1	4	084394	2	0.0009	23	18	39	158	139	138	17	10	12	7	6	9	228	244	244
1	4	084394	2	0.0014	41	28	22	144	144	147	13	12	13	11	7	10	253	250	259
1	4	084394	2	0.0019	41	30	48	186	172	169	14	12	16	8	9	10	299	302	301
1	4	084394	2	0.0023	39	38	30	159	173	144	8	13	13	13	12	7	319	322	300
1	4	084394	2	0.0046	41	38	39	137	154	159	12	10	16	14	11	12	316	319	324
1	4	084394	2	0.0093	30	44	38	169	148	164	17	19	14	16	11	15	304	291	290
1	7	084394	3	0	31	34	31	157	158	148	10	12	11	10	9	8	295	304	303
1	7	084394	3	0.0005	29	27	34	156	143	161	12	19	6	7	13	9	326	330	325
1	7	084394	3	0.0009	29	30	37	162	166	151	16	16	14	10	9	8	330	324	332
1	7	084394	3	0.0014	27	31	34	168	162	156	14	15	10	11	12	8	364	347	336
1	7	084394	3	0.0019	46	37	38	194	172	158	12	14	11	11	7	14	360	347	352
1	7	084394	3	0.0023	27	33	38	185	179	167	9	8	14	13	12	11	370	364	352
1	7	084394	3	0.0046	24	13	29	168	174	178	13	14	12	11	13	14	332	324	327
1	7	084394	3	0.0093	26	26	28	171	188	193	6	8	5	19	14	16	345	339	333
1	2	084395	1	0	28	29	36	163	157	151	16	9	10	6	7	8	287	306	314
1	2	084395	1	0.0001	43	23	24	158	141	150	8	16	18	9	10	11	344	342	360
1	2	084395	1	0.0002	22	27	31	142	133	159	9	10	17	12	11	13	354	345	355
1	2	084395	1	0.0003	28	27	27	150	166	170	17	13	14	15	13	12	368	354	374
1	2	084395	1	0.0004	46	37	27	176	159	169	17	12	9	19	16	18	352	367	359
1	2	084395	1	0.0006	47	39	36	139	141	151	6	7	16	16	17	19	351	348	360
1	2	084395	1	0.0011	28	46	38	162	160	162	13	11	10	17	18	19	332	346	364
1	2	084395	1	0.0022	49	42	42	153	169	178	19	14	13	18	20	18	356	349	339
1	5	084395	2	0	46	44	37	167	144	138	17	12	16	9	8	7	294	307	290
1	5	084395	2	0.0001	32	34	28	136	133	142	9	16	8	9	9	8	313	309	315
1	5	084395	2	0.0002	30	31	32	163	138	153	16	12	12	7	8	7	311	305	312
1	5	084395	2	0.0003	29	32	40	169	154	181	11	14	12	11	12	11	319	302	306
1	5	084395	2	0.0004	40	38	38	172	180	169	16	7	15	8	11	14	310	324	301
1	5	084395	2	0.0006	43	41	38	151	160	168	14	13	9	12	9	10	290	301	303
1	5	084395	2	0.0011	39	36	35	176	181	170	10	14	14	11	12	14	304	309	296
1	5	084395	2	0.0022	37	32	42	216	219	207	14	12	16	16	12	14	330	343	325
1	6	084395	3	0	34	40	30	165	177	152	10	11	8	7	6	5	312	309	313
1	6	084395	3	0.0001	28	20	27	156	186	158	7	16	12	8	6	7	317	316	316
1	6	084395	3	0.0002	30	24	29	166	176	162	14	9	16	8	7	9	317	311	314
1	6	084395	3	0.0003	27	22	32	162	173	186	8	9	13	8	9	10	331	343	332
1	6	084395	3	0.0004	47	44	40	193	176	162	8	8	15	10	8	12	324	336	321
1	6	084395	3	0.0006	39	34	31	138	143	139	16	11	8	9	7	11	330	339	329
1	6	084395	3	0.0011	40	34	34	148	159	153	11	14	8	10	8	13	337	346	330
1	6	084395	3	0.0022	40	43	42	177	189	183	10	10	12	14	12	11	329	320	333

**Mutagenesis in *Salmonella typhimurium* with (+) S9 Metabolic Activation  
(Revertants per plate)**

Set Number	Run Number	Sample ID	Replicate Number	Unit of Use Dose ('units'/plate)	TA98 (+S9)			TA100 (+S9)			TA1535 (+S9)			TA1537 (+S9)			TA102 (+S9)		
					P1	P2	P3	P1	P2	P3	P1	P2	P3	P1	P2	P3	P1	P2	P3
2	4	084454	1	0	27	27	32	100	96	82	18	18	9	10	14	9	307	302	314
2	4	084454	1	0.0022	31	29	24	101	95	98	10	13	10	7	6	6	304	313	296
2	4	084454	1	0.0044	30	28	20	114	103	96	16	17	10	7	9	7	306	291	271
2	4	084454	1	0.0067	26	29	32	99	114	104	10	11	7	11	7	9	296	294	314
2	4	084454	1	0.0089	27	24	22	130	117	106	17	11	11	6	6	7	282	294	311
2	4	084454	1	0.0111	26	24	20	126	116	110	14	12	9	8	7	10	320	310	318
2	4	084454	1	0.0222	28	31	26	106	115	120	6	18	17	16	12	9	299	301	326
2	4	084454	1	0.0445	22	25	28	118	120	125	14	11	19	8	8	9	303	314	301
2	6	084454	2	0	23	27	26	96	90	86	11	18	12	9	9	11	298	319	292
2	6	084454	2	0.0022	29	30	21	96	92	88	14	15	19	11	11	8	305	310	307
2	6	084454	2	0.0044	23	21	23	88	99	96	16	18	17	13	9	10	296	294	290
2	6	084454	2	0.0067	19	19	26	90	103	108	11	20	10	7	7	9	293	304	296
2	6	084454	2	0.0089	24	25	24	110	100	102	12	10	16	7	14	10	296	307	319
2	6	084454	2	0.0111	22	20	24	109	104	109	19	13	20	10	10	12	310	287	277
2	6	084454	2	0.0222	27	24	30	120	115	122	13	20	17	11	10	8	276	267	287
2	6	084454	2	0.0445	27	27	25	112	113	115	14	18	17	10	12	6	280	298	290
2	14	084454	3	0	27	23	37	90	99	96	19	17	20	7	8	8	305	297	308
2	14	084454	3	0.0022	33	24	30	94	100	106	12	16	17	13	14	15	282	273	296
2	14	084454	3	0.0044	21	22	23	96	100	110	13	16	14	6	6	7	272	300	301
2	14	084454	3	0.0067	22	22	22	96	110	104	10	8	18	6	6	7	298	283	293
2	14	084454	3	0.0089	26	32	23	107	116	114	11	14	10	6	6	8	285	289	294
2	14	084454	3	0.0111	26	21	19	104	114	121	17	11	7	9	7	8	285	290	284
2	14	084454	3	0.0222	24	20	20	98	82	95	16	11	9	6	7	9	299	312	292
2	14	084454	3	0.0445	21	22	23	103	100	96	17	14	11	8	8	6	281	288	313
2	5	084455	1	0	24	30	35	80	82	89	14	13	10	10	6	9	297	300	311
2	5	084455	1	0.0005	24	20	21	84	90	92	11	18	13	15	11	10	299	286	282
2	5	084455	1	0.0011	30	25	36	92	88	93	8	8	10	8	7	11	289	310	292
2	5	084455	1	0.0016	23	24	34	100	88	94	9	9	8	12	9	12	309	310	289
2	5	084455	1	0.0022	27	30	27	100	106	113	11	12	13	14	14	11	298	291	323
2	5	084455	1	0.0027	23	22	20	98	111	114	12	16	9	9	9	13	296	324	312
2	5	084455	1	0.0054	30	22	22	118	110	124	14	7	8	10	7	7	319	304	320
2	5	084455	1	0.0108	22	22	21	103	92	106	10	13	12	8	8	10	312	326	304
2	13	084455	2	0	28	17	31	86	97	94	17	17	12	6	5	5	294	315	298
2	13	084455	2	0.0005	24	21	21	106	100	95	13	12	14	7	8	5	311	306	311
2	13	084455	2	0.0011	28	18	20	108	101	98	10	17	14	7	9	5	283	290	303
2	13	084455	2	0.0016	23	22	39	111	113	103	13	19	14	6	7	6	297	303	281
2	13	084455	2	0.0022	36	28	26	120	130	117	19	16	11	7	10	8	304	292	287
2	13	084455	2	0.0027	25	22	28	122	108	112	9	12	17	6	7	6	306	287	304
2	13	084455	2	0.0054	26	28	30	127	114	111	17	10	10	5	4	5	308	300	282
2	13	084455	2	0.0108	24	26	21	98	111	116	6	11	14	8	7	10	306	308	316
2	17	084455	3	0	20	22	21	94	99	90	10	12	14	7	9	8	280	273	282
2	17	084455	3	0.0005	26	22	20	98	106	96	11	10	11	10	10	8	282	286	276
2	17	084455	3	0.0011	31	21	23	98	102	110	12	16	10	7	8	9	291	281	275
2	17	084455	3	0.0016	24	31	22	114	111	119	16	18	12	7	7	6	272	264	256
2	17	084455	3	0.0022	20	29	29	104	105	104	13	10	12	7	7	6	283	267	271
2	17	084455	3	0.0027	21	24	24	110	108	121	13	12	14	7	6	5	282	300	305
2	17	084455	3	0.0054	22	24	30	114	128	116	11	18	19	7	9	7	305	279	286
2	17	084455	3	0.0108	29	30	28	115	106	120	11	10	13	12	9	13	279	285	306

**Mutagenesis in *Salmonella typhimurium* with (+) S9 Metabolic Activation  
(Revertants per plate)**

Set Number	Run Number	Sample ID	Replicate Number	Unit of Use Dose ('units'/plate)	TA98 (+S9)			TA100 (+S9)			TA1535 (+S9)			TA1537 (+S9)			TA102 (+S9)		
					P1	P2	P3	P1	P2	P3	P1	P2	P3	P1	P2	P3	P1	P2	P3
2	3	084456	1	0	26	33	28	84	87	82	6	13	11	8	8	7	292	279	270
2	3	084456	1	0.0001	26	22	21	87	89	88	11	17	13	10	9	9	280	250	283
2	3	084456	1	0.0002	22	30	22	91	84	82	11	18	12	12	9	12	287	313	314
2	3	084456	1	0.0003	24	28	22	89	102	90	11	12	11	8	6	10	298	297	294
2	3	084456	1	0.0004	20	20	24	96	100	111	16	14	10	14	14	12	280	314	313
2	3	084456	1	0.0006	27	34	28	122	107	111	9	7	10	11	11	10	303	324	327
2	3	084456	1	0.0011	22	27	28	122	120	112	6	12	12	15	16	14	307	319	288
2	3	084456	1	0.0022	37	37	50	93	114	98	11	18	12	13	14	12	324	346	320
2	7	084456	2	0	31	21	21	92	90	85	20	10	18	6	9	6	300	282	295
2	7	084456	2	0.0001	22	19	24	90	99	96	15	11	13	8	7	8	304	306	297
2	7	084456	2	0.0002	23	23	24	100	97	102	11	13	12	11	9	9	319	307	289
2	7	084456	2	0.0003	24	20	21	94	108	114	20	19	13	10	9	6	288	314	320
2	7	084456	2	0.0004	30	33	23	126	137	120	14	11	12	14	14	10	299	305	311
2	7	084456	2	0.0006	24	24	23	128	111	115	11	14	17	10	8	11	310	278	295
2	7	084456	2	0.0011	21	24	34	112	103	109	20	14	11	13	12	12	285	298	281
2	7	084456	2	0.0022	33	42	40	106	118	120	13	15	18	13	12	8	321	313	314
2	9	084456	3	0	21	21	22	85	99	90	10	11	19	7	6	5	289	281	304
2	9	084456	3	0.0001	20	23	30	96	98	90	13	11	12	10	8	10	310	296	306
2	9	084456	3	0.0002	20	20	21	103	106	109	12	10	14	8	8	11	290	286	292
2	9	084456	3	0.0003	20	29	22	104	105	113	10	11	23	8	10	10	300	295	284
2	9	084456	3	0.0004	36	23	20	119	110	106	12	18	13	10	11	12	272	279	280
2	9	084456	3	0.0006	24	20	20	116	118	120	18	10	12	13	13	14	308	317	308
2	9	084456	3	0.0011	28	24	21	97	105	98	15	11	13	9	7	8	313	319	286
2	9	084456	3	0.0022	37	30	30	84	95	99	10	12	13	13	14	17	319	300	324
2	8	084457	1	0	26	21	22	85	92	91	11	10	14	5	7	9	275	288	296
2	8	084457	1	0.0010	21	23	26	99	96	107	11	12	9	7	8	7	293	294	301
2	8	084457	1	0.0020	19	24	18	118	110	114	11	12	13	9	12	8	298	305	311
2	8	084457	1	0.0030	24	26	24	120	116	123	10	17	15	12	14	9	317	308	300
2	8	084457	1	0.0040	34	26	24	124	116	126	19	11	10	8	8	8	287	301	282
2	8	084457	1	0.0050	20	26	23	102	108	98	11	13	18	11	13	8	312	318	306
2	8	084457	1	0.0099	31	20	20	119	121	104	13	16	15	6	5	8	287	289	298
2	8	084457	1	0.0198	28	24	23	107	112	107	16	20	19	5	5	11	284	282	289
2	12	084457	2	0	29	31	20	95	98	90	13	11	6	5	6	6	278	293	294
2	12	084457	2	0.0010	28	20	26	101	94	92	11	11	16	7	5	7	303	281	296
2	12	084457	2	0.0020	29	20	24	92	103	103	10	17	12	5	5	5	298	294	308
2	12	084457	2	0.0030	20	27	20	108	112	99	17	8	16	6	7	8	299	315	312
2	12	084457	2	0.0040	21	20	23	98	106	105	9	13	10	9	10	8	278	293	270
2	12	084457	2	0.0050	23	19	20	120	103	105	18	8	11	7	9	8	292	265	287
2	12	084457	2	0.0099	20	20	23	114	100	98	8	14	12	7	9	6	303	270	261
2	12	084457	2	0.0198	21	19	23	112	113	114	13	20	17	8	9	11	298	294	289
2	15	084457	3	0	33	31	28	86	97	95	12	7	12	8	9	9	299	294	310
2	15	084457	3	0.0010	29	24	26	100	92	98	10	16	18	9	6	NA	293	305	298
2	15	084457	3	0.0020	27	35	33	105	100	114	12	12	13	5	5	6	304	296	294
2	15	084457	3	0.0030	26	28	22	102	105	104	14	19	11	12	15	10	301	298	279
2	15	084457	3	0.0040	22	30	32	117	100	104	10	9	13	11	10	9	312	322	296
2	15	084457	3	0.0050	20	24	25	112	100	118	7	20	13	6	5	6	302	310	280
2	15	084457	3	0.0099	29	28	22	101	98	111	8	7	10	6	7	9	285	299	302
2	15	084457	3	0.0198	21	26	23	100	95	114	8	7	10	8	8	6	289	279	304

**Mutagenesis in *Salmonella typhimurium* with (+) S9 Metabolic Activation  
(Revertants per plate)**

Set Number	Run Number	Sample ID	Replicate Number	Unit of Use Dose (units/plate)	TA98 (+S9)			TA100 (+S9)			TA1535 (+S9)			TA1537 (+S9)			TA102 (+S9)		
					P1	P2	P3	P1	P2	P3	P1	P2	P3	P1	P2	P3	P1	P2	P3
2	2	084458	1	0	24	30	20	102	93	86	10	14	10	9	10	10	270	263	255
2	2	084458	1	0.0012	20	29	27	105	94	104	14	11	14	9	8	6	258	268	255
2	2	084458	1	0.0025	26	26	26	107	98	101	11	12	13	8	6	11	320	330	325
2	2	084458	1	0.0037	20	21	28	92	100	95	13	9	11	11	11	10	339	350	320
2	2	084458	1	0.0049	37	21	22	96	111	92	9	16	16	6	9	12	250	234	230
2	2	084458	1	0.0062	29	26	21	103	100	118	10	13	11	14	9	16	200	204	201
2	2	084458	1	0.0124	27	22	28	109	96	94	10	12	12	11	13	8	233	230	214
2	2	084458	1	0.0247	23	28	23	99	97	86	14	11	16	19	20	11	230	218	234
2	10	084458	2	0	27	24	20	92	94	90	16	13	NA	10	6	6	294	292	280
2	10	084458	2	0.0012	28	26	20	90	97	100	11	11	16	5	8	5	294	281	300
2	10	084458	2	0.0025	20	20	30	97	93	110	9	9	10	5	6	10	304	277	270
2	10	084458	2	0.0037	21	NA	29	102	100	116	12	11	10	6	8	5	307	290	280
2	10	084458	2	0.0049	29	21	20	104	104	97	9	9	7	12	7	11	303	286	282
2	10	084458	2	0.0062	23	21	26	101	100	105	10	10	8	9	10	8	306	280	313
2	10	084458	2	0.0123	22	20	22	96	106	95	9	11	11	8	8	5	309	300	302
2	10	084458	2	0.0247	22	21	20	90	106	97	12	10	14	5	6	7	290	302	287
2	16	084458	3	0	23	20	20	84	90	96	18	20	14	8	8	7	274	281	301
2	16	084458	3	0.0012	24	21	18	98	94	92	13	14	18	7	8	7	276	285	295
2	16	084458	3	0.0025	21	20	21	94	100	98	17	12	13	6	5	7	254	295	284
2	16	084458	3	0.0037	24	20	22	96	106	110	15	10	14	5	6	5	292	276	286
2	16	084458	3	0.0049	24	23	28	117	104	105	11	18	10	8	9	10	254	275	271
2	16	084458	3	0.0062	28	24	27	102	118	115	12	16	10	12	10	10	254	268	252
2	16	084458	3	0.0123	29	31	36	110	105	110	13	12	11	5	6	6	234	255	261
2	16	084458	3	0.0247	31	31	26	99	101	87	10	14	11	7	8	9	250	244	232

NA - data not available due to lack of bacterial growth or assay plate contamination

**Mutagenesis in *Salmonella typhimurium* without (-) S9 Metabolic Activation  
(Revertants per plate)**

Set Number	Run Number	Sample ID	Replicate Number	Unit of Use Dose ('units'/plate)	TA98 (-S9)			TA100 (-S9)			TA1535 (-S9)			TA1537 (-S9)			TA102 (-S9)		
					P1	P2	P3	P1	P2	P3	P1	P2	P3	P1	P2	P3	P1	P2	P3
1	3	084394	1	0	23	32	23	167	159	154	9	12	10	8	7	9	273	291	287
1	3	084394	1	0.0005	29	28	27	166	174	167	14	12	16	13	9	10	320	325	338
1	3	084394	1	0.0009	38	30	23	148	156	160	13	14	11	12	14	11	292	308	289
1	3	084394	1	0.0014	26	24	28	172	162	159	18	16	16	14	10	12	309	293	294
1	3	084394	1	0.0019	30	31	20	179	187	162	14	11	17	14	13	14	304	301	291
1	3	084394	1	0.0023	24	24	21	144	152	161	14	17	19	13	16	14	294	300	301
1	3	084394	1	0.0046	22	21	23	156	146	157	17	11	13	11	12	18	297	311	304
1	3	084394	1	0.0093	29	27	26	178	182	180	18	17	5	16	16	17	285	284	288
1	4	084394	2	0	21	20	24	144	149	147	17	11	13	8	6	8	276	287	283
1	4	084394	2	0.0005	30	30	23	147	140	167	14	13	14	11	8	12	286	286	282
1	4	084394	2	0.0009	27	28	20	166	136	157	18	14	11	10	10	12	288	280	278
1	4	084394	2	0.0014	22	32	23	156	144	156	21	12	18	8	12	15	293	306	313
1	4	084394	2	0.0019	32	31	26	143	157	159	11	20	18	10	10	14	273	276	272
1	4	084394	2	0.0023	33	36	20	151	150	157	10	10	17	9	8	10	300	292	306
1	4	084394	2	0.0046	26	26	24	160	154	149	10	16	21	10	14	10	287	302	303
1	4	084394	2	0.0093	30	36	29	170	177	181	24	16	19	12	16	15	275	268	272
1	7	084394	3	0	28	23	20	128	149	156	15	14	20	6	5	7	275	298	278
1	7	084394	3	0.0005	23	26	26	130	156	143	18	19	20	6	8	6	306	323	308
1	7	084394	3	0.0009	21	28	24	162	166	150	17	21	13	7	9	10	317	327	329
1	7	084394	3	0.0014	28	33	26	152	161	146	17	18	16	9	10	8	335	317	336
1	7	084394	3	0.0019	24	26	37	136	158	143	21	15	19	7	9	10	330	296	307
1	7	084394	3	0.0023	20	24	29	148	161	156	18	14	17	13	10	12	317	298	297
1	7	084394	3	0.0046	22	23	28	177	186	180	12	20	18	14	10	12	324	332	325
1	7	084394	3	0.0093	24	28	36	176	169	187	14	16	13	7	8	6	325	276	281
1	2	084395	1	0	27	29	20	144	124	150	19	18	14	7	7	9	276	288	272
1	2	084395	1	0.0001	21	20	29	153	161	146	19	13	8	7	8	6	303	298	298
1	2	084395	1	0.0002	21	20	23	134	148	153	21	22	23	10	8	8	286	289	299
1	2	084395	1	0.0003	23	23	22	159	153	164	14	17	12	8	9	7	287	297	286
1	2	084395	1	0.0004	28	26	24	144	161	133	14	11	12	8	14	11	268	278	267
1	2	084395	1	0.0006	23	24	22	143	162	151	17	16	14	9	12	13	305	294	293
1	2	084395	1	0.0011	29	20	24	147	164	158	11	8	10	15	14	12	293	310	299
1	2	084395	1	0.0022	26	26	27	136	140	152	13	20	17	16	17	19	294	293	296
1	5	084395	2	0	34	28	20	144	149	142	17	18	8	5	6	7	277	274	266
1	5	084395	2	0.0001	27	30	27	147	140	167	18	15	19	8	10	9	299	290	293
1	5	084395	2	0.0002	25	20	25	166	136	157	13	22	12	11	7	14	329	305	334
1	5	084395	2	0.0003	19	22	25	156	144	156	23	11	13	10	9	11	314	309	313
1	5	084395	2	0.0004	23	34	22	170	156	151	12	19	17	15	11	12	294	306	294
1	5	084395	2	0.0006	20	28	23	158	148	172	13	20	16	9	12	10	300	282	294
1	5	084395	2	0.0011	21	20	24	168	175	157	15	16	14	11	9	18	326	324	310
1	5	084395	2	0.0022	21	29	21	187	158	168	19	16	18	11	9	13	326	322	312
1	6	084395	3	0	30	20	20	158	137	144	9	19	15	5	6	7	290	301	301
1	6	084395	3	0.0001	20	22	21	141	159	138	16	10	20	8	6	9	295	305	302
1	6	084395	3	0.0002	21	20	26	146	152	134	16	20	12	12	8	10	307	318	318
1	6	084395	3	0.0003	23	20	20	152	151	136	19	17	15	7	9	7	326	301	310
1	6	084395	3	0.0004	28	21	30	144	152	154	8	20	16	6	9	8	286	271	284
1	6	084395	3	0.0006	36	20	22	147	166	153	13	16	12	10	8	10	306	311	306
1	6	084395	3	0.0011	20	21	20	153	169	173	21	15	17	10	7	9	306	319	323
1	6	084395	3	0.0022	22	22	20	171	164	184	17	23	20	6	5	7	360	381	370



**Mutagenesis in *Salmonella typhimurium* without (-) S9 Metabolic Activation  
(Revertants per plate)**

Set Number	Run Number	Sample ID	Replicate Number	Unit of Use Dose ('units'/plate)	TA98 (-S9)			TA100 (-S9)			TA1535 (-S9)			TA1537 (-S9)			TA102 (-S9)		
					P1	P2	P3	P1	P2	P3	P1	P2	P3	P1	P2	P3	P1	P2	P3
2	4	084454	1	0	28	26	24	162	178	176	11	7	12	11	11	10	283	281	287
2	4	084454	1	0.0022	28	21	22	207	188	223	15	11	14	13	12	8	286	271	283
2	4	084454	1	0.0044	31	27	25	223	221	163	12	11	10	8	9	5	286	296	303
2	4	084454	1	0.0067	20	27	29	205	187	186	13	15	14	5	5	6	322	296	300
2	4	084454	1	0.0089	28	30	31	200	177	174	13	12	11	7	8	7	288	267	274
2	4	084454	1	0.0111	20	24	23	143	159	160	12	10	13	11	13	13	270	278	292
2	4	084454	1	0.0222	29	34	21	132	173	174	11	14	15	7	12	8	291	286	288
2	4	084454	1	0.0445	29	30	32	191	161	174	10	11	12	10	8	8	278	277	292
2	6	084454	2	0	31	25	26	198	197	136	6	9	12	7	9	7	264	247	256
2	6	084454	2	0.0022	28	27	31	129	180	177	10	11	14	5	5	5	256	251	263
2	6	084454	2	0.0044	31	28	34	159	188	178	11	10	12	9	8	8	223	217	241
2	6	084454	2	0.0067	23	24	21	167	178	177	12	13	16	5	7	5	263	272	292
2	6	084454	2	0.0089	29	36	35	186	149	188	16	10	13	9	10	10	273	279	272
2	6	084454	2	0.0111	20	32	27	171	179	181	14	17	10	7	8	8	290	280	288
2	6	084454	2	0.0222	24	32	26	181	111	151	18	12	13	10	9	8	282	266	271
2	6	084454	2	0.0445	24	31	29	168	194	197	13	14	17	9	7	8	292	291	271
2	14	084454	3	0	21	27	22	172	169	169	9	8	13	5	10	6	317	301	324
2	14	084454	3	0.0022	22	21	24	190	150	162	11	14	10	7	5	5	312	309	322
2	14	084454	3	0.0044	21	28	26	177	173	141	12	11	14	11	12	9	313	321	335
2	14	084454	3	0.0067	27	25	37	139	171	143	14	16	14	13	11	11	343	327	359
2	14	084454	3	0.0089	30	26	29	178	184	176	14	16	11	9	9	7	341	348	366
2	14	084454	3	0.0111	22	26	37	197	173	176	18	12	16	7	6	8	381	371	387
2	14	084454	3	0.0222	22	29	26	138	178	194	10	16	14	9	10	10	370	390	390
2	14	084454	3	0.0445	29	27	34	148	144	133	12	10	14	7	9	9	381	358	384
2	5	084455	1	0	26	20	26	183	NA	178	13	12	17	8	5	7	288	279	286
2	5	084455	1	0.0005	21	23	25	154	168	157	10	11	13	5	6	6	297	288	293
2	5	084455	1	0.0011	21	24	20	160	148	150	13	10	6	8	10	11	277	272	282
2	5	084455	1	0.0016	24	26	29	172	190	174	12	11	8	7	7	8	260	261	276
2	5	084455	1	0.0022	30	32	28	197	194	194	7	6	8	5	10	8	277	299	288
2	5	084455	1	0.0027	37	23	29	201	190	219	8	7	8	7	6	9	319	306	301
2	5	084455	1	0.0054	30	21	29	194	181	186	NA	7	7	7	8	6	288	294	286
2	5	084455	1	0.0108	34	26	37	144	132	162	8	8	7	6	9	8	272	268	277
2	13	084455	2	0	37	32	27	168	167	160	9	8	7	6	7	10	323	343	338
2	13	084455	2	0.0005	26	20	24	213	167	158	10	11	12	9	11	14	340	348	372
2	13	084455	2	0.0011	26	32	27	162	163	183	11	12	14	9	11	14	362	372	386
2	13	084455	2	0.0016	26	22	27	191	187	178	12	10	13	11	11	9	348	347	350
2	13	084455	2	0.0022	37	29	24	187	226	208	12	16	13	7	7	6	365	357	382
2	13	084455	2	0.0027	26	25	31	206	174	177	10	12	11	5	6	5	378	376	363
2	13	084455	2	0.0054	26	24	30	134	166	142	13	11	12	8	9	7	380	354	360
2	13	084455	2	0.0108	39	32	33	190	203	156	9	12	11	6	10	9	368	351	383
2	17	084455	3	0	23	22	20	190	168	167	8	9	11	7	9	10	370	351	348
2	17	084455	3	0.0005	29	24	27	192	154	176	15	12	16	6	5	6	358	352	358
2	17	084455	3	0.0011	29	25	23	209	222	142	14	19	14	5	7	5	356	371	361
2	17	084455	3	0.0016	20	22	30	204	189	167	16	14	12	10	7	7	340	364	366
2	17	084455	3	0.0022	29	20	24	181	159	159	13	14	15	8	6	6	373	362	357
2	17	084455	3	0.0027	23	25	28	156	177	162	8	17	16	6	5	7	350	351	342
2	17	084455	3	0.0054	27	30	23	162	152	159	10	13	9	6	7	7	339	354	373
2	17	084455	3	0.0108	28	30	32	141	130	161	16	11	13	7	5	5	370	341	369

**Mutagenesis in *Salmonella typhimurium* without (-) S9 Metabolic Activation  
(Revertants per plate)**

Set Number	Run Number	Sample ID	Replicate Number	Unit of Use Dose ('units'/plate)	TA98 (-S9)			TA100 (-S9)			TA1535 (-S9)			TA1537 (-S9)			TA102 (-S9)		
					P1	P2	P3	P1	P2	P3	P1	P2	P3	P1	P2	P3	P1	P2	P3
2	3	084456	1	0	24	27	20	167	174	122	16	15	12	7	5	8	290	274	269
2	3	084456	1	0.0001	23	27	28	187	146	132	14	17	13	11	14	8	261	287	279
2	3	084456	1	0.0002	32	26	33	159	176	190	18	14	15	10	9	9	278	281	266
2	3	084456	1	0.0003	20	31	39	162	168	176	14	11	14	6	8	7	263	264	279
2	3	084456	1	0.0004	28	34	32	180	187	160	13	12	10	12	6	12	290	287	306
2	3	084456	1	0.0006	22	28	27	194	184	181	12	15	14	12	9	10	279	280	276
2	3	084456	1	0.0011	26	25	28	203	234	182	12	11	15	9	8	7	287	283	281
2	3	084456	1	0.0022	26	32	27	204	194	169	19	15	17	5	13	11	260	273	291
2	7	084456	2	0	26	23	28	174	164	194	10	8	11	6	5	5	276	286	272
2	7	084456	2	0.0001	27	26	22	153	168	190	13	10	11	10	9	8	277	266	253
2	7	084456	2	0.0002	32	24	31	154	158	189	10	15	12	9	9	11	274	253	251
2	7	084456	2	0.0003	27	24	33	199	159	166	17	10	12	8	8	10	302	292	288
2	7	084456	2	0.0004	24	22	24	173	163	193	8	16	9	7	10	9	286	NA	268
2	7	084456	2	0.0006	24	26	31	204	196	203	10	18	11	7	6	6	278	286	293
2	7	084456	2	0.0011	25	27	25	202	164	134	16	15	19	7	8	9	281	273	278
2	7	084456	2	0.0022	29	26	28	141	166	150	13	14	18	5	5	7	303	300	300
2	9	084456	3	0	26	20	23	138	139	172	10	8	11	7	8	5	294	301	282
2	9	084456	3	0.0001	27	22	25	157	162	200	13	11	13	9	8	6	311	283	278
2	9	084456	3	0.0002	26	33	27	193	178	164	15	13	11	7	8	6	289	256	278
2	9	084456	3	0.0003	28	26	29	155	179	171	11	12	14	8	8	5	286	314	302
2	9	084456	3	0.0004	34	30	31	177	174	172	14	13	13	9	5	6	396	362	364
2	9	084456	3	0.0006	23	29	28	182	188	176	13	14	10	6	12	6	352	370	331
2	9	084456	3	0.0011	27	24	22	189	162	172	16	18	14	6	9	6	357	369	351
2	9	084456	3	0.0022	23	34	32	173	150	179	16	17	14	9	9	10	365	388	370
2	8	084457	1	0	37	30	38	174	156	147	6	12	10	6	6	5	287	283	267
2	8	084457	1	0.0010	27	21	20	149	163	157	14	11	10	7	5	7	266	243	236
2	8	084457	1	0.0020	31	26	32	117	140	112	9	12	11	5	8	7	263	286	273
2	8	084457	1	0.0030	27	26	23	82	93	98	14	16	12	5	6	11	282	291	271
2	8	084457	1	0.0040	23	33	26	174	123	162	17	15	11	5	7	6	274	262	253
2	8	084457	1	0.0050	27	32	28	169	172	181	13	18	14	7	5	5	249	234	236
2	8	084457	1	0.0099	32	31	26	182	179	189	9	13	15	5	6	6	248	250	242
2	8	084457	1	0.0198	28	24	27	177	172	193	8	9	14	5	9	6	257	240	246
2	12	084457	2	0	32	31	28	173	163	177	11	13	10	6	5	8	360	347	342
2	12	084457	2	0.0010	29	27	28	182	180	178	10	16	10	7	9	6	381	353	349
2	12	084457	2	0.0020	28	31	24	183	178	176	12	11	15	7	8	6	359	357	372
2	12	084457	2	0.0030	29	30	33	172	169	183	11	14	13	12	9	11	372	368	368
2	12	084457	2	0.0040	35	25	29	179	153	202	11	14	10	7	7	10	387	366	384
2	12	084457	2	0.0050	29	27	34	193	156	177	17	15	13	7	8	10	367	344	358
2	12	084457	2	0.0099	34	28	36	149	143	164	11	14	11	7	5	5	328	324	346
2	12	084457	2	0.0198	24	32	24	102	117	119	18	17	15	5	6	5	330	319	322
2	15	084457	3	0	27	30	31	162	160	148	12	12	14	10	9	9	339	365	348
2	15	084457	3	0.0010	33	31	20	158	197	168	8	16	10	13	10	11	339	338	348
2	15	084457	3	0.0020	20	24	26	160	158	141	15	19	17	11	11	10	346	361	334
2	15	084457	3	0.0030	27	21	22	133	159	128	13	8	9	10	10	11	363	367	358
2	15	084457	3	0.0040	24	30	31	148	182	148	8	7	8	5	5	6	342	359	347
2	15	084457	3	0.0050	21	28	27	178	151	146	8	8	7	7	6	8	339	358	356
2	15	084457	3	0.0099	33	24	28	127	127	124	9	7	8	8	6	8	329	341	344
2	15	084457	3	0.0198	38	23	29	82	92	96	21	7	7	12	13	13	342	332	369

**Mutagenesis in *Salmonella typhimurium* without (-) S9 Metabolic Activation  
(Revertants per plate)**

Set Number	Run Number	Sample ID	Replicate Number	Unit of Use Dose (units/plate)	TA98 (-S9)			TA100 (-S9)			TA1535 (-S9)			TA1537 (-S9)			TA102 (-S9)		
					P1	P2	P3	P1	P2	P3	P1	P2	P3	P1	P2	P3	P1	P2	P3
2	2	084458	1	0	29	27	20	177	163	143	9	11	13	6	6	7	293	289	299
2	2	084458	1	0.0012	33	24	29	174	191	161	11	14	10	5	5	6	284	297	289
2	2	084458	1	0.0025	20	22	21	147	134	160	13	11	14	7	5	5	292	282	271
2	2	084458	1	0.0037	22	27	20	187	160	184	14	16	17	8	7	6	279	276	272
2	2	084458	1	0.0049	31	28	30	158	154	169	16	17	14	7	12	7	252	260	260
2	2	084458	1	0.0062	28	26	27	154	147	168	16	14	18	6	6	12	263	238	264
2	2	084458	1	0.0124	28	21	20	152	133	147	16	15	18	6	10	9	218	228	191
2	2	084458	1	0.0247	30	23	25	149	143	166	16	17	18	6	5	8	186	200	210
2	10	084458	2	0	23	22	30	180	178	184	8	11	7	11	7	7	302	303	335
2	10	084458	2	0.0012	30	31	22	183	177	188	10	16	11	6	10	8	362	344	356
2	10	084458	2	0.0025	22	20	24	172	177	173	14	13	11	6	6	9	379	380	366
2	10	084458	2	0.0037	28	38	25	149	168	199	10	8	13	8	6	8	374	387	372
2	10	084458	2	0.0049	24	30	33	149	172	154	17	11	16	7	7	9	363	336	342
2	10	084458	2	0.0062	26	27	23	171	164	141	16	13	16	13	10	11	367	337	356
2	10	084458	2	0.0123	32	22	28	144	147	152	17	14	16	7	8	8	336	360	346
2	10	084458	2	0.0247	30	22	33	141	133	119	16	15	17	10	8	11	351	364	374
2	16	084458	3	0	32	29	39	139	138	171	7	8	10	7	8	8	358	343	343
2	16	084458	3	0.0012	36	22	21	149	140	138	12	7	11	7	6	7	363	356	361
2	16	084458	3	0.0025	26	31	29	160	180	166	14	10	15	7	8	7	356	352	348
2	16	084458	3	0.0037	20	22	27	177	164	87	10	12	10	6	7	6	362	348	367
2	16	084458	3	0.0049	28	21	25	179	138	166	12	9	14	14	12	11	357	328	340
2	16	084458	3	0.0062	34	22	29	188	132	164	9	12	14	7	5	9	333	330	347
2	16	084458	3	0.0123	23	27	30	159	156	161	8	9	12	6	6	8	364	338	342
2	16	084458	3	0.0247	29	27	30	134	117	159	9	15	11	5	7	7	372	358	384

N/A - data not available due to lack of bacterial growth or assay plate contamination

**Mutagenesis in *Salmonella typhimurium* with (+) S9 Metabolic Activation**  
**(Average No. of Revertants per plate)\***

Set Number	Run Number	Sample ID	Replicate Number	Unit of Use Dose ('units'/plate)	TA98 (+S9)		TA100 (+S9)		TA1535 (+S9)		TA1537 (+S9)		TA102 (+S9)	
					Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD
1	3	084394	1	0	39	6	147	5	14	4	6	2	300	10
1	3	084394	1	0.0005	38	6	151	11	9	3	7	1	327	2
1	3	084394	1	0.0009	38	6	150	17	11	3	10	2	329	2
1	3	084394	1	0.0014	39	3	156	14	11	3	8	2	339	8
1	3	084394	1	0.0019	38	1	158	10	14	3	11	2	352	4
1	3	084394	1	0.0023	33	2	144	12	13	4	9	1	347	7
1	3	084394	1	0.0046	34	6	143	2	12	4	15	3	365	9
1	3	084394	1	0.0093	44	4	156	8	12	2	13	3	366	3
1	4	084394	2	0	30	12	152	10	15	2	6	1	242	20
1	4	084394	2	0.0005	31	12	143	13	13	1	9	2	241	13
1	4	084394	2	0.0009	27	11	145	11	13	4	7	2	239	9
1	4	084394	2	0.0014	30	10	145	2	13	1	9	2	254	5
1	4	084394	2	0.0019	40	9	176	9	14	2	9	1	301	2
1	4	084394	2	0.0023	36	5	159	15	11	3	11	3	314	12
1	4	084394	2	0.0046	39	2	150	12	13	3	12	2	320	4
1	4	084394	2	0.0093	37	7	160	11	17	3	14	3	295	8
1	7	084394	3	0	32	2	154	6	11	1	9	1	301	5
1	7	084394	3	0.0005	30	4	153	9	12	7	10	3	327	3
1	7	084394	3	0.0009	32	4	160	8	15	1	9	1	329	4
1	7	084394	3	0.0014	31	4	162	6	13	3	10	2	349	14
1	7	084394	3	0.0019	40	5	175	18	12	2	11	4	353	7
1	7	084394	3	0.0023	33	6	177	9	10	3	12	1	362	9
1	7	084394	3	0.0046	22	8	173	5	13	1	13	2	328	4
1	7	084394	3	0.0093	27	1	184	12	6	2	16	3	339	6
1	2	084395	1	0	31	4	157	6	12	4	7	1	302	14
1	2	084395	1	0.0001	30	11	150	9	14	5	10	1	349	10
1	2	084395	1	0.0002	27	5	145	13	12	4	12	1	351	6
1	2	084395	1	0.0003	27	1	162	11	15	2	13	2	365	10
1	2	084395	1	0.0004	37	10	168	9	13	4	18	2	359	8
1	2	084395	1	0.0006	41	6	144	6	10	6	17	2	353	6
1	2	084395	1	0.0011	37	9	161	1	11	2	18	1	347	16
1	2	084395	1	0.0022	44	4	167	13	15	3	19	1	348	9
1	5	084395	2	0	42	5	150	15	15	3	8	1	297	9
1	5	084395	2	0.0001	31	3	137	5	11	4	9	1	312	3
1	5	084395	2	0.0002	31	1	151	13	13	2	7	1	309	4
1	5	084395	2	0.0003	34	6	168	14	12	2	11	1	309	9
1	5	084395	2	0.0004	39	1	174	6	13	5	11	3	312	12
1	5	084395	2	0.0006	41	3	160	9	12	3	10	2	298	7
1	5	084395	2	0.0011	37	2	176	6	13	2	12	2	303	7
1	5	084395	2	0.0022	37	5	214	6	14	2	14	2	333	9
1	6	084395	3	0	35	5	165	13	10	2	6	1	311	2
1	6	084395	3	0.0001	25	4	167	17	12	5	7	1	316	1
1	6	084395	3	0.0002	28	3	168	7	13	4	8	1	314	3
1	6	084395	3	0.0003	27	5	174	12	10	3	9	1	335	7
1	6	084395	3	0.0004	44	4	177	16	10	4	10	2	327	8
1	6	084395	3	0.0006	35	4	140	3	12	4	9	2	333	6
1	6	084395	3	0.0011	36	3	153	6	11	3	10	3	338	8
1	6	084395	3	0.0022	42	2	183	6	11	1	12	2	327	7

**Mutagenesis in *Salmonella typhimurium* with (+) S9 Metabolic Activation**  
**(Average No. of Revertants per plate)\***

Set Number	Run Number	Sample ID	Replicate Number	Unit of Use Dose ('units'/plate)	TA98 (+S9)		TA100 (+S9)		TA1535 (+S9)		TA1537 (+S9)		TA102 (+S9)	
					Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD
2	4	084454	1	0	29	3	93	9	15	5	11	3	308	6
2	4	084454	1	0.0022	28	4	98	3	11	2	6	1	304	9
2	4	084454	1	0.0044	26	5	104	9	14	4	8	1	289	18
2	4	084454	1	0.0067	29	3	106	8	9	2	9	2	301	11
2	4	084454	1	0.0089	24	3	118	12	13	3	6	1	296	15
2	4	084454	1	0.0111	23	3	117	8	12	3	8	2	316	5
2	4	084454	1	0.0222	28	3	114	7	14	7	12	4	309	15
2	4	084454	1	0.0445	25	3	121	4	15	4	8	1	306	7
2	6	084454	2	0	25	2	91	5	14	4	10	1	303	14
2	6	084454	2	0.0022	27	5	92	4	16	3	10	2	307	3
2	6	084454	2	0.0044	22	1	94	6	17	1	11	2	293	3
2	6	084454	2	0.0067	21	4	100	9	14	6	8	1	298	6
2	6	084454	2	0.0089	24	1	104	5	13	3	10	4	307	12
2	6	084454	2	0.0111	22	2	107	3	17	4	11	1	291	17
2	6	084454	2	0.0222	27	3	119	4	17	4	10	2	277	10
2	6	084454	2	0.0445	26	1	113	2	16	2	9	3	289	9
2	14	084454	3	0	29	7	95	5	19	2	8	1	303	6
2	14	084454	3	0.0022	29	5	100	6	15	3	14	1	284	12
2	14	084454	3	0.0044	22	1	102	7	14	2	6	1	291	16
2	14	084454	3	0.0067	22	0	103	7	12	5	6	1	291	8
2	14	084454	3	0.0089	27	5	112	5	12	2	7	1	289	5
2	14	084454	3	0.0111	22	4	113	9	12	5	8	1	286	3
2	14	084454	3	0.0222	21	2	92	9	12	4	7	2	301	10
2	14	084454	3	0.0445	22	1	100	4	14	3	7	1	294	17
2	5	084455	1	0	30	6	84	5	12	2	8	2	303	7
2	5	084455	1	0.0005	22	2	89	4	14	4	12	3	289	9
2	5	084455	1	0.0011	30	6	91	3	9	1	9	2	297	11
2	5	084455	1	0.0016	27	6	94	6	9	1	11	2	303	12
2	5	084455	1	0.0022	28	2	106	7	12	1	13	2	304	17
2	5	084455	1	0.0027	22	2	108	9	12	4	10	2	311	14
2	5	084455	1	0.0054	25	5	117	7	10	4	8	2	314	9
2	5	084455	1	0.0108	22	1	100	7	12	2	9	1	314	11
2	13	084455	2	0	25	7	92	6	15	3	5	1	302	11
2	13	084455	2	0.0005	22	2	100	6	13	1	7	2	309	3
2	13	084455	2	0.0011	22	5	102	5	14	4	7	2	292	10
2	13	084455	2	0.0016	28	10	109	5	15	3	6	1	294	11
2	13	084455	2	0.0022	30	5	122	7	15	4	8	2	294	9
2	13	084455	2	0.0027	25	3	114	7	13	4	6	1	299	10
2	13	084455	2	0.0054	28	2	117	9	12	4	5	1	297	13
2	13	084455	2	0.0108	24	3	108	9	10	4	8	2	310	5
2	17	084455	3	0	21	1	94	5	12	2	8	1	278	5
2	17	084455	3	0.0005	23	3	100	5	11	1	9	1	281	5
2	17	084455	3	0.0011	25	5	103	6	13	3	8	1	282	8
2	17	084455	3	0.0016	26	5	115	4	15	3	7	1	264	8
2	17	084455	3	0.0022	26	5	104	1	12	2	7	1	274	8
2	17	084455	3	0.0027	23	2	113	7	13	1	6	1	296	12
2	17	084455	3	0.0054	25	4	119	8	16	4	8	1	290	13
2	17	084455	3	0.0108	29	1	114	7	11	2	11	2	290	14

**Mutagenesis in *Salmonella typhimurium* with (+) S9 Metabolic Activation**  
**(Average No. of Revertants per plate)\***

Set Number	Run Number	Sample ID	Replicate Number	Unit of Use Dose ('units'/plate)	TA98 (+S9)		TA100 (+S9)		TA1535 (+S9)		TA1537 (+S9)		TA102 (+S9)	
					Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD
2	3	084456	1	0	29	4	84	3	10	4	8	1	280	11
2	3	084456	1	0.0001	23	3	88	1	14	3	9	1	271	18
2	3	084456	1	0.0002	25	5	86	5	14	4	11	2	305	15
2	3	084456	1	0.0003	25	3	94	7	11	1	8	2	296	2
2	3	084456	1	0.0004	21	2	102	8	13	3	13	1	302	19
2	3	084456	1	0.0006	30	4	113	8	9	2	11	1	318	13
2	3	084456	1	0.0011	26	3	118	5	10	3	15	1	305	16
2	3	084456	1	0.0022	41	8	102	11	14	4	13	1	330	14
2	7	084456	2	0	24	6	89	4	16	5	7	2	292	9
2	7	084456	2	0.0001	22	3	95	5	13	2	8	1	302	5
2	7	084456	2	0.0002	23	1	100	3	12	1	10	1	305	15
2	7	084456	2	0.0003	22	2	105	10	17	4	8	2	307	17
2	7	084456	2	0.0004	29	5	128	9	12	2	13	2	305	6
2	7	084456	2	0.0006	24	1	118	9	14	3	10	2	294	16
2	7	084456	2	0.0011	26	7	108	5	15	5	12	1	288	9
2	7	084456	2	0.0022	38	5	115	8	15	3	11	3	316	4
2	9	084456	3	0	21	1	91	7	13	5	6	1	291	12
2	9	084456	3	0.0001	24	5	95	4	12	1	9	1	304	7
2	9	084456	3	0.0002	20	1	106	3	12	2	9	2	289	3
2	9	084456	3	0.0003	24	5	107	5	15	7	9	1	293	8
2	9	084456	3	0.0004	26	9	112	7	14	3	11	1	277	4
2	9	084456	3	0.0006	21	2	118	2	13	4	13	1	311	5
2	9	084456	3	0.0011	24	4	100	4	13	2	8	1	306	18
2	9	084456	3	0.0022	32	4	93	8	12	2	15	2	314	13
2	8	084457	1	0	23	3	89	4	12	2	7	2	286	11
2	8	084457	1	0.0010	23	3	101	6	11	2	7	1	296	4
2	8	084457	1	0.0020	20	3	114	4	12	1	10	2	305	7
2	8	084457	1	0.0030	25	1	120	4	14	4	12	3	308	9
2	8	084457	1	0.0040	28	5	122	5	13	5	8	0	290	10
2	8	084457	1	0.0050	23	3	103	5	14	4	11	3	312	6
2	8	084457	1	0.0099	24	6	115	9	15	2	6	2	291	6
2	8	084457	1	0.0198	25	3	109	3	18	2	7	3	285	4
2	12	084457	2	0	27	6	94	4	10	4	6	1	288	9
2	12	084457	2	0.0010	25	4	96	5	13	3	6	1	293	11
2	12	084457	2	0.0020	24	5	99	6	13	4	5	0	300	7
2	12	084457	2	0.0030	22	4	106	7	14	5	7	1	309	9
2	12	084457	2	0.0040	21	2	103	4	11	2	9	1	280	12
2	12	084457	2	0.0050	21	2	109	9	12	5	8	1	281	14
2	12	084457	2	0.0099	21	2	104	9	11	3	7	2	278	22
2	12	084457	2	0.0198	21	2	113	1	17	4	9	2	294	5
2	15	084457	3	0	31	3	93	6	10	3	9	1	301	8
2	15	084457	3	0.0010	26	3	97	4	15	4	8	2	299	6
2	15	084457	3	0.0020	32	4	106	7	12	1	5	1	298	5
2	15	084457	3	0.0030	25	3	104	2	15	4	12	3	293	12
2	15	084457	3	0.0040	28	5	107	9	11	2	10	1	310	13
2	15	084457	3	0.0050	23	3	110	9	13	7	6	1	297	16
2	15	084457	3	0.0099	26	4	103	7	8	2	7	2	295	9
2	15	084457	3	0.0198	23	3	103	10	8	2	7	1	291	13

**Mutagenesis in *Salmonella typhimurium* with (+) S9 Metabolic Activation**  
**(Average No. of Revertants per plate)\***

Set Number	Run Number	Sample ID	Replicate Number	Unit of Use Dose ('units'/plate)	TA98 (+S9)		TA100 (+S9)		TA1535 (+S9)		TA1537 (+S9)		TA102 (+S9)	
					Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD
2	2	084458	1	0	25	5	94	8	11	2	10	1	263	8
2	2	084458	1	0.0012	25	5	101	6	13	2	8	2	260	7
2	2	084458	1	0.0025	26	0	102	5	12	1	8	3	325	5
2	2	084458	1	0.0037	23	4	96	4	11	2	11	1	336	15
2	2	084458	1	0.0049	27	9	100	10	14	4	9	3	238	11
2	2	084458	1	0.0062	25	4	107	10	11	2	13	4	202	2
2	2	084458	1	0.0124	26	3	100	8	11	1	11	3	226	10
2	2	084458	1	0.0247	25	3	94	7	14	3	17	5	227	8
2	10	084458	2	0	24	4	92	2	15	2	7	2	289	8
2	10	084458	2	0.0012	25	4	96	5	13	3	6	2	292	10
2	10	084458	2	0.0025	23	6	100	9	9	1	7	3	284	18
2	10	084458	2	0.0037	25	6	106	9	11	1	6	2	292	14
2	10	084458	2	0.0049	23	5	102	4	8	1	10	3	290	11
2	10	084458	2	0.0062	23	3	102	3	9	1	9	1	300	17
2	10	084458	2	0.0123	21	1	99	6	10	1	7	2	304	5
2	10	084458	2	0.0247	21	1	98	8	12	2	6	1	293	8
2	16	084458	3	0	21	2	90	6	17	3	8	1	285	14
2	16	084458	3	0.0012	21	3	95	3	15	3	7	1	285	10
2	16	084458	3	0.0025	21	1	97	3	14	3	6	1	278	21
2	16	084458	3	0.0037	22	2	104	7	13	3	5	1	285	8
2	16	084458	3	0.0049	25	3	109	7	13	4	9	1	267	11
2	16	084458	3	0.0062	26	2	112	9	13	3	11	1	258	9
2	16	084458	3	0.0123	32	4	108	3	12	1	6	1	250	14
2	16	084458	3	0.0247	29	3	96	8	12	2	8	1	242	9

\*Values represent the mean number of revertants (average of three plates)

**Mutagenesis in *Salmonella typhimurium* without (-) S9 Metabolic Activation  
(Average No. of Revertants per plate)\***

Set Number	Run Number	Sample ID	Replicate Number	Unit of Use Dose ('units'/plate)	TA98 (-S9)		TA100 (-S9)		TA1535 (-S9)		TA1537 (-S9)		TA102 (-S9)	
					Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD
1	3	084394	1	0	26	5	160	7	10	2	8	1	284	9
1	3	084394	1	0.0005	28	1	169	4	14	2	11	2	328	9
1	3	084394	1	0.0009	30	8	155	6	13	2	12	2	296	10
1	3	084394	1	0.0014	26	2	164	7	17	1	12	2	299	9
1	3	084394	1	0.0019	27	6	176	13	14	3	14	1	299	7
1	3	084394	1	0.0023	23	2	152	9	17	3	14	2	298	4
1	3	084394	1	0.0046	22	1	153	6	14	3	14	4	304	7
1	3	084394	1	0.0093	27	2	180	2	13	7	16	1	286	2
1	4	084394	2	0	22	2	147	3	14	3	7	1	282	6
1	4	084394	2	0.0005	28	4	151	14	14	1	10	2	285	2
1	4	084394	2	0.0009	25	4	153	15	14	4	11	1	282	5
1	4	084394	2	0.0014	26	6	152	7	17	5	12	4	304	10
1	4	084394	2	0.0019	30	3	153	9	16	5	11	2	274	2
1	4	084394	2	0.0023	30	9	153	4	12	4	9	1	299	7
1	4	084394	2	0.0046	25	1	154	6	16	6	11	2	297	9
1	4	084394	2	0.0093	32	4	176	6	20	4	14	2	272	4
1	7	084394	3	0	24	4	144	15	16	3	6	1	284	13
1	7	084394	3	0.0005	25	2	143	13	19	1	7	1	312	9
1	7	084394	3	0.0009	24	4	159	8	17	4	9	2	324	6
1	7	084394	3	0.0014	29	4	153	8	17	1	9	1	329	11
1	7	084394	3	0.0019	29	7	146	11	18	3	9	2	311	17
1	7	084394	3	0.0023	24	5	155	7	16	2	12	2	304	11
1	7	084394	3	0.0046	24	3	181	5	17	4	12	2	327	4
1	7	084394	3	0.0093	29	6	177	9	14	2	7	1	294	27
1	2	084395	1	0	25	5	139	14	17	3	8	1	279	8
1	2	084395	1	0.0001	23	5	153	8	13	6	7	1	300	3
1	2	084395	1	0.0002	21	2	145	10	22	1	9	1	291	7
1	2	084395	1	0.0003	23	1	159	6	14	3	8	1	290	6
1	2	084395	1	0.0004	26	2	146	14	12	2	11	3	271	6
1	2	084395	1	0.0006	23	1	152	10	16	2	11	2	297	7
1	2	084395	1	0.0011	24	5	156	9	10	2	14	2	301	9
1	2	084395	1	0.0022	26	1	143	8	17	4	17	2	294	2
1	5	084395	2	0	27	7	145	4	14	6	6	1	272	6
1	5	084395	2	0.0001	28	2	151	14	17	2	9	1	294	5
1	5	084395	2	0.0002	23	3	153	15	16	6	11	4	323	16
1	5	084395	2	0.0003	22	3	152	7	16	6	10	1	312	3
1	5	084395	2	0.0004	26	7	159	10	16	4	13	2	298	7
1	5	084395	2	0.0006	24	4	159	12	16	4	10	2	292	9
1	5	084395	2	0.0011	22	2	167	9	15	1	13	5	320	9
1	5	084395	2	0.0022	24	5	171	15	18	2	11	2	320	7
1	6	084395	3	0	23	6	146	11	14	5	6	1	297	6
1	6	084395	3	0.0001	21	1	146	11	15	5	8	2	301	5
1	6	084395	3	0.0002	22	3	144	9	16	4	10	2	314	6
1	6	084395	3	0.0003	21	2	146	9	17	2	8	1	312	13
1	6	084395	3	0.0004	26	5	150	5	15	6	8	2	280	8
1	6	084395	3	0.0006	26	9	155	10	14	2	9	1	308	3
1	6	084395	3	0.0011	20	1	165	11	18	3	9	2	316	9
1	6	084395	3	0.0022	21	1	173	10	20	3	6	1	370	11



**Mutagenesis in *Salmonella typhimurium* without (-) S9 Metabolic Activation  
(Average No. of Revertants per plate)\***

Set Number	Run Number	Sample ID	Replicate Number	Unit of Use Dose ('units'/plate)	TA98 (-S9)		TA100 (-S9)		TA1535 (-S9)		TA1537 (-S9)		TA102 (-S9)	
					Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD
2	4	084454	1	0	26	2	172	9	10	3	11	1	284	3
2	4	084454	1	0.0022	24	4	206	18	13	2	11	3	280	8
2	4	084454	1	0.0044	28	3	202	34	11	1	7	2	295	9
2	4	084454	1	0.0067	25	5	193	11	14	1	5	1	306	14
2	4	084454	1	0.0089	30	2	184	14	12	1	7	1	276	11
2	4	084454	1	0.0111	22	2	154	10	12	2	12	1	280	11
2	4	084454	1	0.0222	28	7	160	24	13	2	9	3	288	3
2	4	084454	1	0.0445	30	2	175	15	11	1	9	1	282	8
2	6	084454	2	0	27	3	177	36	9	3	8	1	256	9
2	6	084454	2	0.0022	29	2	162	29	12	2	5	0	257	6
2	6	084454	2	0.0044	31	3	175	15	11	1	8	1	227	12
2	6	084454	2	0.0067	23	2	174	6	14	2	6	1	276	15
2	6	084454	2	0.0089	33	4	174	22	13	3	10	1	275	4
2	6	084454	2	0.0111	26	6	177	5	14	4	8	1	286	5
2	6	084454	2	0.0222	27	4	148	35	14	3	9	1	273	8
2	6	084454	2	0.0445	28	4	186	16	15	2	8	1	285	12
2	14	084454	3	0	23	3	170	2	10	3	7	3	314	12
2	14	084454	3	0.0022	22	2	167	21	12	2	6	1	314	7
2	14	084454	3	0.0044	25	4	164	20	12	2	11	2	323	11
2	14	084454	3	0.0067	30	6	151	17	15	1	12	1	343	16
2	14	084454	3	0.0089	28	2	179	4	14	3	8	1	352	13
2	14	084454	3	0.0111	28	8	182	13	15	3	7	1	380	8
2	14	084454	3	0.0222	26	4	170	29	13	3	10	1	383	12
2	14	084454	3	0.0445	30	4	142	8	12	2	8	1	374	14
2	5	084455	1	0	24	3	181	4	14	3	7	2	284	5
2	5	084455	1	0.0005	23	2	160	7	11	2	6	1	293	5
2	5	084455	1	0.0011	22	2	153	6	10	4	10	2	277	5
2	5	084455	1	0.0016	26	3	179	10	10	2	7	1	266	9
2	5	084455	1	0.0022	30	2	195	2	7	1	8	3	288	11
2	5	084455	1	0.0027	30	7	203	15	8	1	7	2	309	9
2	5	084455	1	0.0054	27	5	187	7	7	0	7	1	289	4
2	5	084455	1	0.0108	32	6	146	15	8	1	8	2	272	5
2	13	084455	2	0	32	5	165	4	8	1	8	2	335	10
2	13	084455	2	0.0005	23	3	179	30	11	1	11	3	353	17
2	13	084455	2	0.0011	28	3	169	12	12	2	11	3	373	12
2	13	084455	2	0.0016	25	3	185	7	12	2	10	1	348	2
2	13	084455	2	0.0022	30	7	207	20	14	2	7	1	368	13
2	13	084455	2	0.0027	27	3	186	18	11	1	5	1	372	8
2	13	084455	2	0.0054	27	3	147	17	12	1	8	1	365	14
2	13	084455	2	0.0108	35	4	183	24	11	2	8	2	367	16
2	17	084455	3	0	22	2	175	13	9	2	9	2	356	12
2	17	084455	3	0.0005	27	3	174	19	14	2	6	1	356	3
2	17	084455	3	0.0011	26	3	191	43	16	3	6	1	363	8
2	17	084455	3	0.0016	24	5	187	19	14	2	8	2	357	14
2	17	084455	3	0.0022	24	5	166	13	14	1	7	1	364	8
2	17	084455	3	0.0027	25	3	165	11	14	5	6	1	348	5
2	17	084455	3	0.0054	27	4	158	5	11	2	7	1	355	17
2	17	084455	3	0.0108	30	2	144	16	13	3	6	1	360	16

**Mutagenesis in *Salmonella typhimurium* without (-) S9 Metabolic Activation**  
**(Average No. of Revertants per plate)\***

Set Number	Run Number	Sample ID	Replicate Number	Unit of Use Dose ('units'/plate)	TA98 (-S9)		TA100 (-S9)		TA1535 (-S9)		TA1537 (-S9)		TA102 (-S9)	
					Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD
2	3	084456	1	0	24	4	154	28	14	2	7	2	278	11
2	3	084456	1	0.0001	26	3	155	29	15	2	11	3	276	13
2	3	084456	1	0.0002	30	4	175	16	16	2	9	1	275	8
2	3	084456	1	0.0003	30	10	169	7	13	2	7	1	269	9
2	3	084456	1	0.0004	31	3	176	14	12	2	10	3	294	10
2	3	084456	1	0.0006	26	3	186	7	14	2	10	2	278	2
2	3	084456	1	0.0011	26	2	206	26	13	2	8	1	284	3
2	3	084456	1	0.0022	28	3	189	18	17	2	10	4	275	16
2	7	084456	2	0	26	3	177	15	10	2	5	1	278	7
2	7	084456	2	0.0001	25	3	170	19	11	2	9	1	265	12
2	7	084456	2	0.0002	29	4	167	19	12	3	10	1	259	13
2	7	084456	2	0.0003	28	5	175	21	13	4	9	1	294	7
2	7	084456	2	0.0004	23	1	176	15	11	4	9	2	277	13
2	7	084456	2	0.0006	27	4	201	4	13	4	6	1	286	8
2	7	084456	2	0.0011	26	1	167	34	17	2	8	1	277	4
2	7	084456	2	0.0022	28	2	152	13	15	3	6	1	301	2
2	9	084456	3	0	23	3	150	19	10	2	7	2	292	10
2	9	084456	3	0.0001	25	3	173	24	12	1	8	2	291	18
2	9	084456	3	0.0002	29	4	178	15	13	2	7	1	274	17
2	9	084456	3	0.0003	28	2	168	12	12	2	7	2	301	14
2	9	084456	3	0.0004	32	2	174	3	13	1	7	2	374	19
2	9	084456	3	0.0006	27	3	182	6	12	2	8	3	351	20
2	9	084456	3	0.0011	24	3	174	14	16	2	7	2	359	9
2	9	084456	3	0.0022	30	6	167	15	16	2	9	1	374	12
2	8	084457	1	0	35	4	159	14	9	3	6	1	279	11
2	8	084457	1	0.0010	23	4	156	7	12	2	6	1	248	16
2	8	084457	1	0.0020	30	3	123	15	11	2	7	2	274	12
2	8	084457	1	0.0030	25	2	91	8	14	2	7	3	281	10
2	8	084457	1	0.0040	27	5	153	27	14	3	6	1	263	11
2	8	084457	1	0.0050	29	3	174	6	15	3	6	1	240	8
2	8	084457	1	0.0099	30	3	183	5	12	3	6	1	247	4
2	8	084457	1	0.0198	26	2	181	11	10	3	7	2	248	9
2	12	084457	2	0	30	2	171	7	11	2	6	2	350	9
2	12	084457	2	0.0010	28	1	180	2	12	3	7	2	361	17
2	12	084457	2	0.0020	28	4	179	4	13	2	7	1	363	8
2	12	084457	2	0.0030	31	2	175	7	13	2	11	2	369	2
2	12	084457	2	0.0040	30	5	178	25	12	2	8	2	379	11
2	12	084457	2	0.0050	30	4	175	19	15	2	8	2	356	12
2	12	084457	2	0.0099	33	4	152	11	12	2	6	1	333	12
2	12	084457	2	0.0198	27	5	113	9	17	2	5	1	324	6
2	15	084457	3	0	29	2	157	8	13	1	9	1	351	13
2	15	084457	3	0.0010	28	7	174	20	11	4	11	2	342	6
2	15	084457	3	0.0020	23	3	153	10	17	2	11	1	347	14
2	15	084457	3	0.0030	23	3	140	17	10	3	10	1	363	5
2	15	084457	3	0.0040	28	4	159	20	8	1	5	1	349	9
2	15	084457	3	0.0050	25	4	158	17	8	1	7	1	351	10
2	15	084457	3	0.0099	28	5	126	2	8	1	7	1	338	8
2	15	084457	3	0.0198	30	8	90	7	12	8	13	1	348	19

**Mutagenesis in *Salmonella typhimurium* without (-) S9 Metabolic Activation**  
**(Average No. of Revertants per plate)\***

Set Number	Run Number	Sample ID	Replicate Number	Unit of Use Dose ('units'/plate)	TA98 (-S9)		TA100 (-S9)		TA1535 (-S9)		TA1537 (-S9)		TA102 (-S9)	
					Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD
2	2	084458	1	0	25	5	161	17	11	2	6	1	294	5
2	2	084458	1	0.0012	29	5	175	15	12	2	5	1	290	7
2	2	084458	1	0.0025	21	1	147	13	13	2	6	1	282	11
2	2	084458	1	0.0037	23	4	177	15	16	2	7	1	276	4
2	2	084458	1	0.0049	30	2	160	8	16	2	9	3	257	5
2	2	084458	1	0.0062	27	1	156	11	16	2	8	3	255	15
2	2	084458	1	0.0124	23	4	144	10	16	2	8	2	212	19
2	2	084458	1	0.0247	26	4	153	12	17	1	6	2	199	12
2	10	084458	2	0	25	4	181	3	9	2	8	2	313	19
2	10	084458	2	0.0012	28	5	183	6	12	3	8	2	354	9
2	10	084458	2	0.0025	22	2	174	3	13	2	7	2	375	8
2	10	084458	2	0.0037	30	7	172	25	10	3	7	1	378	8
2	10	084458	2	0.0049	29	5	158	12	15	3	8	1	347	14
2	10	084458	2	0.0062	25	2	159	16	15	2	11	2	353	15
2	10	084458	2	0.0123	27	5	148	4	16	2	8	1	347	12
2	10	084458	2	0.0247	28	6	131	11	16	1	10	2	363	12
2	16	084458	3	0	33	5	149	19	8	2	8	1	348	9
2	16	084458	3	0.0012	26	8	142	6	10	3	7	1	360	4
2	16	084458	3	0.0025	29	3	169	10	13	3	7	1	352	4
2	16	084458	3	0.0037	23	4	143	49	11	1	6	1	359	10
2	16	084458	3	0.0049	25	4	161	21	12	3	12	2	342	15
2	16	084458	3	0.0062	28	6	161	28	12	3	7	2	337	9
2	16	084458	3	0.0123	27	4	159	3	10	2	7	1	348	14
2	16	084458	3	0.0247	29	2	137	21	12	3	6	1	371	13

\*Values represent the mean number of revertants (average of three plates)

**Slope Analysis of the Linear Portion of the Dose-Response Curve  
(Revertant Colonies/Unit of Use)**

Strain and S9 Activation	Sample ID	Sample Description	Number of Revertant Colonies/Unit of Use										
			Replicate 1		Replicate 2		Replicate 3		Statistics for Replicate 'Unit' Slope Estimates				
			Dose Range		Dose Range		Dose Range		Standard		t-test p-value (H <sub>0</sub> : mean = 0)		
			(units/plate)	slope	(units/plate)	slope	(units/plate)	slope	Mean	Error	95% C.I.	p-value	significance
TA98 (+S9)	084394	Camel SNUS Frost	0 - 0.009	435	0 - 0.009	980	0 - 0.009	-870	182	549	0* - 2543	0.772	not significant
TA98 (+S9)	084395	2S3	0 - 0.002	6976	0 - 0.002	603	0 - 0.002	5426	4335	1919	0* - 12590	0.152	not significant
TA98 (+S9)	084454	Fresh Strips	0 - 0.044	-48	0 - 0.044	60	0 - 0.022	-309	0*	110	0* - 373	0.463	not significant
TA98 (+S9)	084455	Mellow Sticks	0 - 0.011	-539	0 - 0.011	5.1	0 - 0.011	555	7.0	316	0* - 1365	0.984	not significant
TA98 (+S9)	084456	Copenhagen Long Cut	0 - 0.002	6841	0 - 0.002	6745	0 - 0.002	4372	5986	807	2512 - 9459	0.018	<b>significant</b>
TA98 (+S9)	084457	Ariva Wintergreen	0 - 0.02	91	0 - 0.02	-216	0 - 0.02	-283	0*	115	0* - 360	0.359	not significant
TA98 (+S9)	084458	Fresh Orbs	0 - 0.025	-8	0 - 0.025	-144	0 - 0.012	986	278	356	0* - 1810	0.516	not significant
TA98 (-S9)	084394	Camel SNUS Frost	0 - 0.009	-165	0 - 0.009	654	0 - 0.005	0.00	163	250	0* - 1239	0.581	not significant
TA98 (-S9)	084395	2S3	0 - 0.002	1225	0 - 0.002	-1435	0 - 0.001	-724	0*	795	0* - 3111	0.733	not significant
TA98 (-S9)	084454	Fresh Strips	0 - 0.044	110	0 - 0.044	-10.1	0 - 0.044	114	71.5	40.8	0* - 247	0.222	not significant
TA98 (-S9)	084455	Mellow Sticks	0 - 0.011	770	0 - 0.011	571	0 - 0.011	562	634	68	343 - 926	0.011	<b>significant</b>
TA98 (-S9)	084456	Copenhagen Long Cut	0 - 0.002	401	0 - 0.002	494	0 - 0.002	1334	743	297	0* - 2020	0.129	not significant
TA98 (-S9)	084457	Ariva Wintergreen	0 - 0.02	-100	0 - 0.01	372	0 - 0.02	177	150	137	0* - 739	0.389	not significant
TA98 (-S9)	084458	Fresh Orbs	0 - 0.025	-6.15	0 - 0.025	96	0 - 0.025	-7.04	27.8	34.4	0* - 176	0.504	not significant
TA100 (+S9)	084394	Camel SNUS Frost	0 - 0.002	802	0 - 0.002	8102	0 - 0.002	11086	6663	3055	0* - 19806	0.161	not significant
TA100 (+S9)	084395	2S3	0 - 0.0004	30885	0 - 0.0004	71069	0 - 0.0004	28491	43482	13811	0* - 102905	0.088	not significant
TA100 (+S9)	084454	Fresh Strips	0 - 0.011	2360	0 - 0.022	1348	0 - 0.011	1649	1786	300	495 - 3077	0.027	<b>significant</b>
TA100 (+S9)	084455	Mellow Sticks	0 - 0.005	6503	0 - 0.003	9600	0 - 0.005	4278	6794	1543	154 - 13433	0.048	<b>significant</b>
TA100 (+S9)	084456	Copenhagen Long Cut	0 - 0.001	34043	0 - 0.001	63912	0 - 0.001	47710	48555	8633	11411 - 85700	0.030	<b>significant</b>
TA100 (+S9)	084457	Ariva Wintergreen	0 - 0.004	8499	0 - 0.02	773	0 - 0.005	3311	4195	2274	0* - 13978	0.206	not significant
TA100 (+S9)	084458	Fresh Orbs	0 - 0.012	334	0 - 0.006	1712	0 - 0.006	3633	1893	957	0* - 6010	0.186	not significant
TA100 (-S9)	084394	Camel SNUS Frost	0 - 0.009	1445	0 - 0.009	2737	0 - 0.009	3970	2718	729	0* - 5854	0.065	not significant
TA100 (-S9)	084395	2S3	0 - 0.001	10169	0 - 0.002	10733	0 - 0.002	13812	11571	1132	6701 - 16442	0.009	<b>significant</b>
TA100 (-S9)	084454	Fresh Strips	0 - 0.044	-499	0 - 0.044	141	0 - 0.022	334	0*	252	0* - 1076	0.977	not significant
TA100 (-S9)	084455	Mellow Sticks	0 - 0.005	5462	0 - 0.011	-216	0 - 0.011	-3601	548	2644	0* - 11924	0.855	not significant
TA100 (-S9)	084456	Copenhagen Long Cut	0 - 0.001	47463	0 - 0.001	78.2	0 - 0.001	13634	20392	14090	0* - 81016	0.285	not significant
TA100 (-S9)	084457	Ariva Wintergreen	0 - 0.02	2469	0 - 0.02	-3393	0 - 0.02	-3748	0*	2016	0* - 7116	0.521	not significant
TA100 (-S9)	084458	Fresh Orbs	0 - 0.025	-664	0 - 0.025	-2067	0 - 0.025	-504	0*	496	0* - 1058	0.162	not significant
TA102 (+S9)	084394	Camel SNUS Frost	0 - 0.002	25056	0 - 0.002	34260	0 - 0.002	24989	28102	3079	14853 - 41350	0.012	<b>significant</b>
TA102 (+S9)	084395	2S3	0 - 0.0004	117544	0 - 0.0022	10948	0 - 0.0006	41130	56540	31722	0* - 193027	0.217	not significant
TA102 (+S9)	084454	Fresh Strips	0 - 0.044	139	0 - 0.044	-421	0 - 0.044	83.7	0*	178	0* - 700	0.746	not significant
TA102 (+S9)	084455	Mellow Sticks	0 - 0.011	1787	0 - 0.011	789	0 - 0.011	1383	1320	290	73 - 2567	0.045	<b>significant</b>
TA102 (+S9)	084456	Copenhagen Long Cut	0 - 0.002	20085	0 - 0.002	5003	0 - 0.002	10430	11839	4411	0* - 30816	0.115	not significant
TA102 (+S9)	084457	Ariva Wintergreen	0 - 0.02	-628	0 - 0.02	-234	0 - 0.02	-474	0*	115	0* - 49	0.061	not significant
TA102 (+S9)	084458	Fresh Orbs	0 - 0.025	-2683	0 - 0.025	303	0 - 0.025	-1880	0*	892	0* - 2418	0.252	not significant
TA102 (-S9)	084394	Camel SNUS Frost	0 - 0.009	-1464	0 - 0.005	3297	0 - 0.009	-850	327	1495	0* - 6761	0.847	not significant
TA102 (-S9)	084395	2S3	0 - 0.002	4454	0 - 0.002	13498	0 - 0.002	30871	16274	7751	0* - 49625	0.171	not significant

**Slope Analysis of the Linear Portion of the Dose-Response Curve  
(Revertant Colonies/Unit of Use)**

			Number of Revertant Colonies/Unit of Use										
Strain and S9 Activation	Sample ID	Sample Description	Replicate 1		Replicate 2		Replicate 3		Statistics for Replicate 'Unit' Slope Estimates				
			Dose Range		Dose Range		Dose Range		Standard			t-test p-value (H <sub>0</sub> : mean = 0)	
			(units/plate)	slope	(units/plate)	slope	(units/plate)	slope	Mean	Error	95% C.I.	p-value	significance
TA102 (-S9)	084454	Fresh Strips	0 - 0.044	-100	0 - 0.044	730	0 - 0.011	5916	2182	1882	0* - 10282	0.366	not significant
TA102 (-S9)	084455	Mellow Sticks	0 - 0.005	1956	0 - 0.011	1603	0 - 0.011	117	1226	564	0* - 3651	0.162	not significant
TA102 (-S9)	084456	Copenhagen Long Cut	0 - 0.002	-54.6	0 - 0.002	12173	0 - 0.001	78723	30280	24477	0* - 135596	0.342	not significant
TA102 (-S9)	084457	Ariva Wintergreen	0 - 0.02	-1294	0 - 0.02	-2174	0 - 0.02	-244	0*	558	0* - 1163	0.157	not significant
TA102 (-S9)	084458	Fresh Orbs	0 - 0.025	-4105	0 - 0.025	543	0 - 0.025	681	0*	1573	0* - 5808	0.604	not significant
TA1535 (+S9)	084394	Camel SNUS Frost	0 - 0.009	51.0	0 - 0.009	313	0 - 0.009	-624	0*	279	0* - 1114	0.785	not significant
TA1535 (+S9)	084395	2S3	0 - 0.002	924	0 - 0.002	376	0 - 0.002	-129	390	304	0* - 1698	0.328	not significant
TA1535 (+S9)	084454	Fresh Strips	0 - 0.044	45.4	0 - 0.044	41.6	0 - 0.044	-45.2	14	30	0* - 141	0.684	not significant
TA1535 (+S9)	084455	Mellow Sticks	0 - 0.011	-33.8	0 - 0.011	-409	0 - 0.005	777	111	350	0* - 1617	0.781	not significant
TA1535 (+S9)	084456	Copenhagen Long Cut	0 - 0.002	428	0 - 0.002	540	0 - 0.002	-582	129	357	0* - 1665	0.753	not significant
TA1535 (+S9)	084457	Ariva Wintergreen	0 - 0.02	341	0 - 0.02	221	0 - 0.02	-262	100	184	0* - 893	0.642	not significant
TA1535 (+S9)	084458	Fresh Orbs	0 - 0.025	55.0	0 - 0.025	6.8	0 - 0.025	-163	0*	66	0* - 250	0.661	not significant
TA1535 (-S9)	084394	Camel SNUS Frost	0 - 0.009	41.1	0 - 0.009	575	0 - 0.009	-337	93	264	0* - 1230	0.758	not significant
TA1535 (-S9)	084395	2S3	0 - 0.002	-674	0 - 0.002	735	0 - 0.002	2332	798	868	0* - 4534	0.455	not significant
TA1535 (-S9)	084454	Fresh Strips	0 - 0.022	83.8	0 - 0.022	205	0 - 0.022	137	142	35	0* - 293	0.056	not significant
TA1535 (-S9)	084455	Mellow Sticks	0 - 0.011	-410	0 - 0.011	34.1	0 - 0.011	-32.6	0*	138	0* - 458	0.429	not significant
TA1535 (-S9)	084456	Copenhagen Long Cut	0 - 0.002	981	0 - 0.002	2292	0 - 0.001	4445	2573	1010	0* - 6917	0.126	not significant
TA1535 (-S9)	084457	Ariva Wintergreen	0 - 0.005	1142	0 - 0.02	218	0 - 0.02	-87.1	424	370	0* - 2014	0.370	not significant
TA1535 (-S9)	084458	Fresh Orbs	0 - 0.006	925	0 - 0.012	492	0 - 0.025	41.6	486	255	0* - 1584	0.197	not significant
TA1537 (+S9)	084394	Camel SNUS Frost	0 - 0.005	1751	0 - 0.009	758	0 - 0.009	789	1099	326	0* - 2503	0.078	not significant
TA1537 (+S9)	084395	2S3	0 - 0.001	19533	0 - 0.002	2666	0 - 0.002	2440	8213	5661	0* - 32568	0.284	not significant
TA1537 (+S9)	084454	Fresh Strips	0 - 0.044	23.3	0 - 0.044	-9.6	0 - 0.044	-38.4	0*	18	0* - 69	0.690	not significant
TA1537 (+S9)	084455	Mellow Sticks	0 - 0.011	-189	0 - 0.011	122	0 - 0.011	290	75	140	0* - 679	0.648	not significant
TA1537 (+S9)	084456	Copenhagen Long Cut	0 - 0.001	6042	0 - 0.001	4635	0 - 0.002	2550	4409	1014	44 - 8774	0.049	significant
TA1537 (+S9)	084457	Ariva Wintergreen	0 - 0.02	-101	0 - 0.02	163	0 - 0.02	-62.6	0*	83	0* - 355	0.999	not significant
TA1537 (+S9)	084458	Fresh Orbs	0 - 0.025	310	0 - 0.025	-42.9	0 - 0.025	13.7	93	109	0* - 564	0.483	not significant
TA1537 (-S9)	084394	Camel SNUS Frost	0 - 0.002	2489	0 - 0.009	524	0 - 0.005	1321	1445	571	0* - 3900	0.127	not significant
TA1537 (-S9)	084395	2S3	0 - 0.002	4651	0 - 0.001	4733	0 - 0.001	1519	3634	1058	0* - 8186	0.075	not significant
TA1537 (-S9)	084454	Fresh Strips	0 - 0.044	-10.6	0 - 0.044	33.6	0 - 0.044	13.8	12	13	0* - 67	0.438	not significant
TA1537 (-S9)	084455	Mellow Sticks	0 - 0.011	35.6	0 - 0.011	-142	0 - 0.011	-126	0*	57	0* - 167	0.305	not significant
TA1537 (-S9)	084456	Copenhagen Long Cut	0 - 0.002	318	0 - 0.002	-924	0 - 0.002	961	118	553	0* - 2498	0.850	not significant
TA1537 (-S9)	084457	Ariva Wintergreen	0 - 0.02	9.2	0 - 0.02	-132	0 - 0.02	102	0*	68	0* - 286	0.925	not significant
TA1537 (-S9)	084458	Fresh Orbs	0 - 0.012	240	0 - 0.025	65.6	0 - 0.025	-57.4	83	86	0* - 454	0.439	not significant

0\*: Mean or lower bound of the 95% confidence interval has been truncated at 0.

### One-Way ANOVA of Mean 'Unit of Use' Slope Estimates Among Test Samples

TA98 (+S9)

Source	Sum of Squares	Df	Mean Square	F-Ratio	P-Value
Among Samples	116551558	6	19425259.66	9.277	<b>0.000</b>
Within Samples	29314294.07	14	2093878.148		
Total (Corr.)	145865852	20			

TA100 (+S9)

Source	Sum of Squares	Df	Mean Square	F-Ratio	P-Value
Among Samples	7581433377	6	1263572230	10.412	<b>0.000</b>
Within Samples	1698930785	14	121352199		
Total (Corr.)	9280364163	20			

TA102 (+S9)

Source	Sum of Squares	Df	Mean Square	F-Ratio	P-Value
Among Samples	8452947813	6	1408824635	3.173	<b>0.035</b>
Within Samples	6216693792	14	444049556.6		
Total (Corr.)	14669641605	20			

TA1535 (+S9)

Source	Sum of Squares	Df	Mean Square	F-Ratio	P-Value
Among Samples	433557.2337	6	72259.53895	0.367	0.888
Within Samples	2755876.133	14	196848.2952		
Total (Corr.)	3189433.367	20			

TA1537 (+S9)

Source	Sum of Squares	Df	Mean Square	F-Ratio	P-Value
Among Samples	181771266.4	6	30295211.07	2.128	0.115
Within Samples	199293927.5	14	14235280.54		
Total (Corr.)	381065193.9	20			

### One-Way ANOVA of Mean 'Unit of Use' Slope Estimates Among Test Samples

TA98 (-S9)

Source	Sum of Squares	Df	Mean Square	F-Ratio	P-Value
Among Samples	2382624.897	6	397104.1495	1.145	0.388
Within Samples	4856477.046	14	346891.2176		
Total (Corr.)	7239101.943	20			

TA100 (-S9)

Source	Sum of Squares	Df	Mean Square	F-Ratio	P-Value
Among Samples	1227918265	6	204653044.2	2.256	0.098
Within Samples	1270201864	14	90728704.59		
Total (Corr.)	2498120129	20			

TA102 (-S9)

Source	Sum of Squares	Df	Mean Square	F-Ratio	P-Value
Among Samples	2580517534	6	430086255.7	1.502	0.248
Within Samples	4008514695	14	286322478.2		
Total (Corr.)	6589032229	20			

TA1535 (-S9)

Source	Sum of Squares	Df	Mean Square	F-Ratio	P-Value
Among Samples	14932663.82	6	2488777.304	2.811	0.052
Within Samples	12393809.23	14	885272.088		
Total (Corr.)	27326473.05	20			

TA1537 (-S9)

Source	Sum of Squares	Df	Mean Square	F-Ratio	P-Value
Among Samples	34344667.59	6	5724111.265	7.562	0.001
Within Samples	10597060.8	14	756932.9143		
Total (Corr.)	44941728.39	20			

One-way ANOVA analysis indicates significant differences (at  $\alpha = 0.05$ ) among mean 'Unit of Use' specific activity slope estimates for test samples with TA98 (+S9), TA100 (+S9), TA102 (+S9) and TA1537 (-S9).

**Evaluation of Ratio (Max ÷ Min) of Standard  
Deviations of 'Unit of Use' Slope Estimates and  
Corresponding Method of Comparison**

<b>Strain and S9 Activation</b>	<b>Std. Dev. Ratio (Max ÷ Min)</b>	<b>Method of Comparison</b>
TA98 (+S9)	17.5	Pairwise T-test (unequal variance)
TA98 (-S9)	23.2	Pairwise T-test (unequal variance)
TA100 (+S9)	46.0	Pairwise T-test (unequal variance)
TA100 (-S9)	55.9	Pairwise T-test (unequal variance)
TA102 (+S9)	276.1	Pairwise T-test (unequal variance)
TA102 (-S9)	43.9	Pairwise T-test (unequal variance)
TA1535 (+S9)	12.1	ANOVA (equal variance)
TA1535 (-S9)	28.7	Pairwise T-test (unequal variance)
TA1537 (+S9)	317.2	Pairwise T-test (unequal variance)
TA1537 (-S9)	82.7	Pairwise T-test (unequal variance)



**Evaluation of Ratio ( $\text{Max} \div \text{Min}$ ) of Standard  
Deviations of 'Unit of Use' Slope Estimates and  
Corresponding Method of Comparison**

**ANOVA-Based Comparison Tests of Mean 'Unit of Use' Slope  
for Contrasts of Interest using Bonferroni-adjusted p-values**

ANOVA-Based Comparison	TA98 (+S9)			TA100 (+S9)			TA102 (+S9)			TA1535 (+S9)			TA1537 (+S9)		
	f-ratio	p-value	significance at $\alpha = 0.05$	f-ratio	p-value	significance at $\alpha = 0.05$	f-ratio	p-value	significance at $\alpha = 0.05$	f-ratio	p-value	significance at $\alpha = 0.05$	f-ratio	p-value	significance at $\alpha = 0.05$
<b>084394 vs. 084395</b>	12.357	0.0034	not significant	16.756	0.0011	<b>significant</b>	2.732	0.1206	not significant	1.734	0.2090	not significant	5.333	0.0367	not significant
084394 vs. 084454	0.056	0.8158	not significant	0.294	0.5962	not significant	2.680	0.1239	not significant	0.077	0.7851	not significant	0.129	0.7246	not significant
084394 vs. 084455	0.022	0.8846	not significant	0.000	0.9887	not significant	2.423	0.1419	not significant	0.299	0.5932	not significant	0.111	0.7444	not significant
<b>084394 vs. 084456</b>	24.133	0.0002	<b>significant</b>	21.692	0.0004	<b>significant</b>	0.893	0.3606	not significant	0.354	0.5614	not significant	1.154	0.3009	not significant
084394 vs. 084457	0.072	0.7919	not significant	0.075	0.7877	not significant	2.753	0.1193	not significant	0.266	0.6143	not significant	0.127	0.7265	not significant
084394 vs. 084458	0.007	0.9360	not significant	0.281	0.6042	not significant	2.944	0.1082	not significant	0.022	0.8854	not significant	0.107	0.7489	not significant
<b>084395 vs. 084454</b>	14.081	0.0021	<b>significant</b>	21.489	0.0004	<b>significant</b>	10.824	0.0054	not significant	1.079	0.3165	not significant	7.122	0.0183	not significant
<b>084395 vs. 084455</b>	13.418	0.0026	not significant	16.638	0.0011	<b>significant</b>	10.301	0.0063	not significant	0.593	0.4540	not significant	6.979	0.0193	not significant
084395 vs. 084456	1.953	0.1841	not significant	0.318	0.5816	not significant	6.750	0.0211	not significant	0.521	0.4822	not significant	1.525	0.2372	not significant
<b>084395 vs. 084457</b>	14.320	0.0020	<b>significant</b>	19.078	0.0006	<b>significant</b>	10.970	0.0051	not significant	0.642	0.4362	not significant	7.108	0.0184	not significant
<b>084395 vs. 084458</b>	11.788	0.0040	not significant	21.379	0.0004	<b>significant</b>	11.348	0.0046	not significant	1.369	0.2615	not significant	6.947	0.0196	not significant
084454 vs. 084455	0.008	0.9300	not significant	0.310	0.5865	not significant	0.006	0.9369	not significant	0.072	0.7920	not significant	0.001	0.9789	not significant
<b>084454 vs. 084456</b>	26.521	0.0001	<b>significant</b>	27.037	0.0001	<b>significant</b>	0.479	0.5003	not significant	0.100	0.7560	not significant	2.056	0.1736	not significant
084454 vs. 084457	0.001	0.9752	not significant	0.072	0.7928	not significant	0.000	0.9827	not significant	0.056	0.8158	not significant	0.000	0.9979	not significant
084454 vs. 084458	0.102	0.7544	not significant	0.000	0.9907	not significant	0.006	0.9384	not significant	0.017	0.8975	not significant	0.001	0.9741	not significant
<b>084455 vs. 084456</b>	25.608	0.0002	<b>significant</b>	21.557	0.0004	<b>significant</b>	0.374	0.5507	not significant	0.002	0.9623	not significant	1.979	0.1813	not significant
084455 vs. 084457	0.015	0.9053	not significant	0.083	0.7768	not significant	0.011	0.9197	not significant	0.001	0.9754	not significant	0.001	0.9810	not significant
084455 vs. 084458	0.053	0.8217	not significant	0.297	0.5945	not significant	0.025	0.8758	not significant	0.160	0.6952	not significant	0.000	0.9952	not significant
<b>084456 vs. 084457</b>	26.848	0.0001	<b>significant</b>	24.324	0.0002	<b>significant</b>	0.510	0.4870	not significant	0.006	0.9378	not significant	2.048	0.1743	not significant
<b>084456 vs. 084458</b>	23.336	0.0003	<b>significant</b>	26.913	0.0001	<b>significant</b>	0.594	0.4537	not significant	0.201	0.6609	not significant	1.962	0.1830	not significant
084457 vs. 084458	0.123	0.7310	not significant	0.065	0.8018	not significant	0.003	0.9556	not significant	0.136	0.7180	not significant	0.001	0.9762	not significant

TA98 (+S9)

Sample Description	Sample ID	Mean Slope	Homogenous Groupings
Ariva Wintergreen	084457	-136	X
Fresh Strips	084454	-98.7	X
Mellow Sticks	084455	7.00	XX
Camel SNUS Frost	084394	182	XX
Fresh Orbs	084458	278	XX
2S3	084395	4335	XX
Copenhagen Long Cut	084456	5986	X

TA100 (+S9)

Sample Description	Sample ID	Mean Slope	Homogenous Groupings
Fresh Strips	084454	1786	X
Fresh Orbs	084458	1893	X
Ariva Wintergreen	084457	4195	X
Camel SNUS Frost	084394	6663	X
Mellow Sticks	084455	6794	X
2S3	084395	43482	X
Copenhagen Long Cut	084456	48555	X

ANOVA-based comparison p-values less than the Bonferroni-adjusted  $\alpha = 0.05$  indicate that significant differences in mean 'Unit of Use' specific activity slope were as shown in the tables of Homogenous Groupings for TA98 (+S9) and TA100 (+S9).

**ANOVA-Based Comparison Tests of Mean 'Unit of Use' Slope  
for Contrasts of Interest using Bonferroni-adjusted p-values**

ANOVA-Based Comparison	TA98 (-S9)			TA100 (-S9)			TA102 (-S9)			TA1535 (-S9)			TA1537 (-S9)		
	f-ra io	p-value	significance at $\alpha = 0.05$	f-ratio	p-value	significance at $\alpha = 0.05$	f-ra io	p-value	significance at $\alpha = 0.05$	f-ratio	p-value	significance at $\alpha = 0.05$	f-ratio	p-value	significance at $\alpha = 0.05$
084394 vs. 084395	0.973	0.3407	not significant	1.296	0.2741	not significant	1.332	0.2677	not significant	0.841	0.3746	not significant	9.502	0.0081	not significant
084394 vs. 084454	0.036	0.8516	not significant	0.123	0.7312	not significant	0.018	0.8951	not significant	0.004	0.9501	not significant	4.066	0.0634	not significant
084394 vs. 084455	0.960	0.3438	not significant	0.078	0.7844	not significant	0.004	0.9491	not significant	0.089	0.7699	not significant	4.591	0.0502	not significant
084394 vs. 084456	1.455	0.2477	not significant	5.164	0.0393	not significant	4.700	0.0479	not significant	10.417	0.0061	not significant	3.486	0.0830	not significant
084394 vs. 084457	0.001	0.9780	not significant	0.302	0.5912	not significant	0.013	0.9114	not significant	0.186	0.6728	not significant	4.177	0.0603	not significant
084394 vs. 084458	0.079	0.7825	not significant	0.238	0.6330	not significant	0.009	0.9271	not significant	0.262	0.6166	not significant	3.675	0.0759	not significant
<b>084395 vs. 084454</b>	0.633	0.4395	not significant	2.217	0.1587	not significant	1.040	0.3250	not significant	0.728	0.4078	not significant	25.998	0.0002	<b>significant</b>
<b>084395 vs. 084455</b>	3.865	0.0694	not significant	2.009	0.1783	not significant	1.186	0.2944	not significant	1.477	0.2443	not significant	27.303	0.0001	<b>significant</b>
<b>084395 vs. 084456</b>	4.808	0.0457	not significant	1.286	0.2758	not significant	1.028	0.3279	not significant	5.338	0.0366	not significant	24.498	0.0002	<b>significant</b>
<b>084395 vs. 084457</b>	0.918	0.3542	not significant	2.849	0.1135	not significant	1.607	0.2257	not significant	0.236	0.6346	not significant	26.279	0.0002	<b>significant</b>
<b>084395 vs. 084458</b>	0.497	0.4925	not significant	2.646	0.1261	not significant	1.556	0.2327	not significant	0.164	0.6915	not significant	24.996	0.0002	<b>significant</b>
084454 vs. 084455	1.370	0.2614	not significant	0.005	0.9440	not significant	0.005	0.9458	not significant	0.131	0.7228	not significant	0.016	0.9012	not significant
084454 vs. 084456	1.951	0.1842	not significant	6.880	0.0201	not significant	4.136	0.0614	not significant	10.010	0.0069	not significant	0.022	0.8835	not significant
084454 vs. 084457	0.026	0.8733	not significant	0.040	0.8450	not significant	0.061	0.8081	not significant	0.135	0.7187	not significant	0.001	0.9785	not significant
084454 vs. 084458	0.008	0.9289	not significant	0.019	0.8925	not significant	0.052	0.8234	not significant	0.201	0.6608	not significant	0.010	0.9224	not significant
084455 vs. 084456	0.051	0.8240	not significant	6.510	0.0231	not significant	4.423	0.0540	not significant	12.431	0.0034	not significant	0.076	0.7869	not significant
084455 vs. 084457	1.016	0.3306	not significant	0.073	0.7906	not significant	0.032	0.8611	not significant	0.532	0.4777	not significant	0.010	0.9226	not significant
084455 vs. 084458	1.591	0.2279	not significant	0.044	0.8373	not significant	0.025	0.8766	not significant	0.656	0.4314	not significant	0.051	0.8248	not significant
084456 vs. 084457	1.524	0.2373	not significant	7.965	0.0136	not significant	5.204	0.0387	not significant	7.819	0.0143	not significant	0.031	0.8623	not significant
084456 vs. 084458	2.213	0.1590	not significant	7.621	0.0153	not significant	5.113	0.0402	not significant	7.374	0.0167	not significant	0.003	0.9608	not significant
084457 vs. 084458	0.064	0.8037	not significant	0.004	0.9518	not significant	0.000	0.9843	not significant	0.007	0.9368	not significant	0.016	0.9010	not significant

## TA1537 (-S9)

Sample Description	Sample ID	Mean Slope	Homogenous Groupings
Mellow Sticks	084455	-77.5	X
Ariva Wintergreen	084457	-7.24	X
Fresh Strips	084454	12.3	X
Fresh Orbs	084458	82.7	X
Copenhagen Long Cut	084456	118	X
Camel SNUS Frost	084394	1445	XX
2S3	084395	3634	X

ANOVA-based comparison p-values less than the Bonferroni-adjusted  $\alpha = 0.05$  indicate that significant differences in mean 'Unit of Use' specific activity slope were as shown in the table of Homogenous Groupings for TA1537 (-S9).

**Pairwise T-Test Comparisons of Mean 'Unit of Use' Slope  
for Contrasts of Interest using Bonferroni-adjusted p-values**

Pairwise T-test Comparison	TA98 (+S9)			TA100 (+S9)			TA102 (+S9)			TA1535 (+S9)			TA1537 (+S9)		
	t-statistic	p-value	significance at $\alpha = 0.05$	t-statistic	p-value	significance at $\alpha = 0.05$	t-statistic	p-value	significance at $\alpha = 0.05$	t-statistic	p-value	significance at $\alpha = 0.05$	t-statistic	p-value	significance at $\alpha = 0.05$
084394 vs. 084395	2.081184	0.1059	not significant	2.60298	0.0599	not significant	0.892318	0.4227	not significant				1.254667	0.2779	not significant
<b>084394 vs. 084454</b>	0.500942	0.6427	not significant	1.589134	0.1872	not significant	9.132875	0.0008	<b>significant</b>				3.39047	0.0275	not significant
<b>084394 vs. 084455</b>	0.275922	0.7963	not significant	0.038013	0.9715	not significant	8.659783	0.0010	<b>significant</b>				2.885612	0.0448	not significant
084394 vs. 084456	5.945519	0.0040	not significant	4.574631	0.0102	not significant	3.023344	0.0390	not significant				3.105842	0.0360	not significant
<b>084394 vs. 084457</b>	0.566645	0.6012	not significant	0.648365	0.5521	not significant	9.264911	0.0008	<b>significant</b>				3.2676	0.0309	not significant
<b>084394 vs. 084458</b>	0.14768	0.8897	not significant	1.490312	0.2104	not significant	9.209101	0.0008	<b>significant</b>				2.923887	0.0431	not significant
084395 vs. 084454	2.307061	0.0823	not significant	3.018327	0.0392	not significant	1.784452	0.1489	not significant				1.452408	0.2200	not significant
084395 vs. 084455	2.225823	0.0900	not significant	2.640033	0.0576	not significant	1.74072	0.1567	not significant				1.437326	0.2240	not significant
084395 vs. 084456	0.793137	0.4721	not significant	0.311504	0.7710	not significant	1.395748	0.2353	not significant				0.661545	0.5444	not significant
084395 vs. 084457	2.326134	0.0806	not significant	2.806862	0.0485	not significant	1.796429	0.1468	not significant				1.450822	0.2204	not significant
084395 vs. 084458	2.078826	0.1062	not significant	3.004083	0.0398	not significant	1.826432	0.1418	not significant				1.434181	0.2248	not significant
084454 vs. 084455	0.316338	0.7676	not significant	3.185196	0.0334	not significant	4.074178	0.0152	not significant				0.586096	0.5893	not significant
<b>084454 vs. 084456</b>	7.468384	0.0017	<b>significant</b>	5.414243	0.0056	not significant	2.697102	0.0543	not significant				4.353614	0.0121	not significant
084454 vs. 084457	0.235137	0.8256	not significant	1.050109	0.3529	not significant	1.790158	0.1479	not significant				0.096483	0.9278	not significant
084454 vs. 084458	1.011974	0.3688	not significant	0.106826	0.9201	not significant	1.48815	0.2109	not significant				0.918025	0.4106	not significant
<b>084455 vs. 084456</b>	6.897674	0.0023	<b>significant</b>	4.761983	0.0089	not significant	2.379954	0.0760	not significant				4.232245	0.0133	not significant
084455 vs. 084457	0.425921	0.6921	not significant	0.945769	0.3978	not significant	5.662533	0.0048	not significant				0.459241	0.6699	not significant
084455 vs. 084458	0.570257	0.5990	not significant	2.698817	0.0542	not significant	2.920829	0.0432	not significant				0.105589	0.9210	not significant
<b>084456 vs. 084457</b>	7.507229	0.0017	<b>significant</b>	4.969054	0.0077	not significant	2.784376	0.0496	not significant				4.331944	0.0123	not significant
084456 vs. 084458	6.468758	0.0029	not significant	5.372211	0.0058	not significant	2.946559	0.0421	not significant				4.229541	0.0134	not significant
084457 vs. 084458	1.107406	0.3302	not significant	0.932881	0.4037	not significant	1.083263	0.3396	not significant				0.682937	0.5322	not significant

Pariwise t-test comparison p-values less than the Bonferroni-adjusted  $\alpha = 0.05$  indicate that significant differences in mean 'Unit of Use' specific activity slope were as follows for strains TA98 (+S9) and TA102 (+S9).

TA98 (+S9): Copenhagen Long Cut (084456) was significantly different from each of {Fresh Strips (084454), Mellow Sticks (084455), Ariva Wintergreen (084457)}

TA102 (+S9): Camel SNUS Frost (084394) was significantly different from each of {Fresh Strips (084454), Mellow Sticks (084455), Ariva Wintergreen (084457), Fresh Orbs (084458)}

**Pairwise T-Test Comparisons of Mean 'Unit of Use' Slope  
for Contrasts of Interest using Bonferroni-adjusted p-values**

Pairwise T-test Comparison	TA98 (-S9)			TA100 (-S9)			TA102 (-S9)			TA1535 (-S9)			TA1537 (-S9)		
	t-statistic	p-value	significance at $\alpha = 0.05$	t-statistic	p-value	significance at $\alpha = 0.05$	t-statistic	p-value	significance at $\alpha = 0.05$	t-statistic	p-value	significance at $\alpha = 0.05$	t-statistic	p-value	significance at $\alpha = 0.05$
084394 vs. 084395	0.568876	0.5999	not significant	6.575896	0.0028	not significant	2.020102	0.1135	not significant	0.776206	0.4810	not significant	1.821726	0.1426	not significant
084394 vs. 084454	0.361628	0.7359	not significant	3.533893	0.0241	not significant	0.771411	0.4835	not significant	0.183558	0.8633	not significant	2.509283	0.0661	not significant
084394 vs. 084455	1.818302	0.1432	not significant	0.79091	0.4732	not significant	0.562102	0.6041	not significant	0.768191	0.4852	not significant	2.654114	0.0567	not significant
084394 vs. 084456	1.494497	0.2094	not significant	1.252717	0.2785	not significant	1.221444	0.2890	not significant	2.375479	0.0764	not significant	1.668889	0.1705	not significant
084394 vs. 084457	0.047451	0.9644	not significant	1.994152	0.1169	not significant	0.980488	0.3824	not significant	0.729324	0.5062	not significant	2.526211	0.0649	not significant
084394 vs. 084458	0.536114	0.6203	not significant	4.304126	0.0126	not significant	0.593312	0.5849	not significant	1.07079	0.3446	not significant	2.35962	0.0777	not significant
<b>084395 vs. 084454</b>	0.480489	0.6560	not significant	9.984992	0.0006	<b>significant</b>	1.766736	0.1520	not significant	0.754381	0.4926	not significant	3.423615	0.0267	not significant
084395 vs. 084455	1.184446	0.3018	not significant	3.832745	0.0186	not significant	1.936354	0.1249	not significant	1.061802	0.3482	not significant	3.503679	0.0248	not significant
084395 vs. 084456	1.242046	0.2821	not significant	0.624002	0.5664	not significant	0.545513	0.6144	not significant	1.332644	0.2535	not significant	2.945352	0.0422	not significant
084395 vs. 084457	0.570936	0.5986	not significant	5.678688	0.0047	not significant	2.253383	0.0873	not significant	0.395479	0.7127	not significant	3.435212	0.0264	not significant
<b>084395 vs. 084458</b>	0.425772	0.6922	not significant	10.23398	0.0005	<b>significant</b>	2.179045	0.0948	not significant	0.343864	0.7483	not significant	3.346144	0.0287	not significant
<b>084454 vs. 084455</b>	7.117879	0.0021	<b>significant</b>	0.209567	0.8442	not significant	0.486663	0.6520	not significant	1.950656	0.1229	not significant	1.542992	0.1977	not significant
084454 vs. 084456	2.241858	0.0884	not significant	1.447607	0.2213	not significant	1.144576	0.3162	not significant	2.405572	0.0739	not significant	0.191626	0.8574	not significant
084454 vs. 084457	0.546877	0.6135	not significant	0.762456	0.4883	not significant	1.741496	0.1566	not significant	0.760772	0.4892	not significant	0.28184	0.7920	not significant
084454 vs. 084458	0.819663	0.4584	not significant	1.922869	0.1269	not significant	1.280838	0.2695	not significant	1.337244	0.2521	not significant	0.808151	0.4643	not significant
084455 vs. 084456	0.357871	0.7385	not significant	1.38418	0.2385	not significant	1.186712	0.3010	not significant	2.657625	0.0565	not significant	0.352117	0.7425	not significant
084455 vs. 084457	3.173463	0.0337	not significant	0.633291	0.5609	not significant	3.10587	0.0360	not significant	1.420574	0.2285	not significant	0.792818	0.4723	not significant
<b>084455 vs. 084458</b>	7.98516	0.0013	<b>significant</b>	0.604863	0.5779	not significant	1.308131	0.2609	not significant	2.145414	0.0985	not significant	1.551854	0.1956	not significant
084456 vs. 084457	1.816015	0.1435	not significant	1.542066	0.1979	not significant	1.287314	0.2674	not significant	1.99776	0.1164	not significant	0.22526	0.8328	not significant
084456 vs. 084458	2.394159	0.0748	not significant	1.522872	0.2025	not significant	1.2737	0.2717	not significant	2.002988	0.1157	not significant	0.0635	0.9524	not significant
084457 vs. 084458	0.863142	0.4367	not significant	0.230419	0.8291	not significant	0.166017	0.8762	not significant	0.138075	0.8969	not significant	0.819035	0.4588	not significant

Pairwise t-test comparison p-values less than the Bonferroni-adjusted  $\alpha = 0.05$  indicate that significant differences in mean 'Unit of Use' specific activity slope were as follows for strains TA98 (-S9) and TA100 (-S9).

**TA98 (-S9):** Mellow Sticks (084455) was significantly different from each of {Fresh Strips (084454), Fresh Orbs (084458)}

**TA100 (-S9):** 2S3 (084395) was significantly different from each of {Fresh Strips (084454), Fresh Orbs (084458)}

**Number of Mean 'Unit of Use' Slope Estimates Significantly Greater than Zero (0), the Corresponding Number of Paired Comparisons and Comparison Method**

Strain and S9 Activation	# of Significant Mean Slopes	Number of Comparisons	Std. Dev. Ratio (Max ÷ Min)	Method of Comparison
TA98 (+S9)	1	0		
TA98 (-S9)	1	0		
TA100 (+S9)	3	3	28.8	Pairwise T-test (unequal variance)
TA100 (-S9)	1	0		
TA102 (+S9)	2	1	10.6	ANOVA (equal variance)
TA102 (-S9)	0	0		
TA1535 (+S9)	0	0		
TA1535 (-S9)	0	0		
TA1537 (+S9)	1	0		
TA1537 (-S9)	0	0		

**One-Way ANOVA and ANOVA-Based Comparisons Among Test Samples of Mean 'Unit of Use' Slope Estimates that are Significantly Greater than Zero (0)**

TA100 (+S9)

Source	Sum of Squares	Df	Mean Square	F-Ratio	P-Value
Among Samples	4.0E+09	2	2.0E+09	25.691	0.001
Within Samples	4.6E+08	6	7.7E+07		
Total (Corr.)	4.4E+09	8			

TA100 (+S9)			
Pairwise T-test Comparison	t-statistic	p-value	significance at $\alpha = 0.05$
084454 vs. 084455	3.19	0.0334	not significant
084454 vs. 084456	5.41	0.0056	significant
084455 vs. 084456	4.76	0.0089	significant

TA102 (+S9)

Source	Sum of Squares	Df	Mean Square	F-Ratio	P-Value
Among Samples	1.1E+09	1	1.1E+09	74.99	0.001
Within Samples	5.7E+07	4	1.4E+07		
Total (Corr.)	1.1E+09	5			

TA102 (+S9)			
ANOVA-Based Comparison	f-ratio	p-value	significance at $\alpha = 0.05$
084394 vs. 084455	74.99	0.0010	significant

Both TA100 (+S9) and TA102 (+S9) strains have more than one test sample for which the mean 'unit of use' specific activity slope estimate is greater than zero (0) .

**TA100 (+S9):**

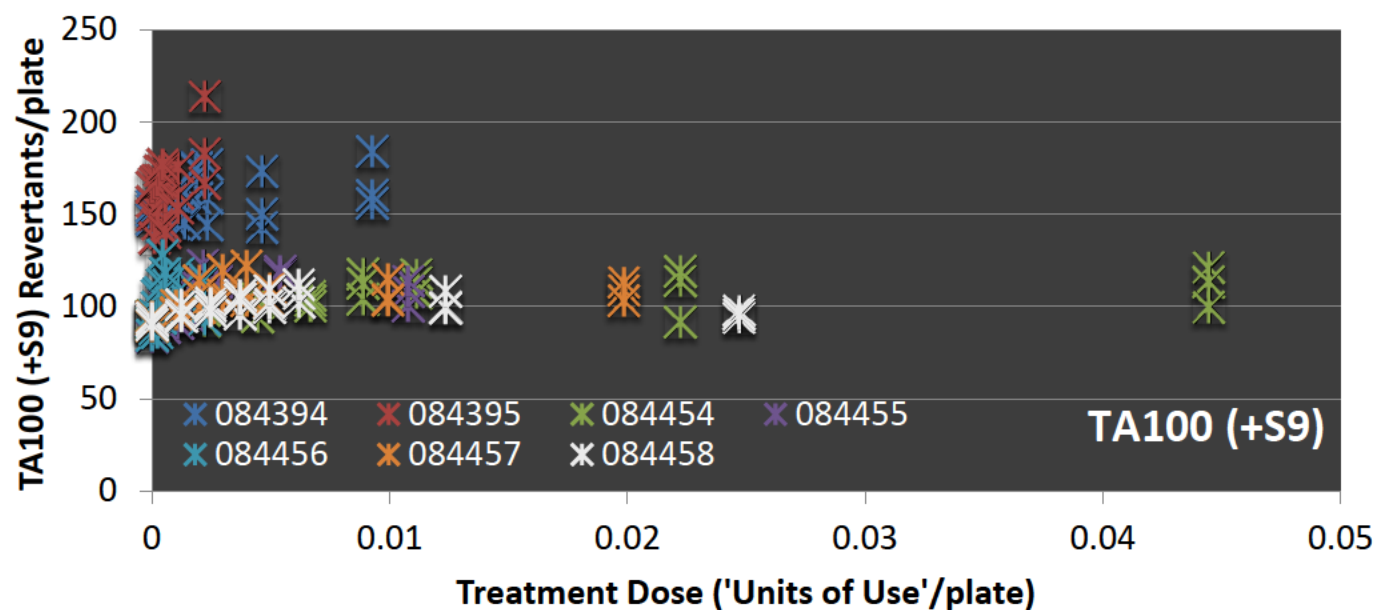
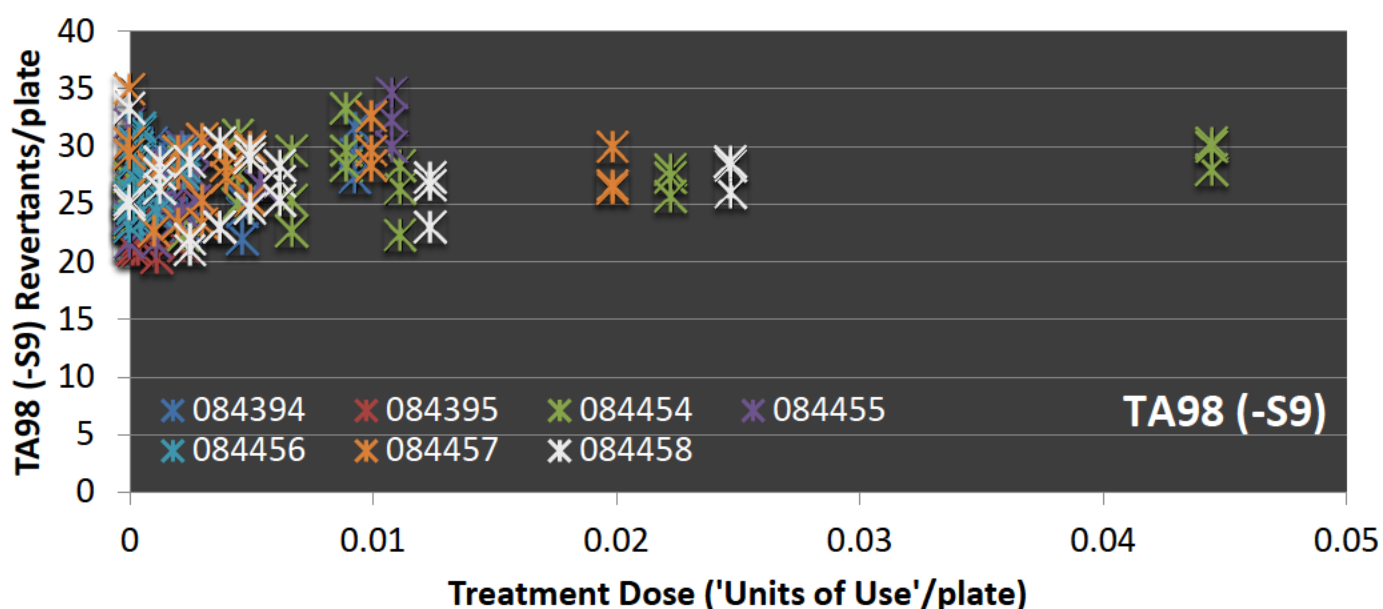
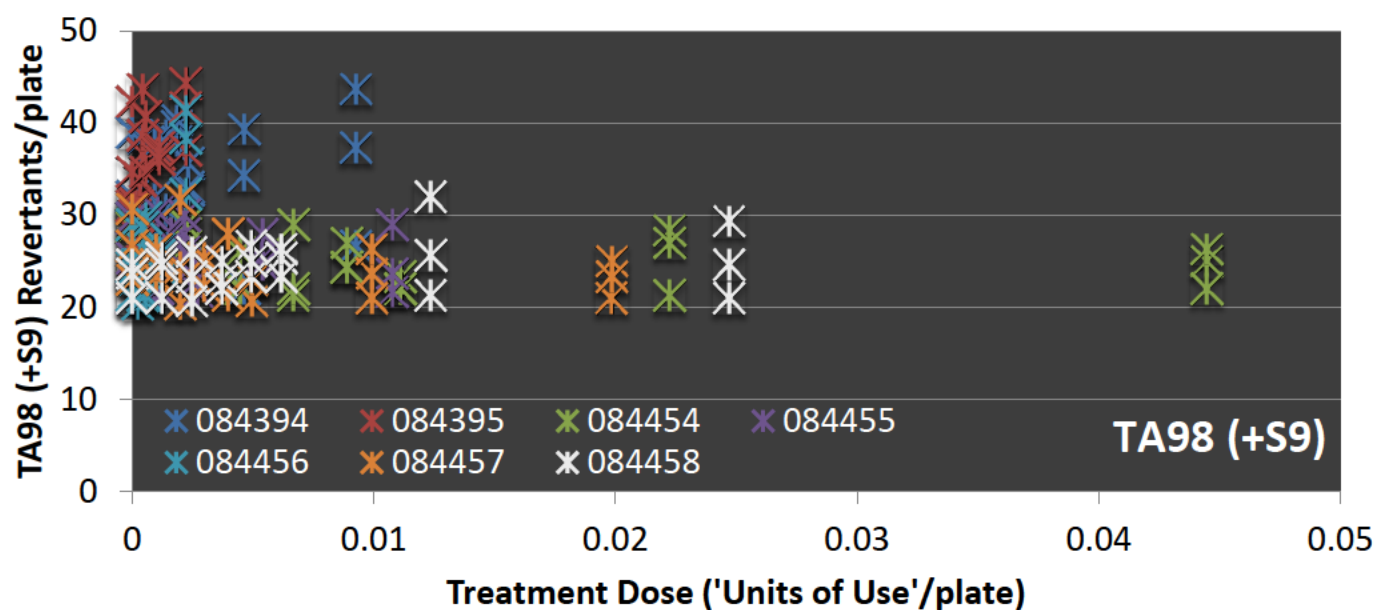
Significant differences among mean 'unit of use' specific activity slope estimates were detected in TA100 (+S9) between test sample 084456 (Copenhagen Long Cut) and each of {084454 (Fresh Strips), 084455 (Mellow Sticks)}.

**TA102 (+S9):**

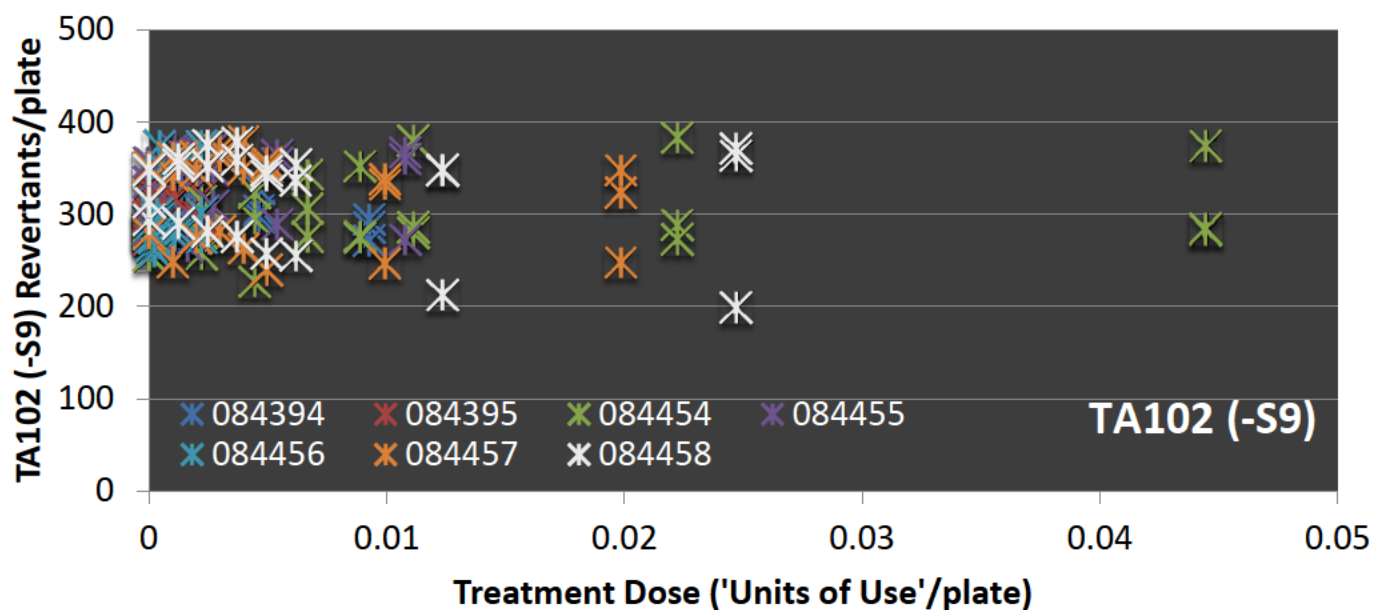
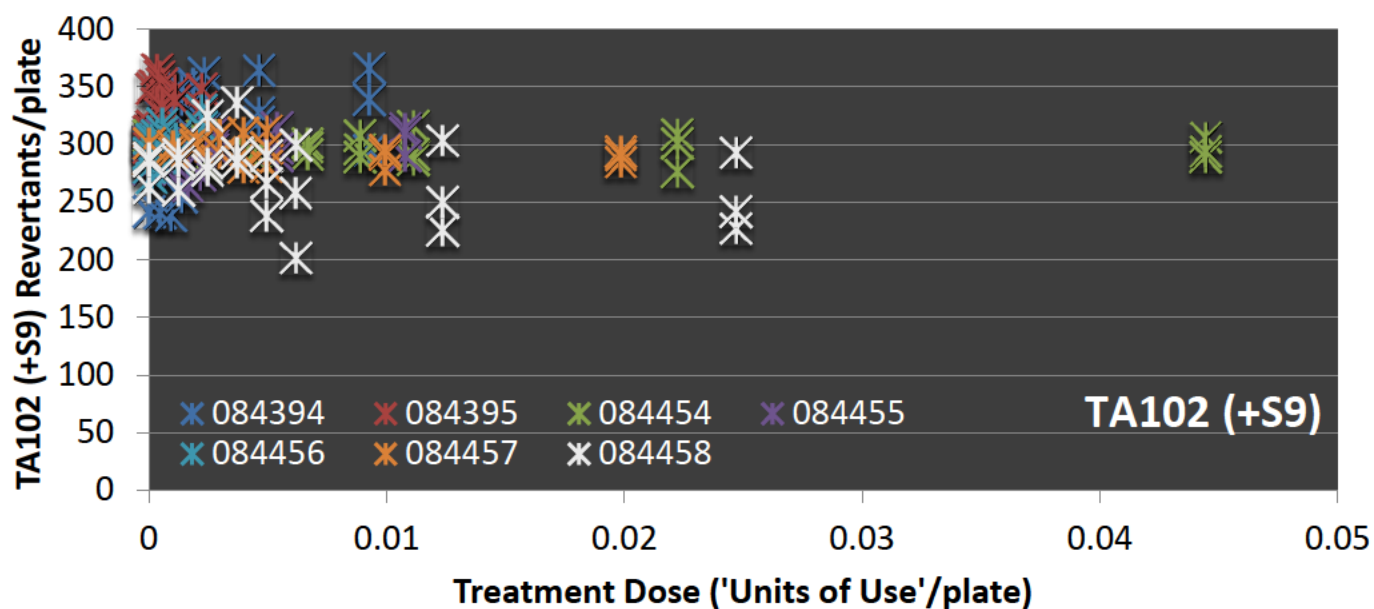
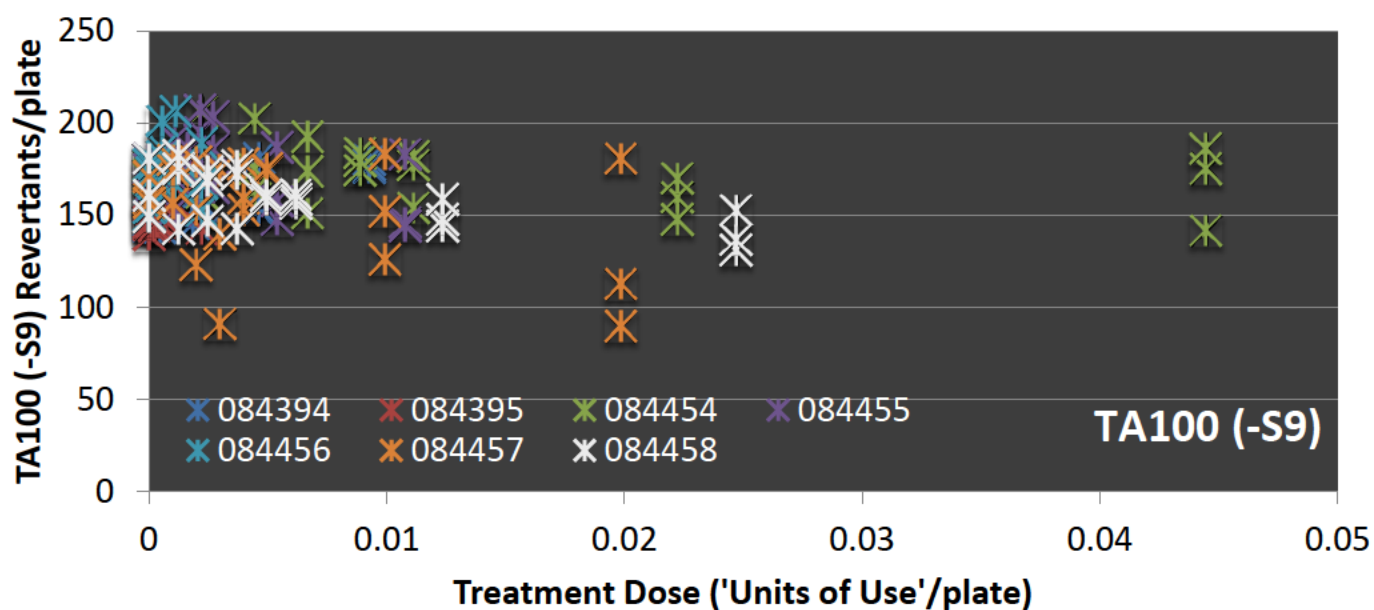
Significant differences among mean 'unit of use' specific activity slope estimates were detected in TA102 (+S9) between test samples 084394 (Camel SNUS Frost) and 084455 (Mellow Sticks) .

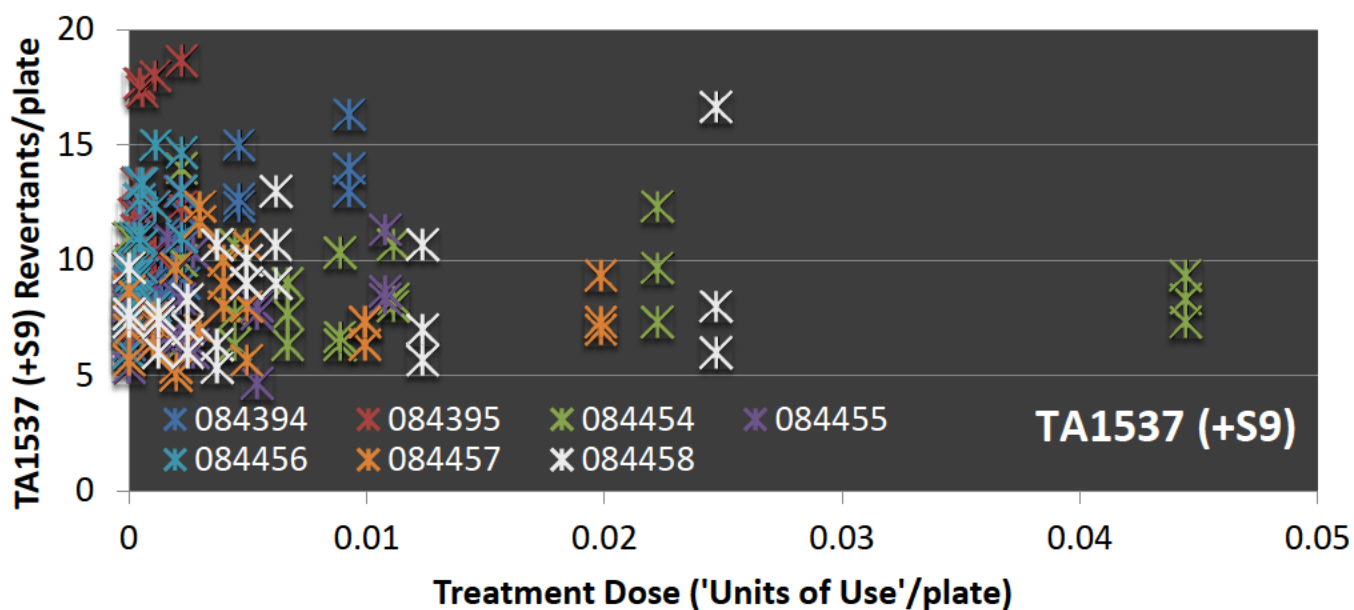
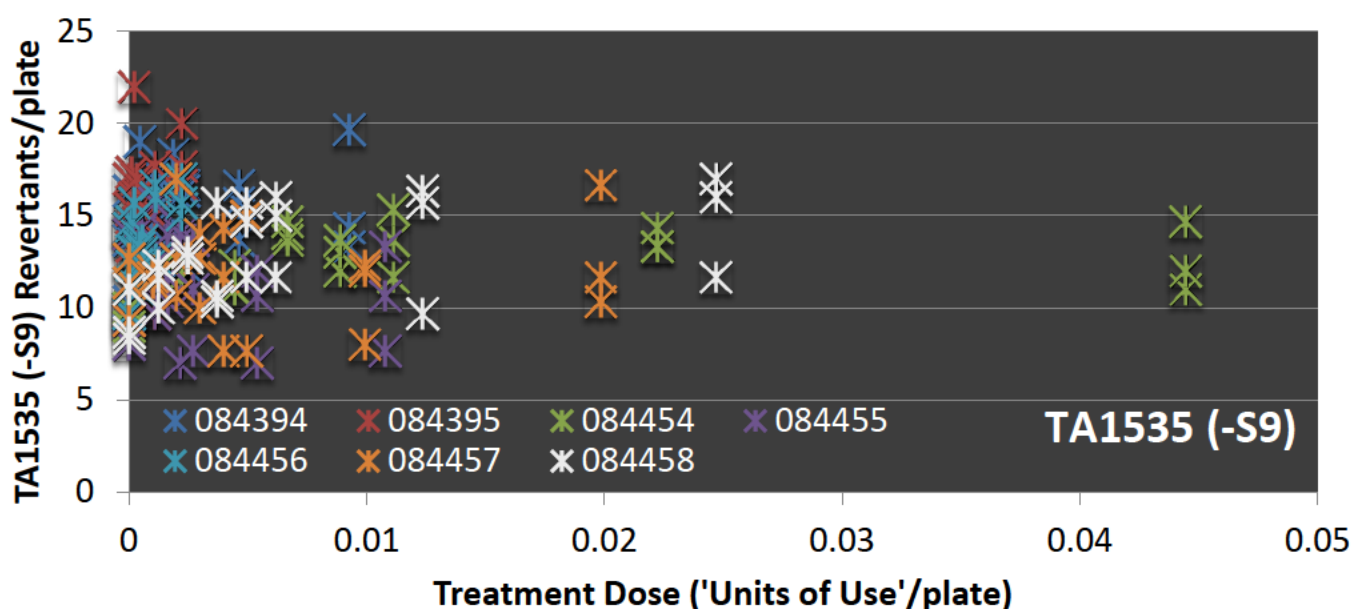
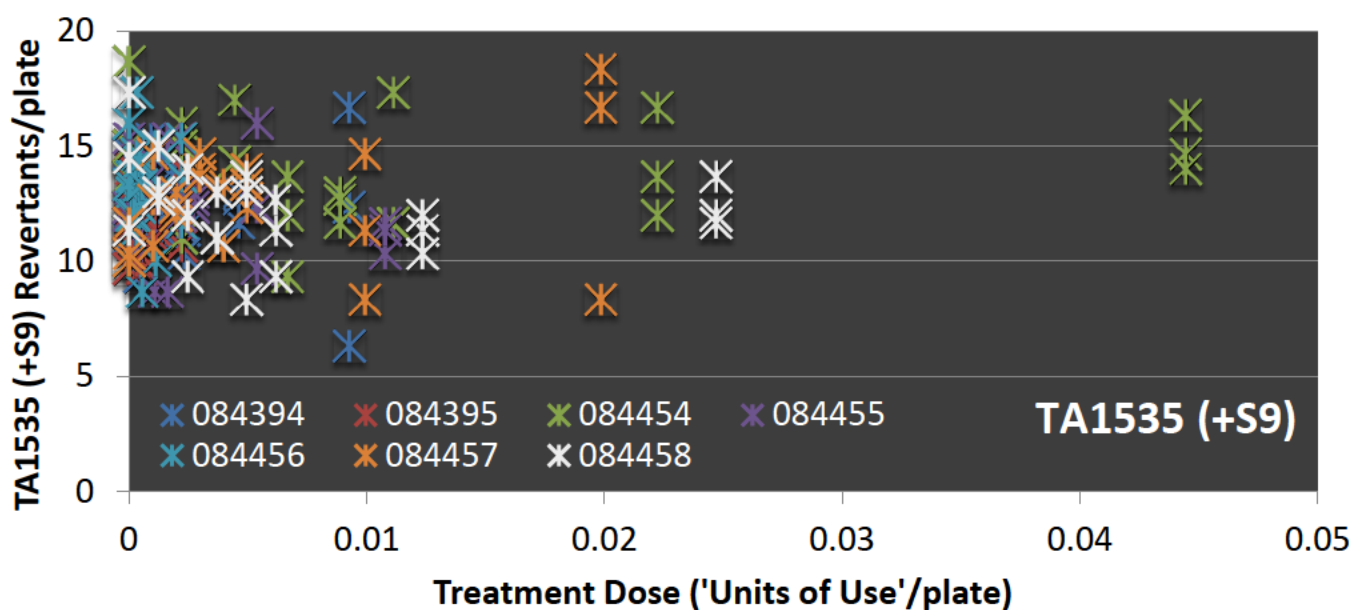
**Number of Mean 'Unit of Use' Slope Estimates Significantly Greater than Zero (0), the Corresponding Number of Paired Comparisons and Comparison Method**

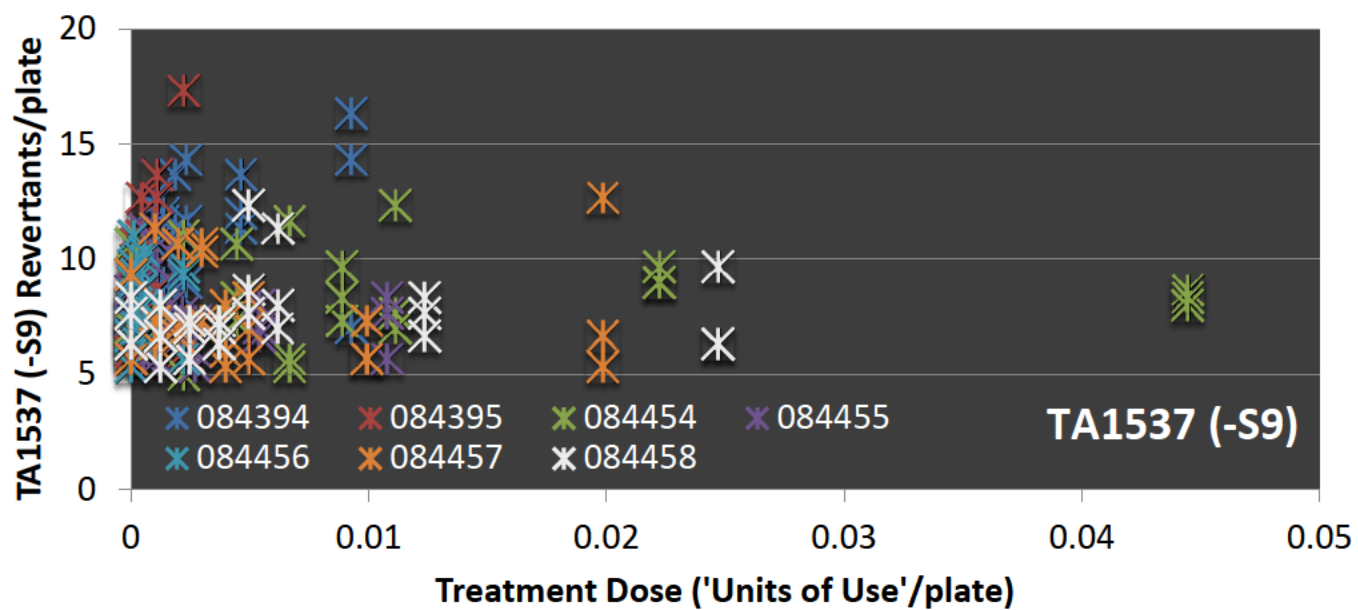
**One-Way ANOVA and ANOVA-Based Comparisons Among Test Samples of Mean 'Unit of Use' Slope Estimates that are Significantly Greater than Zero (0)**

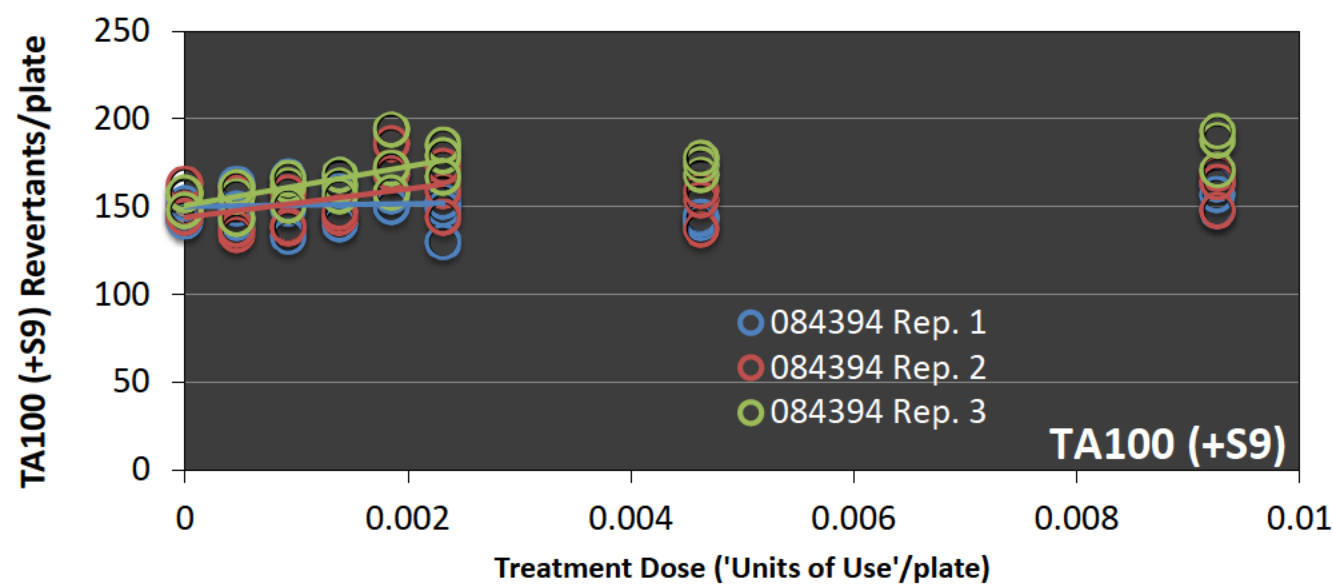
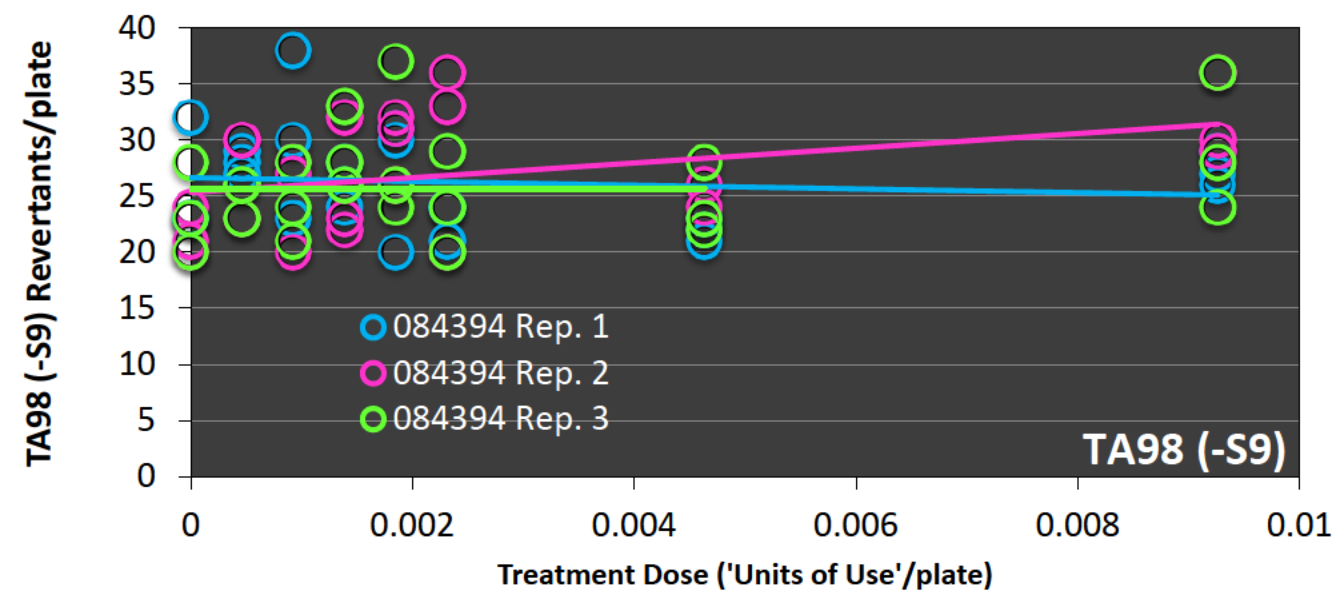
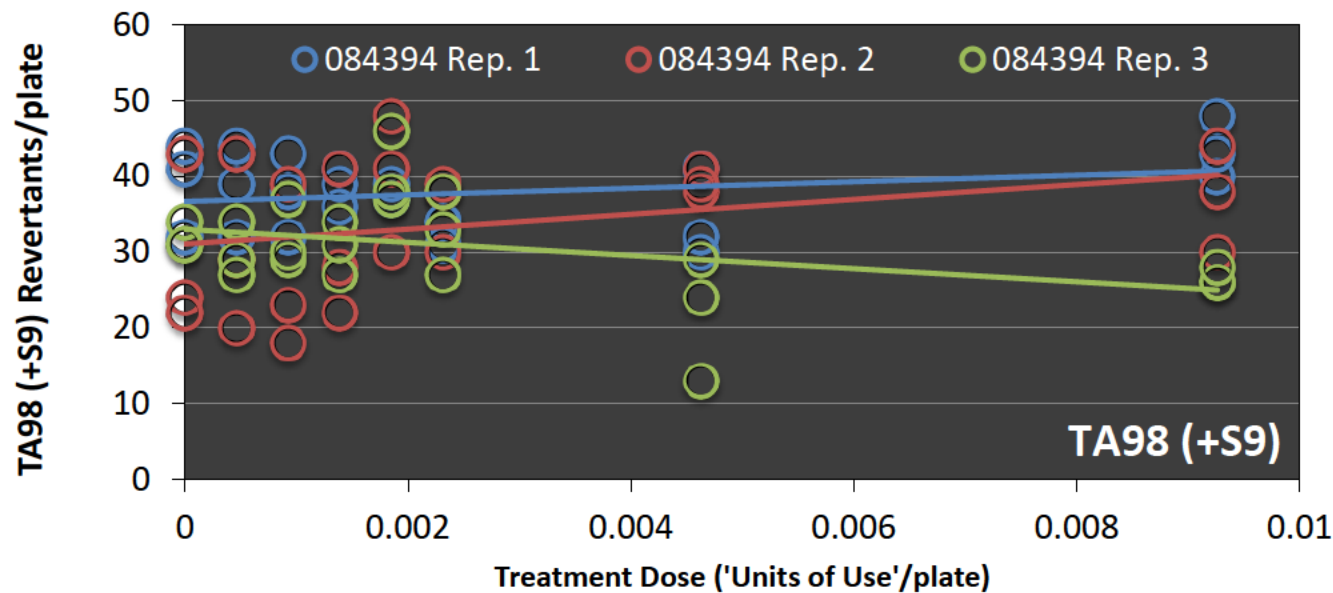


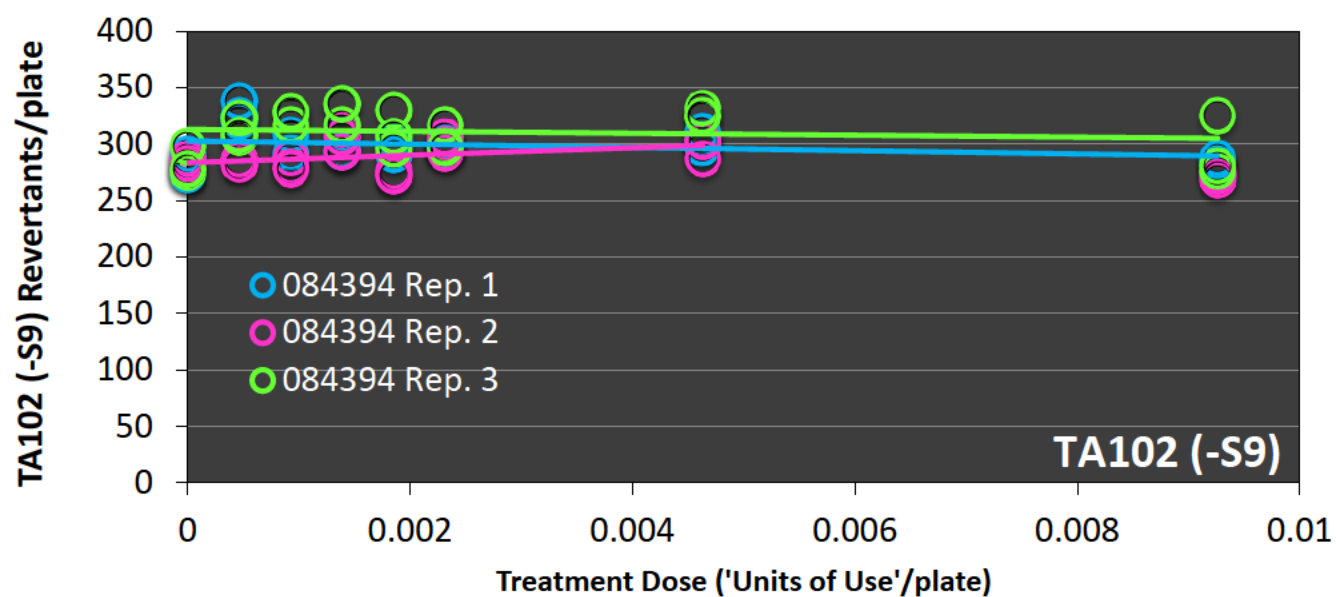
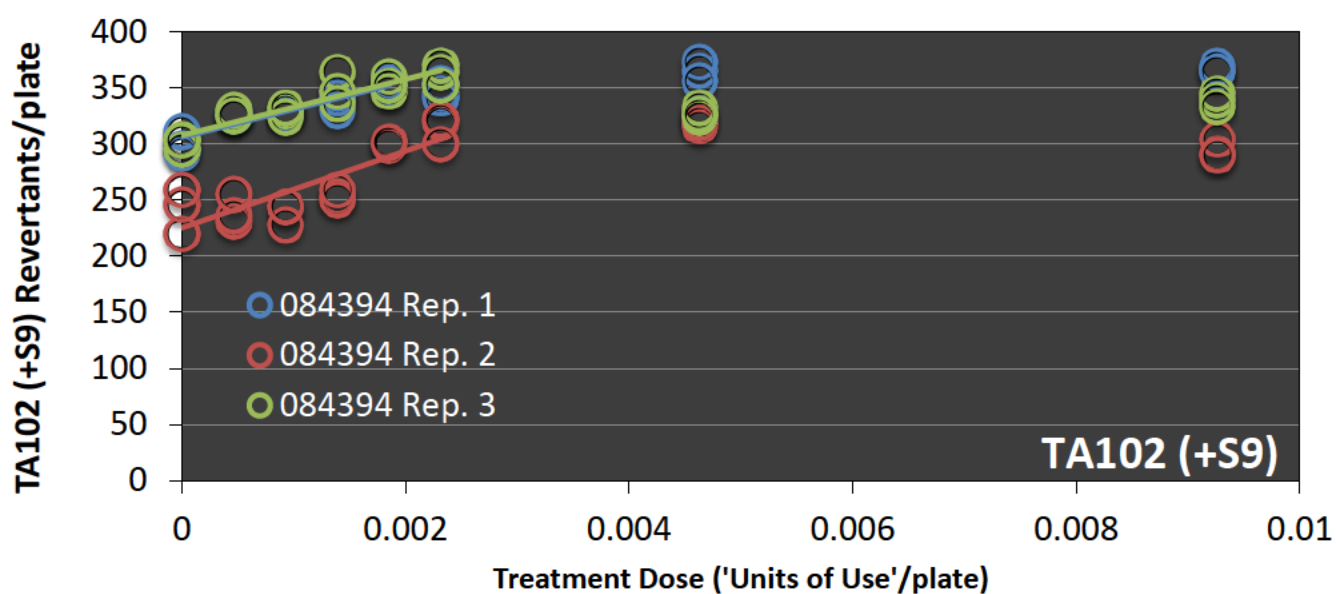
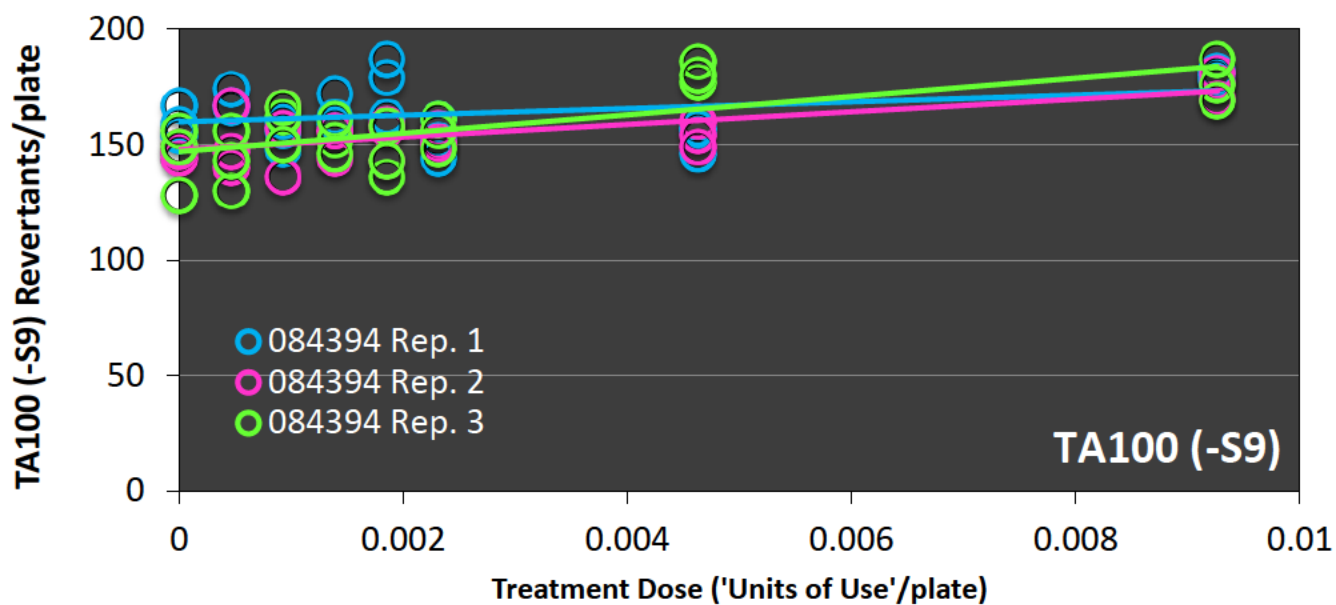


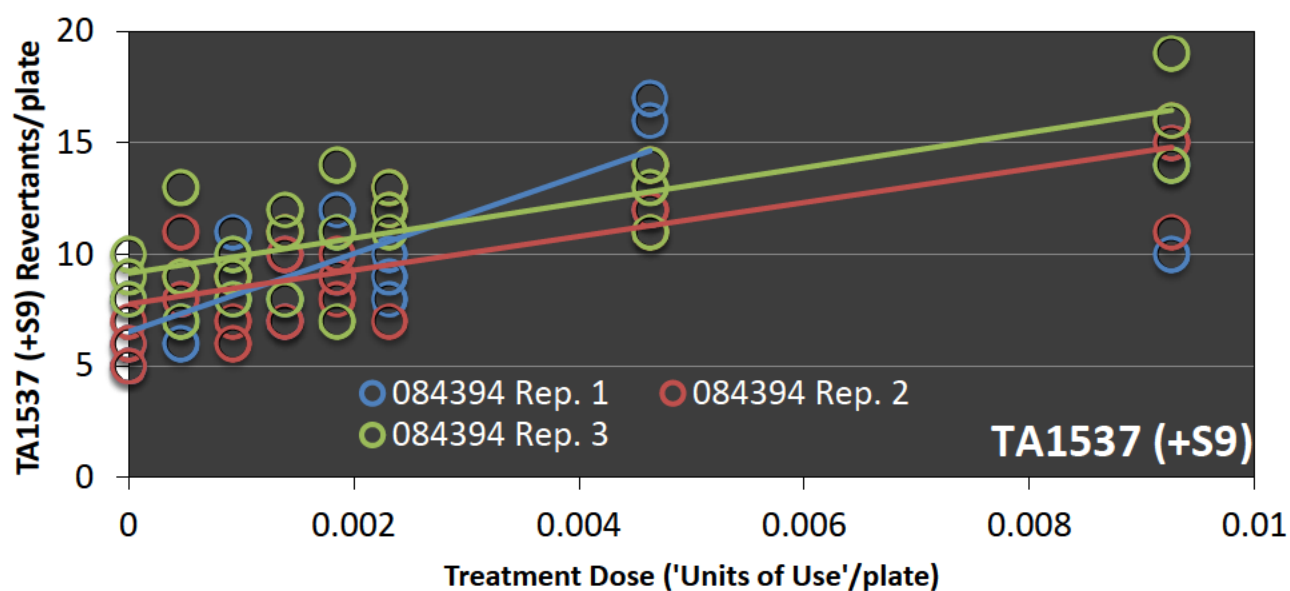
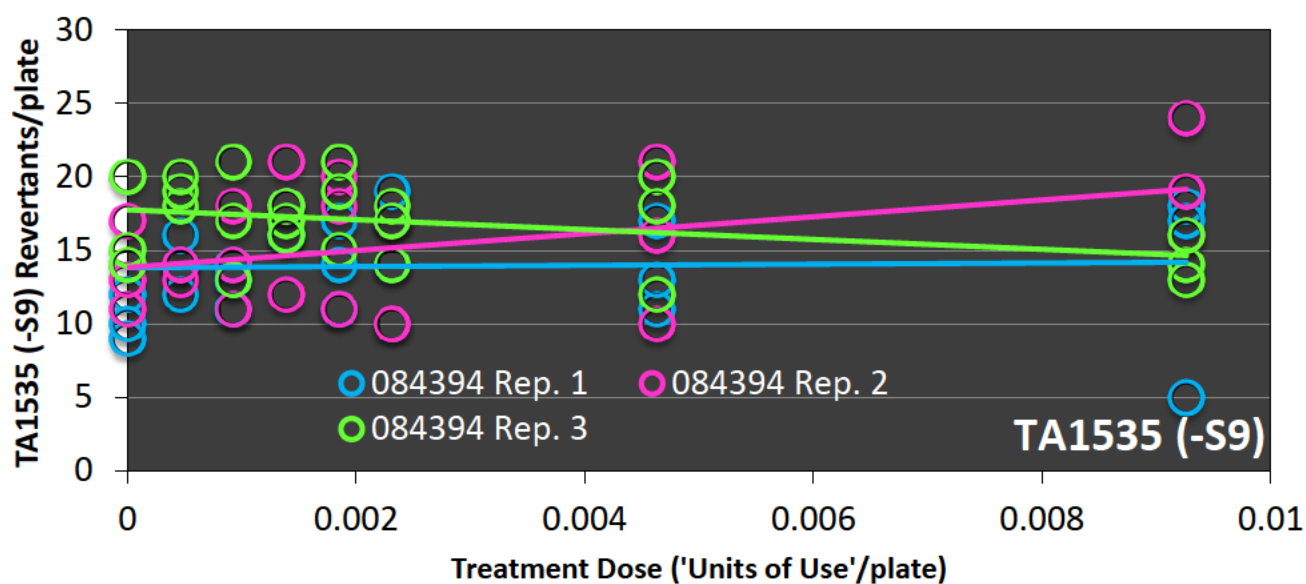
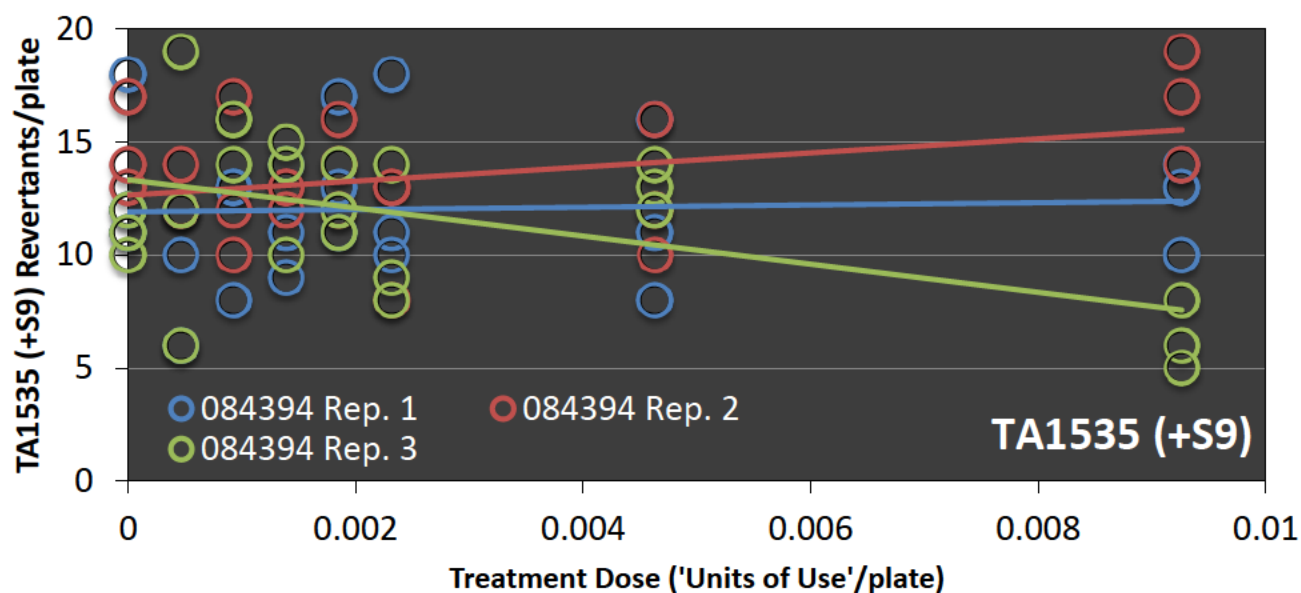


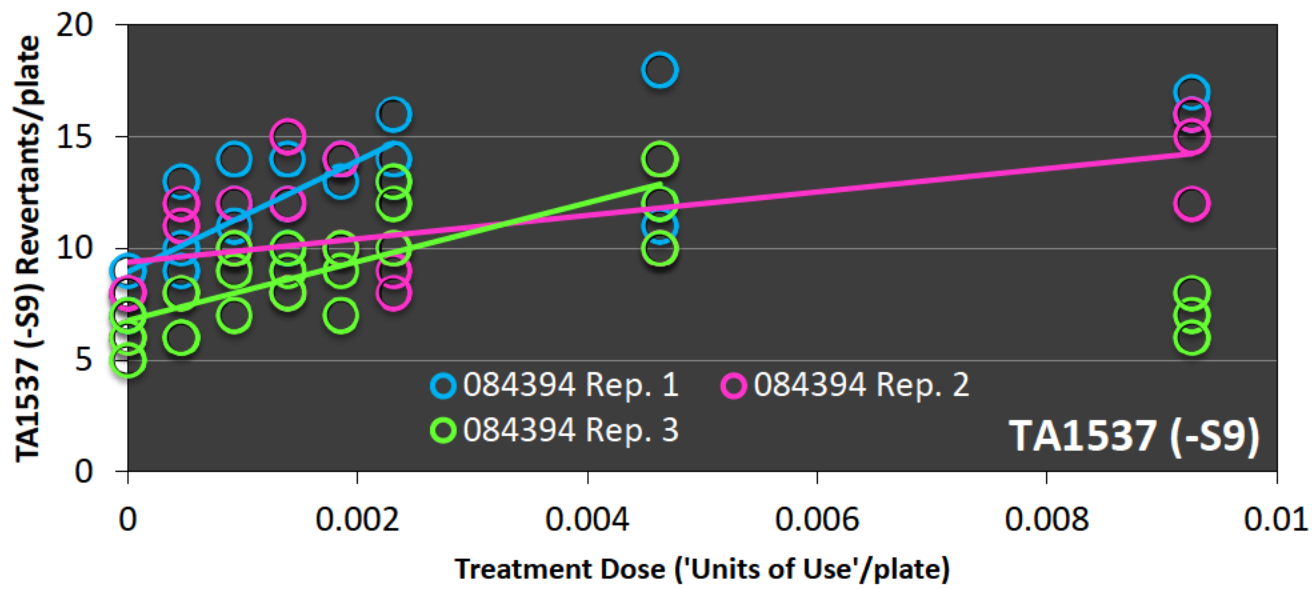




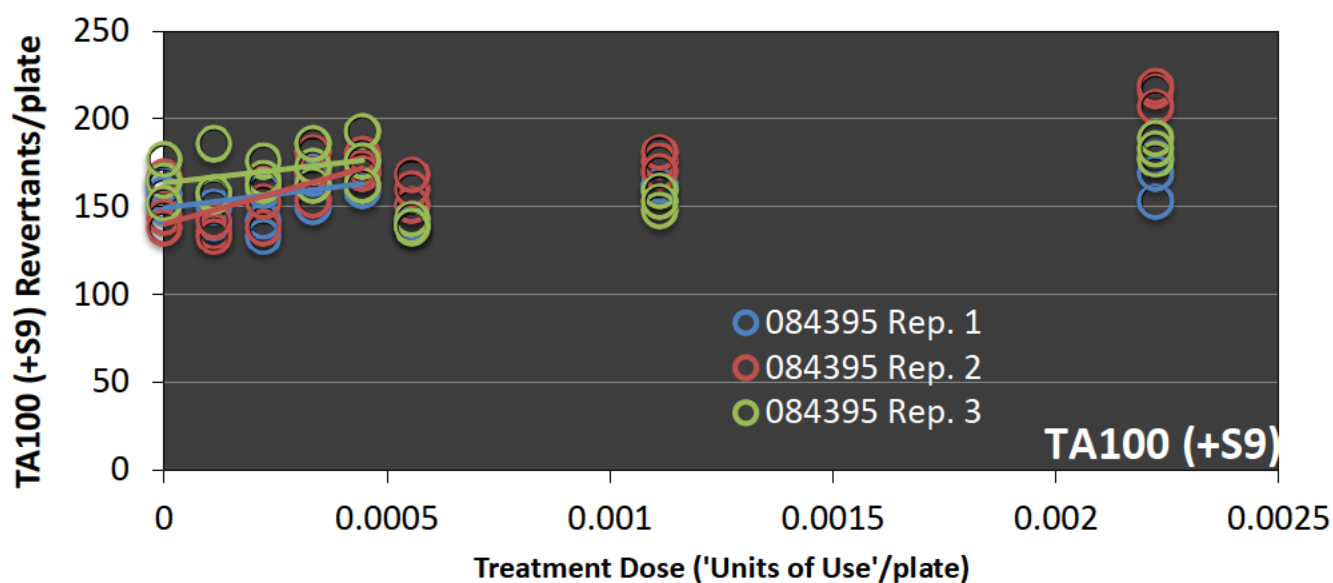
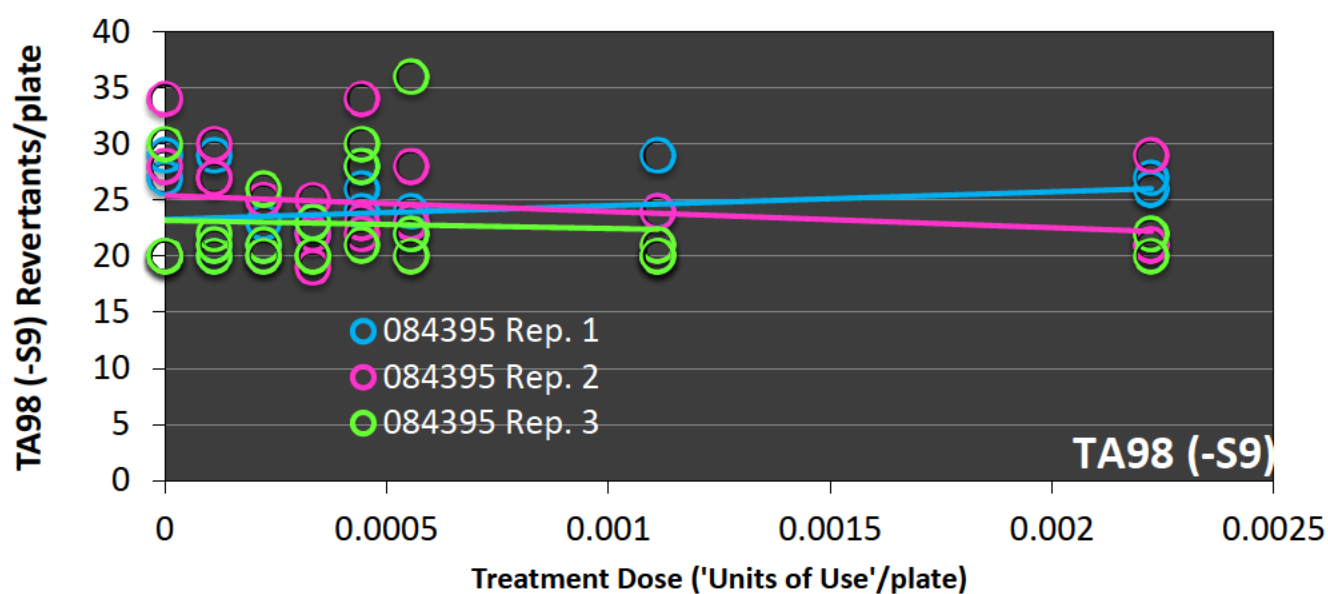
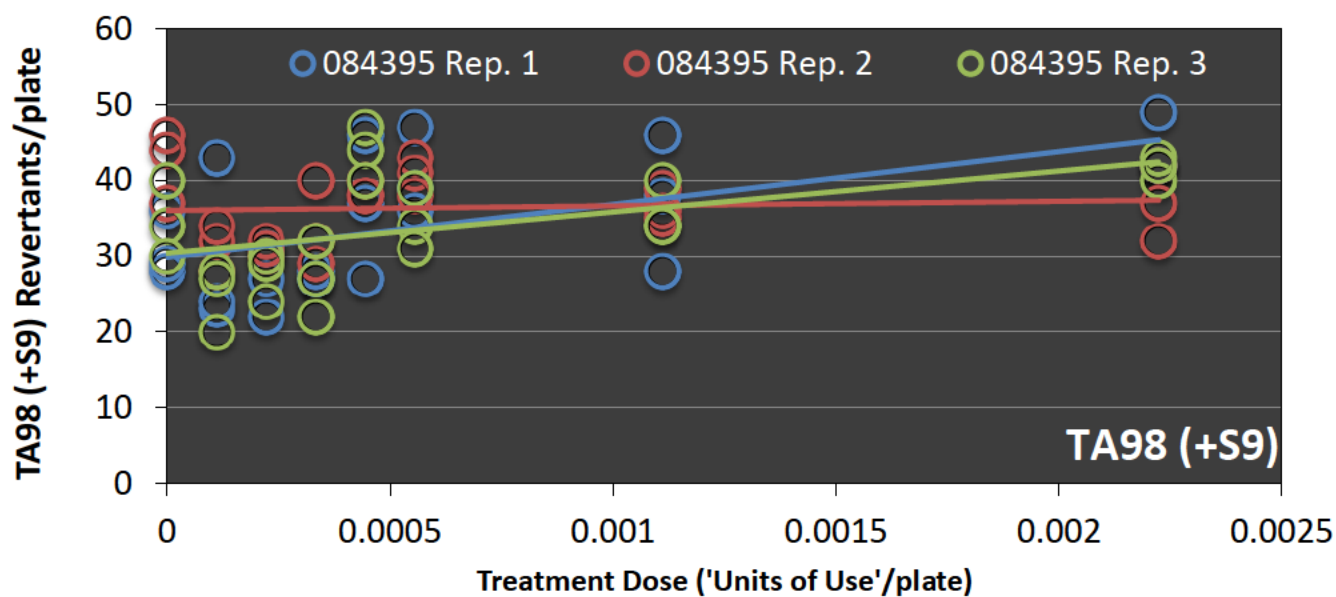




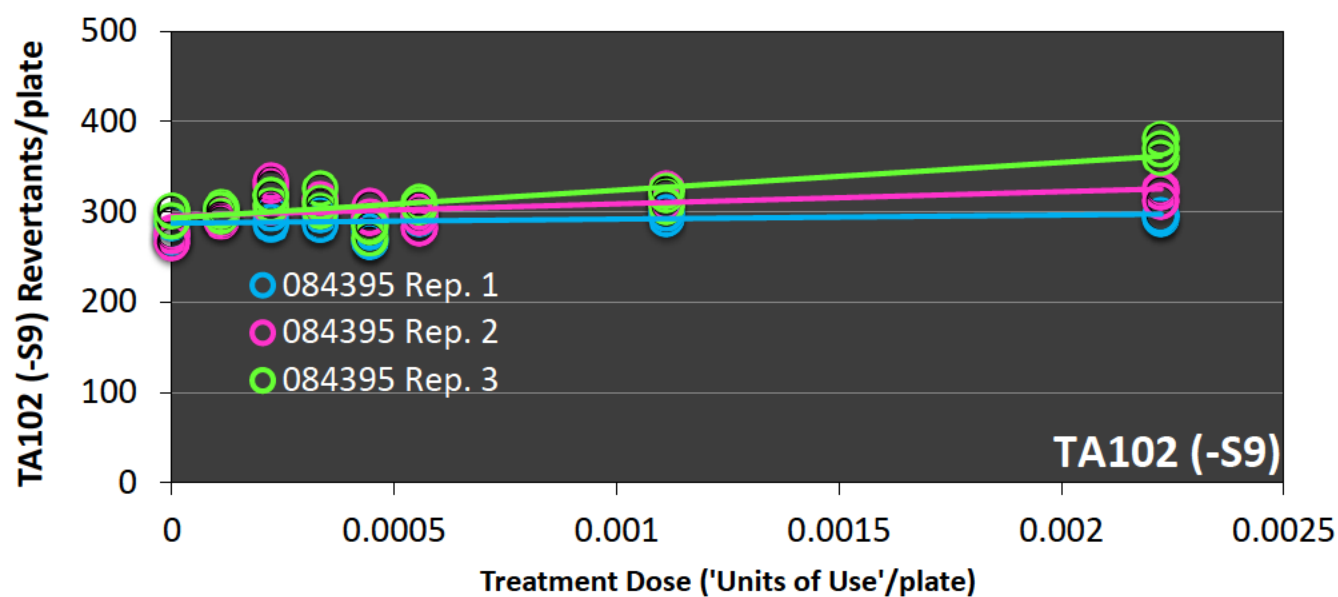
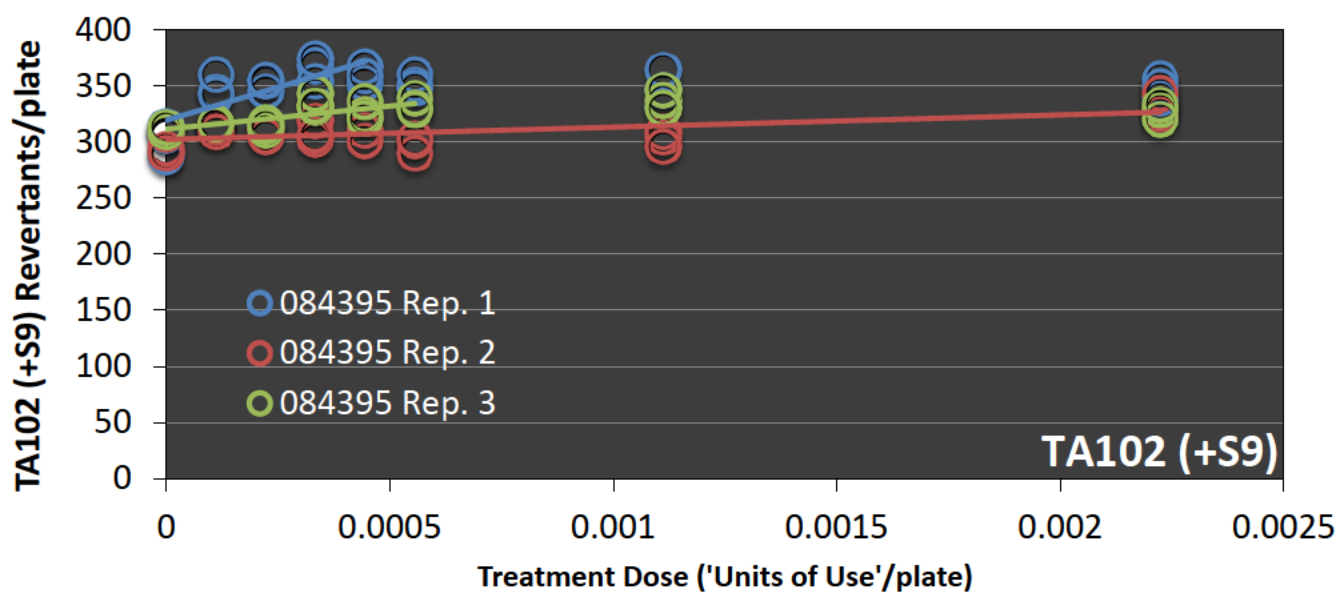
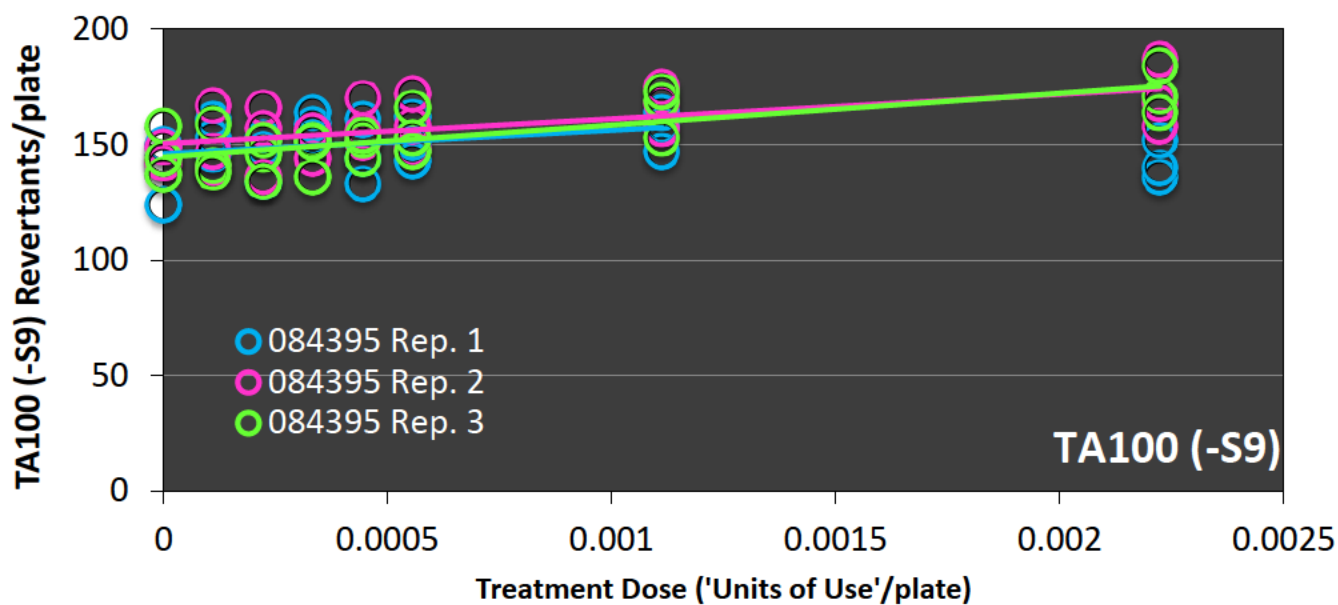


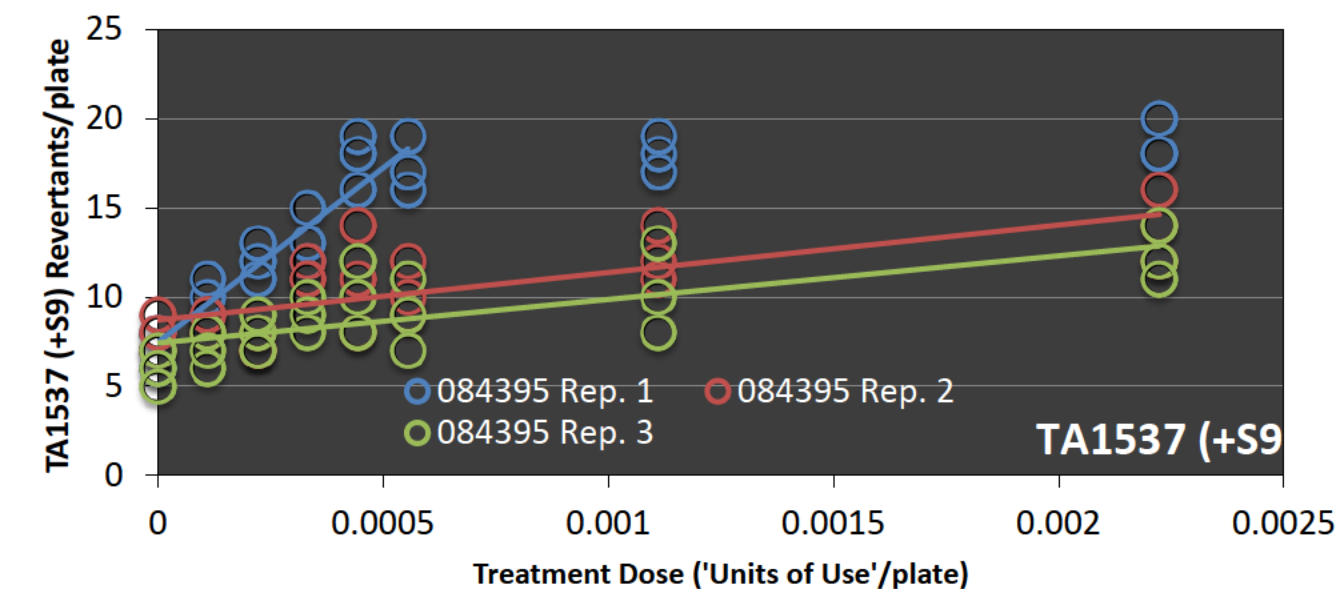
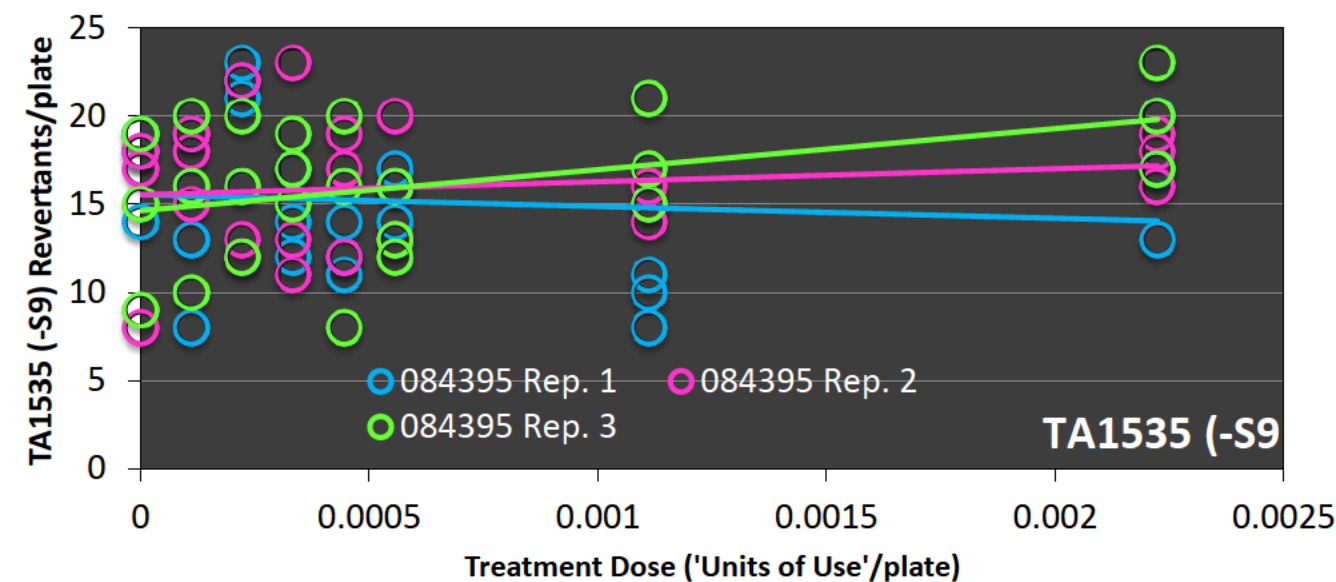
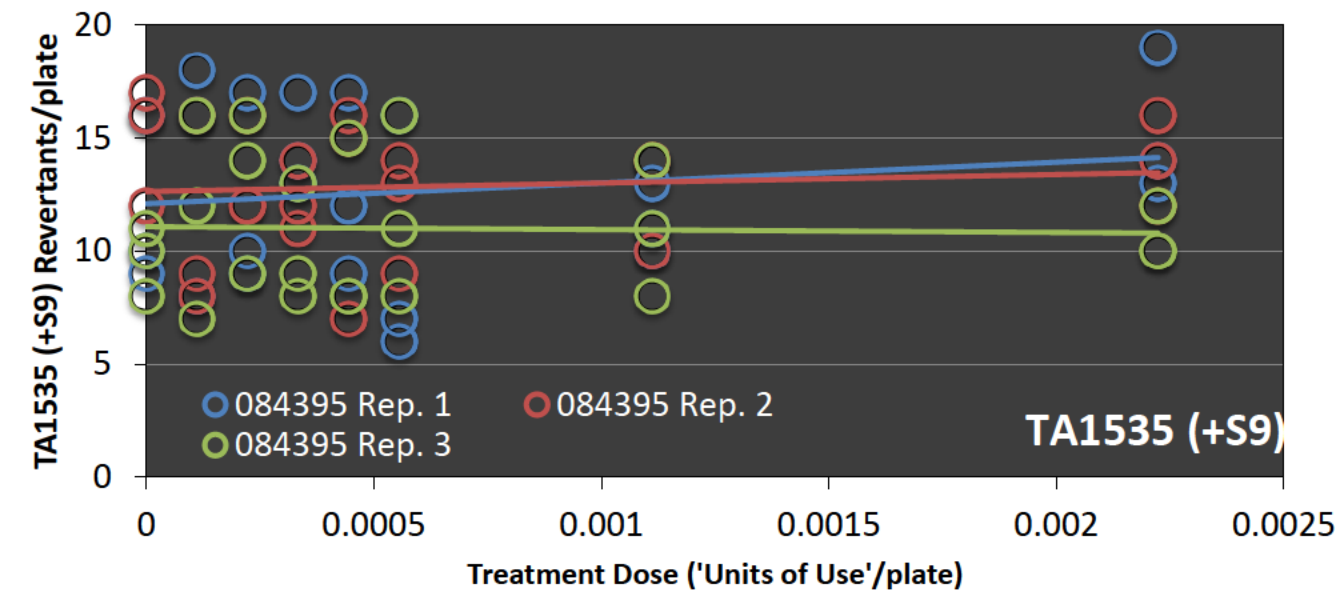


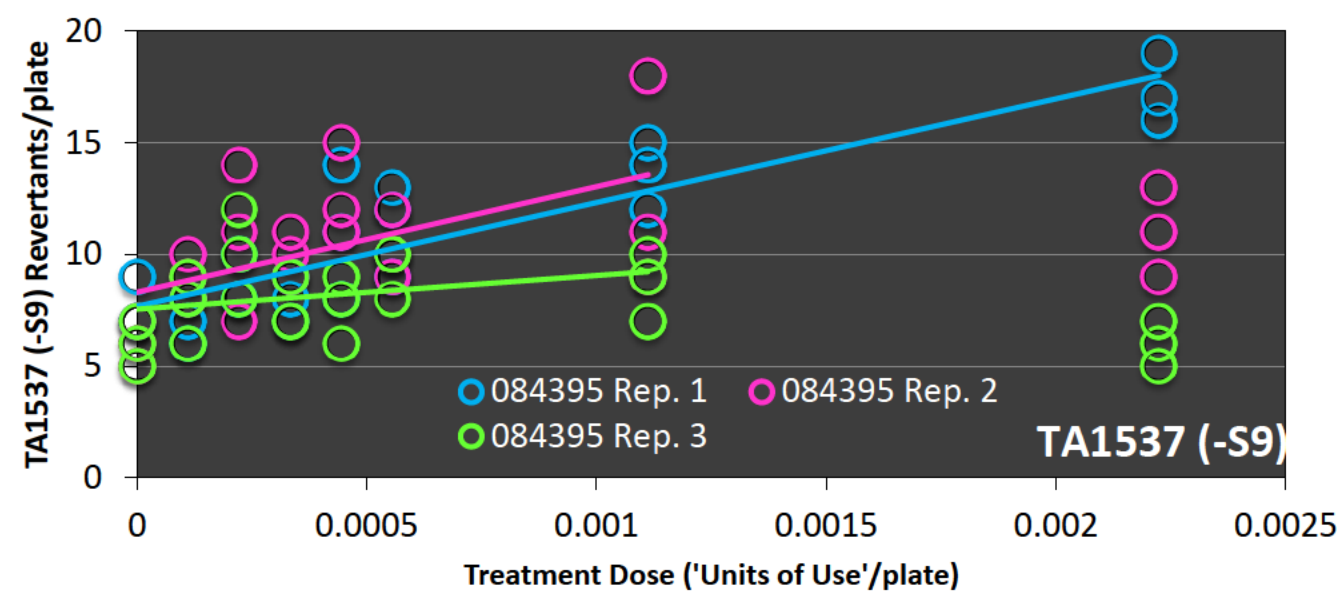


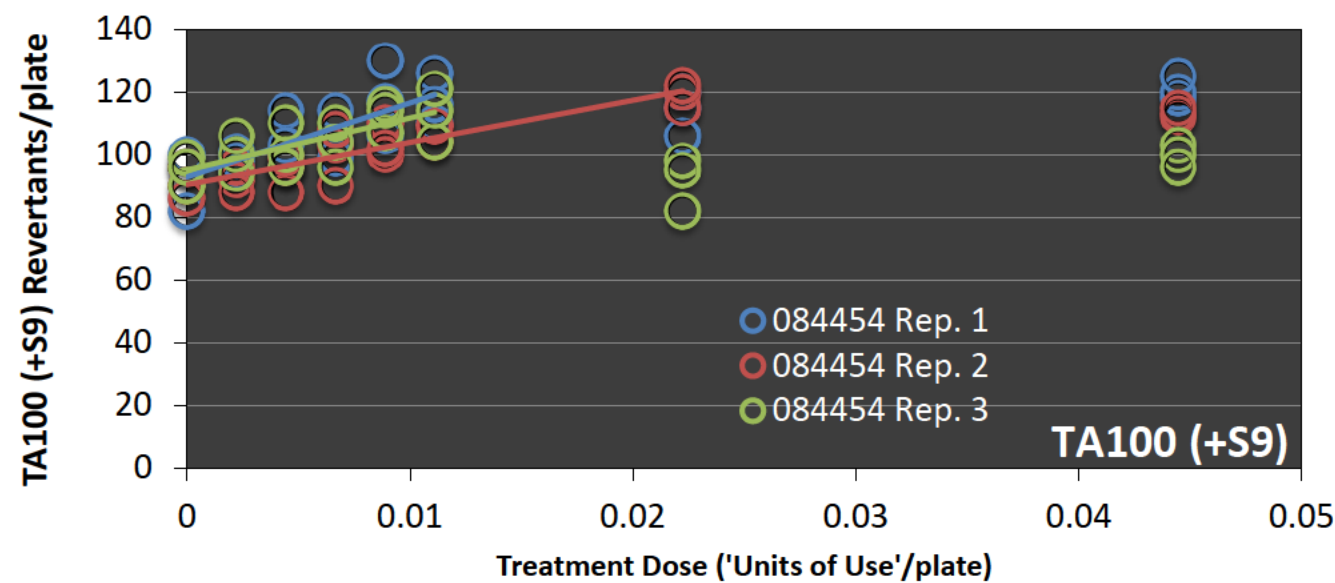
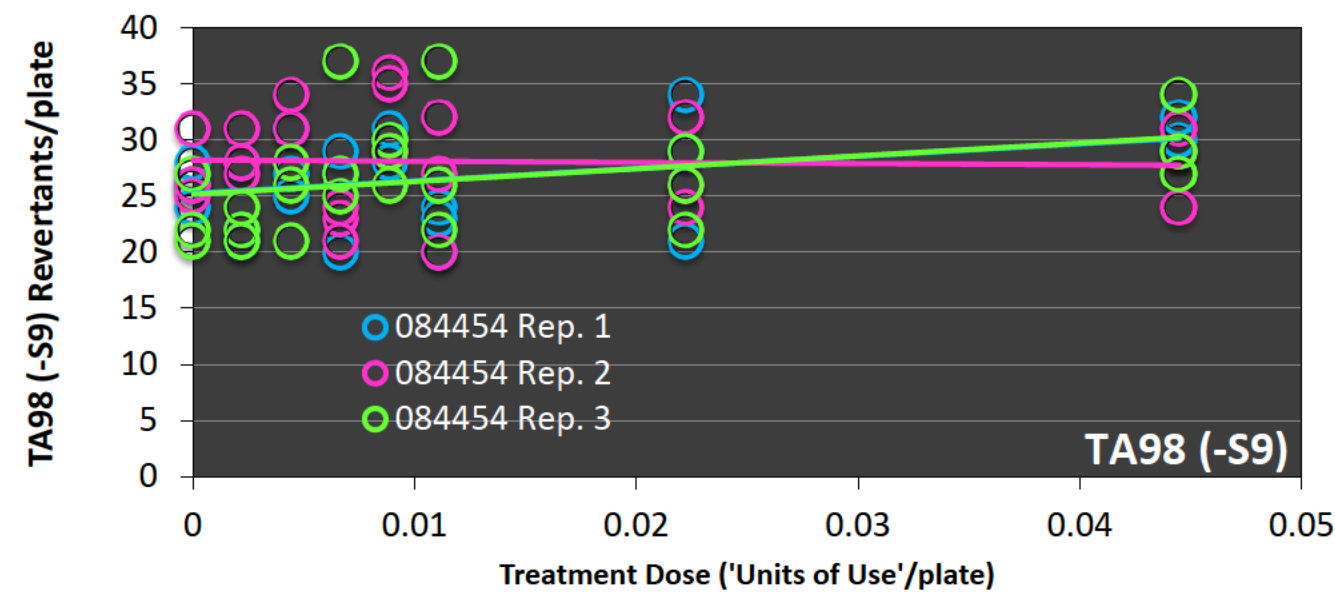
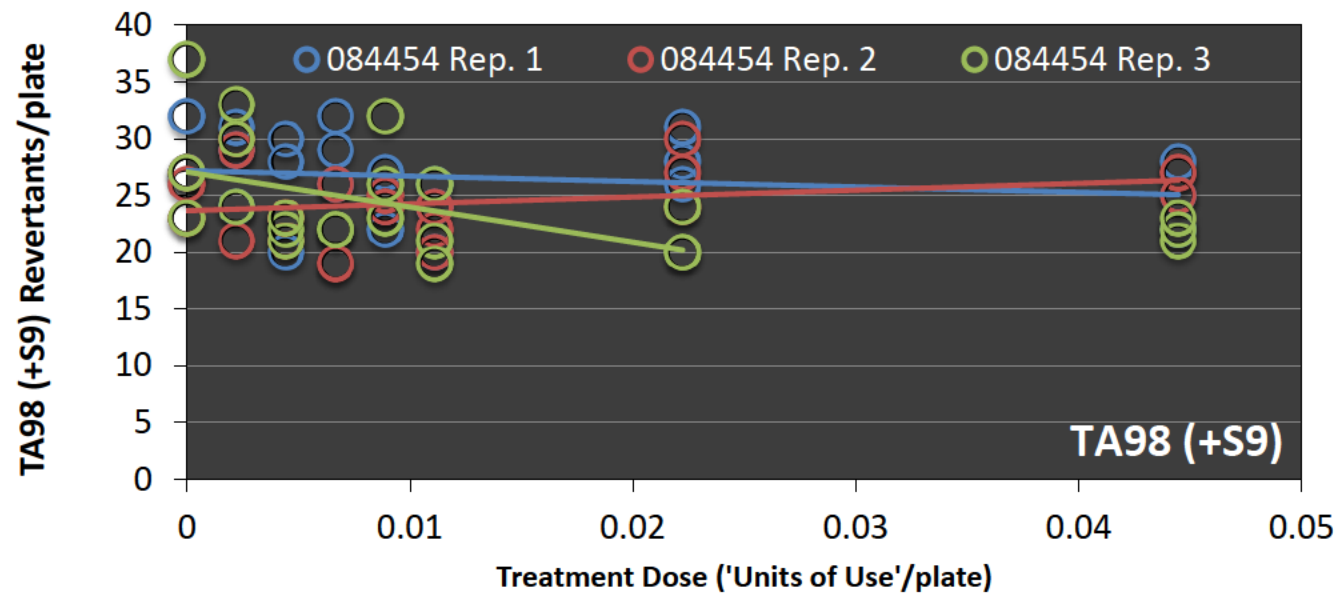


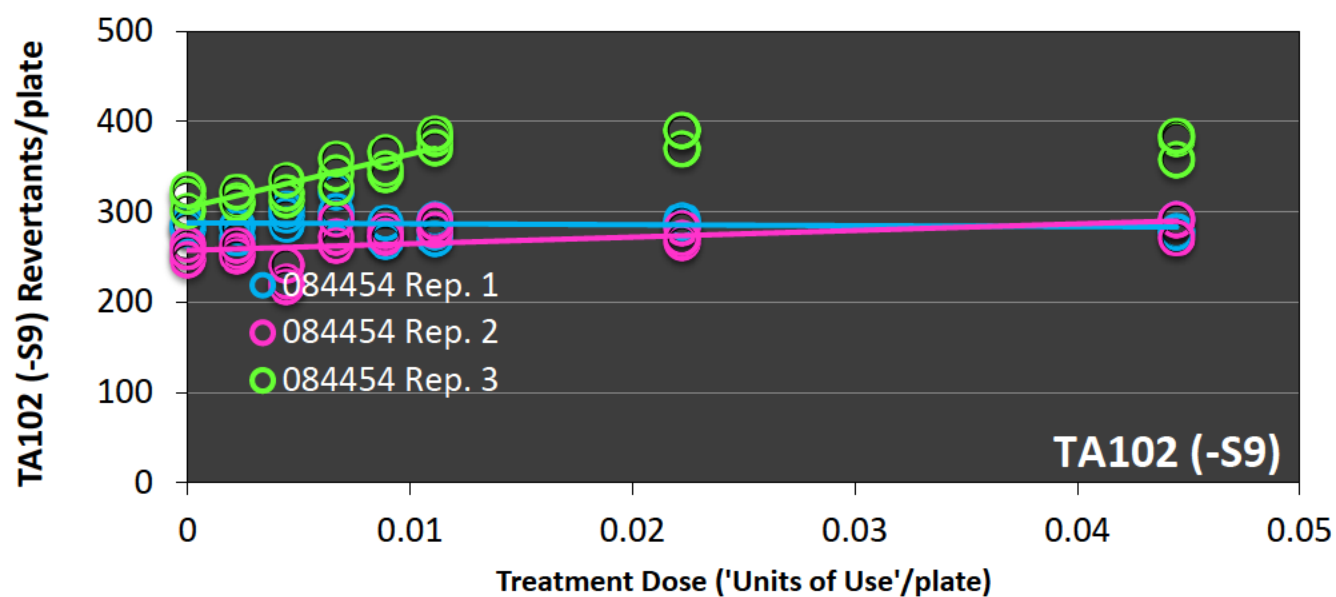
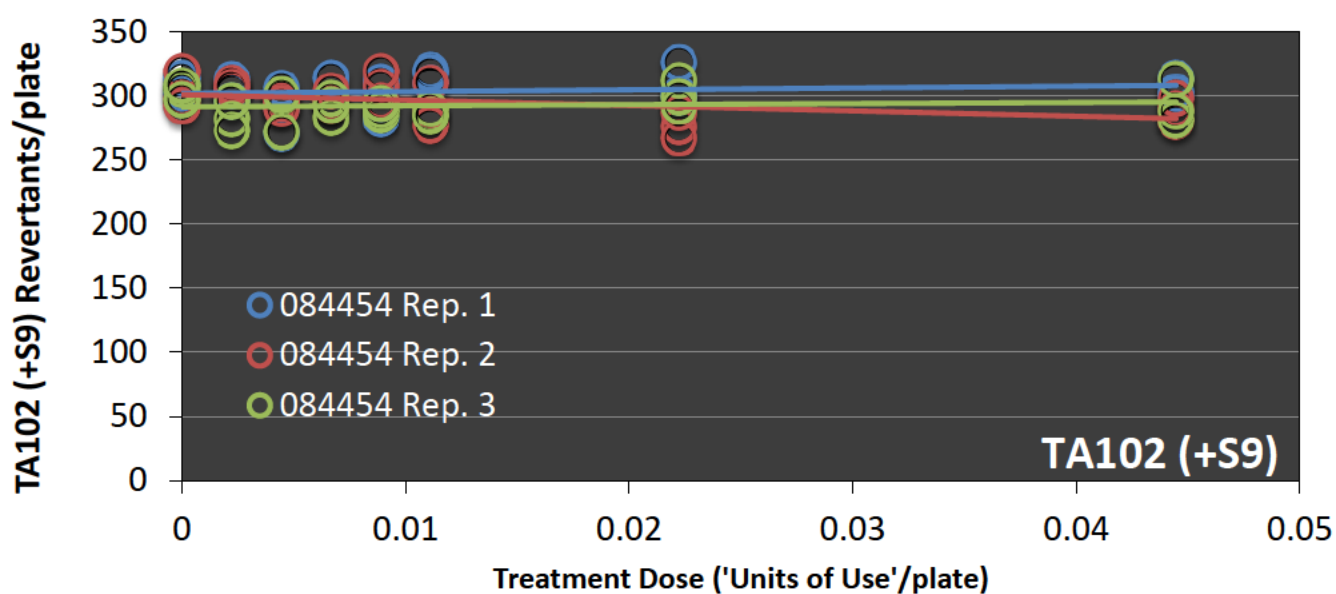
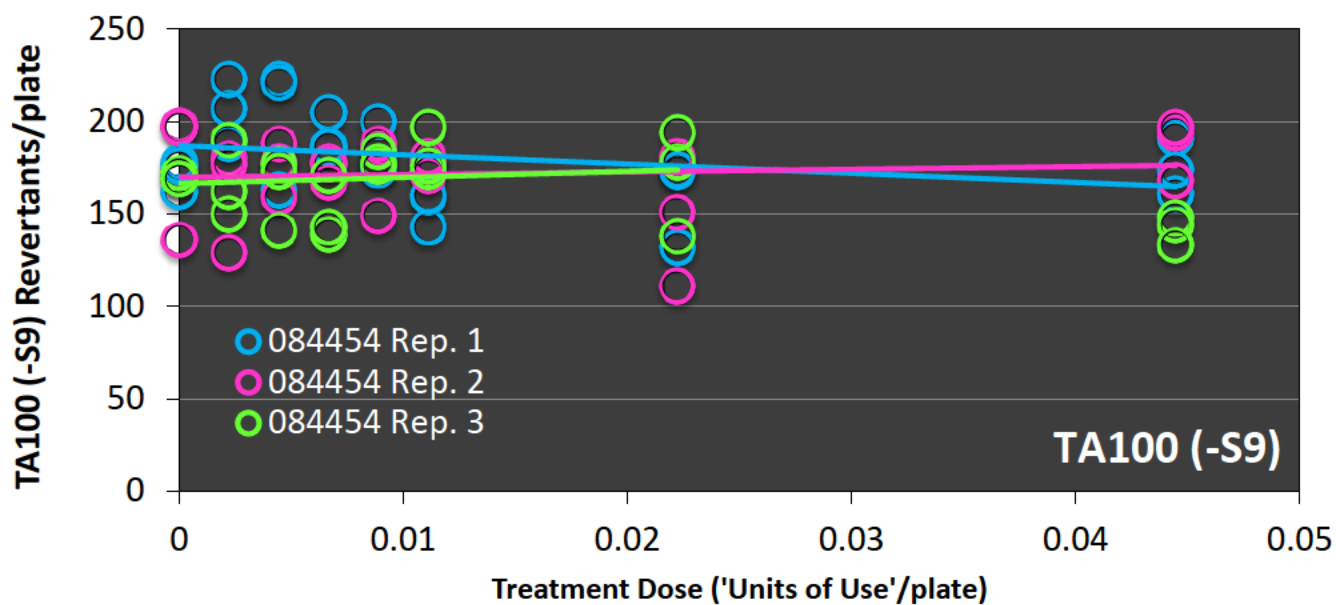


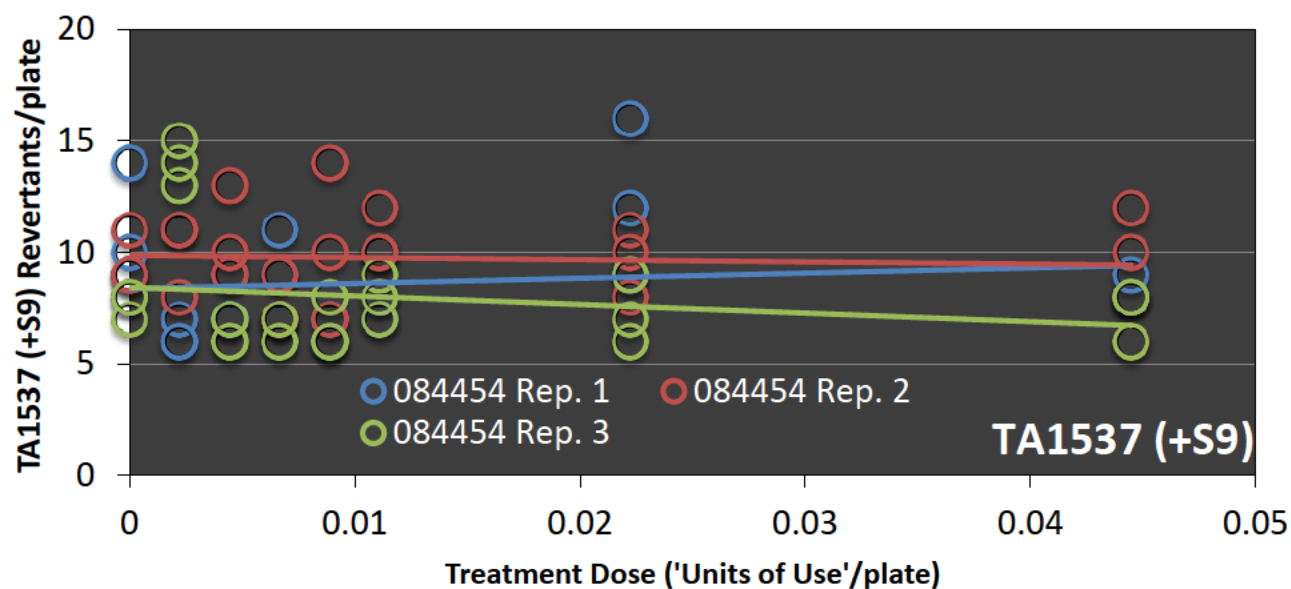
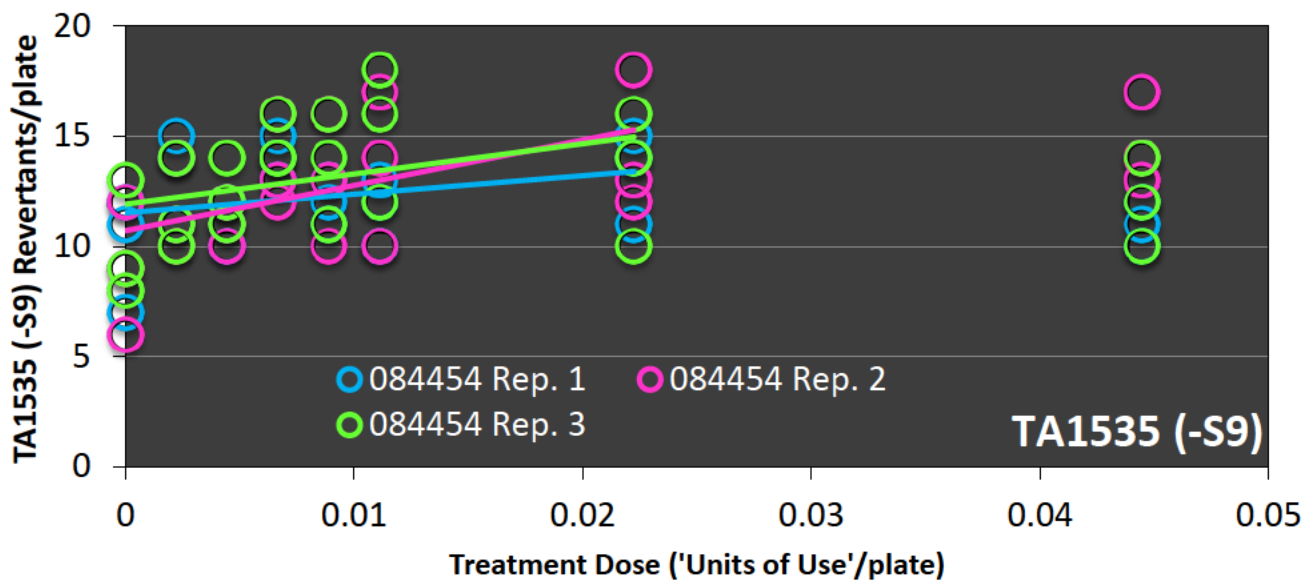
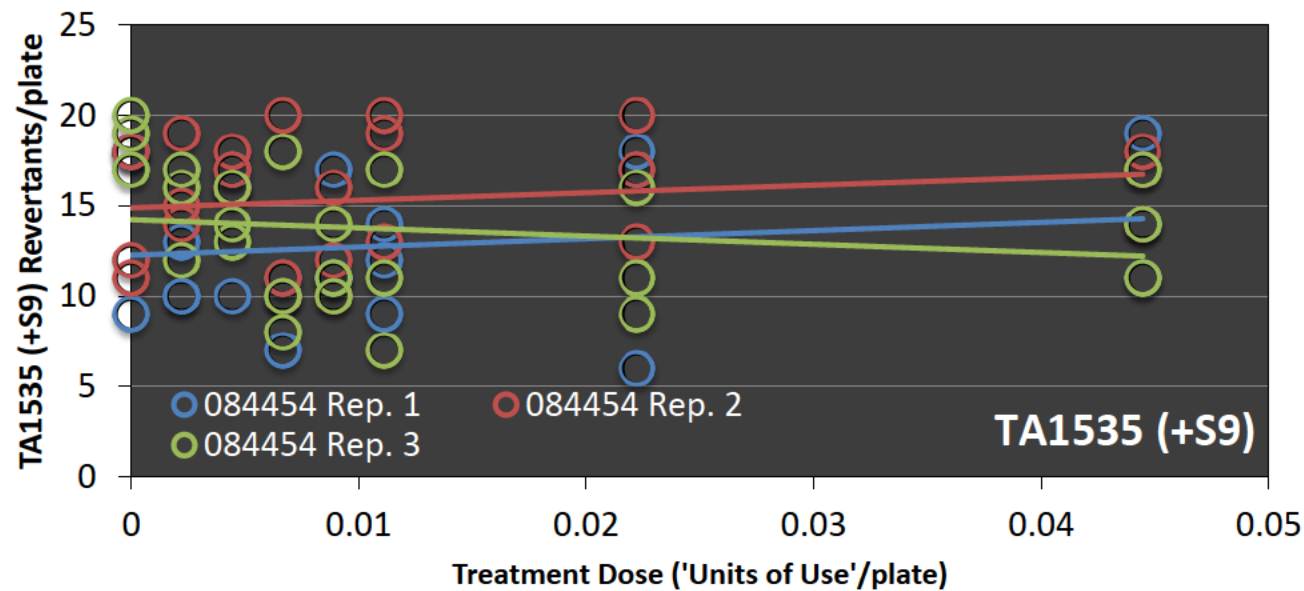


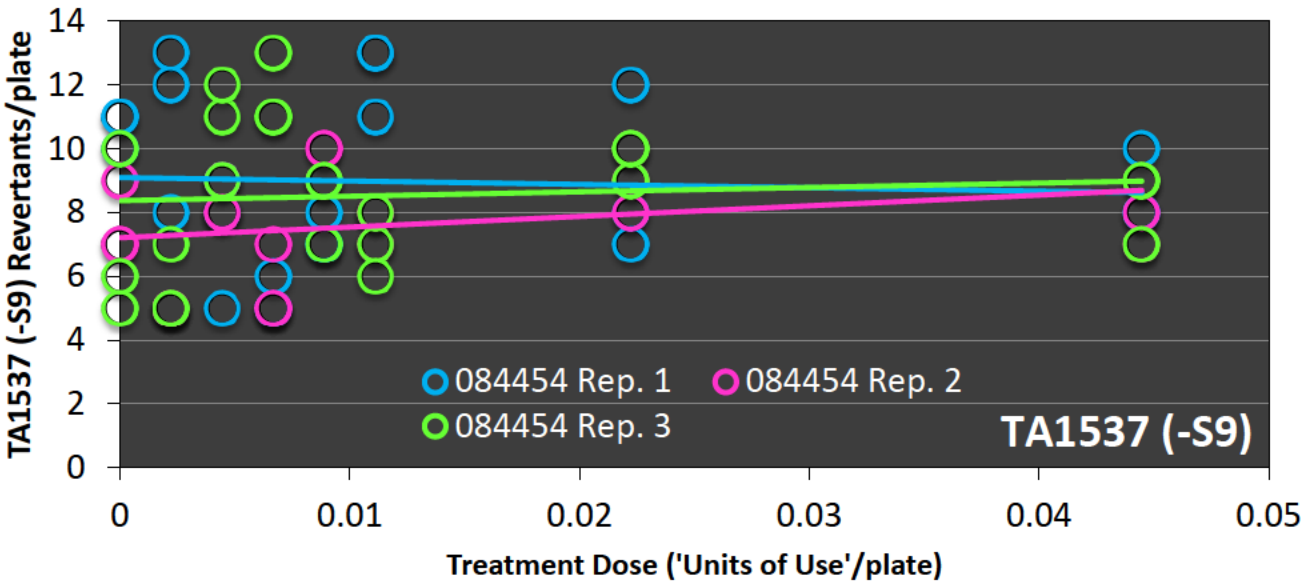




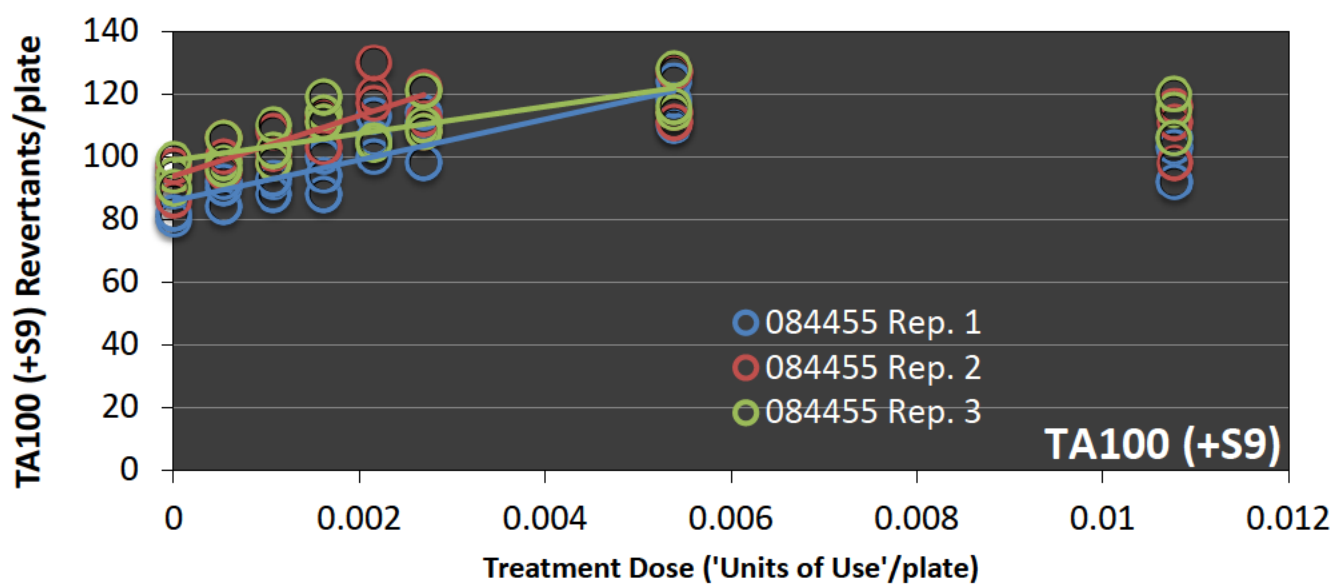
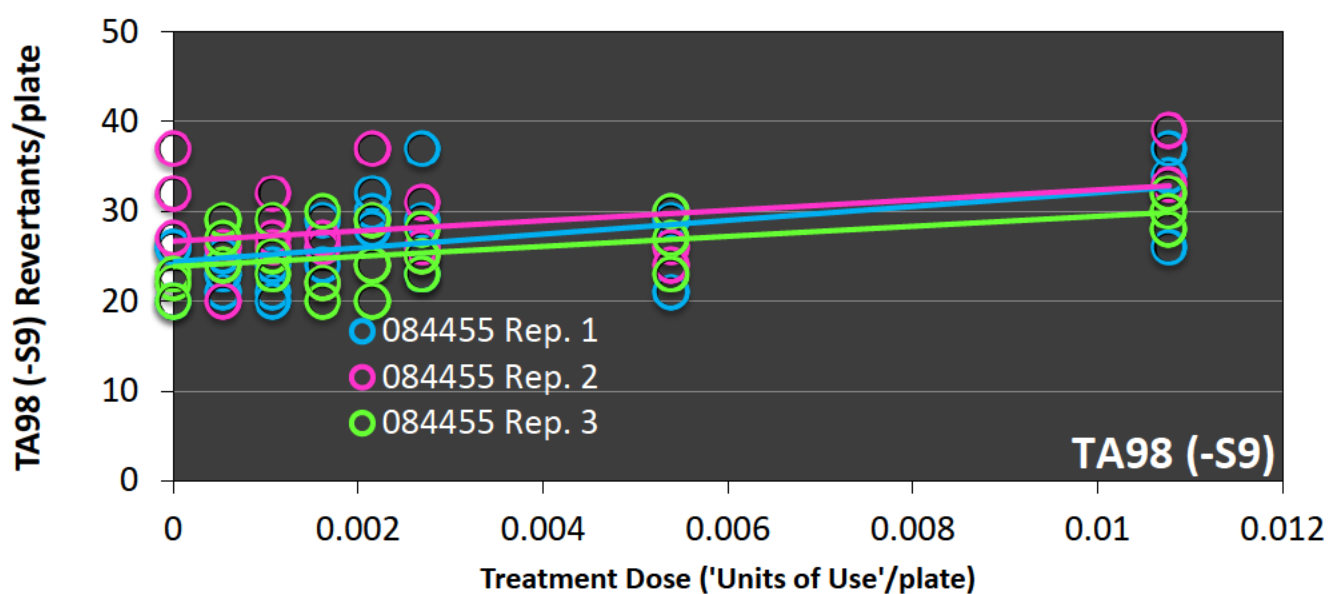
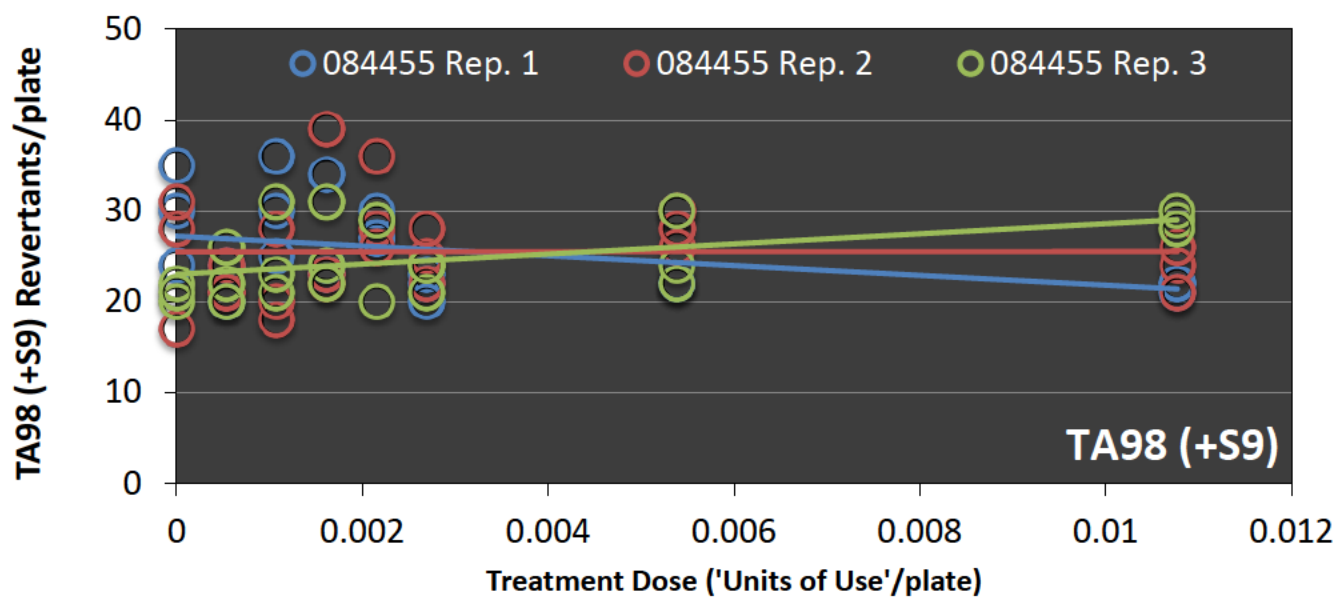




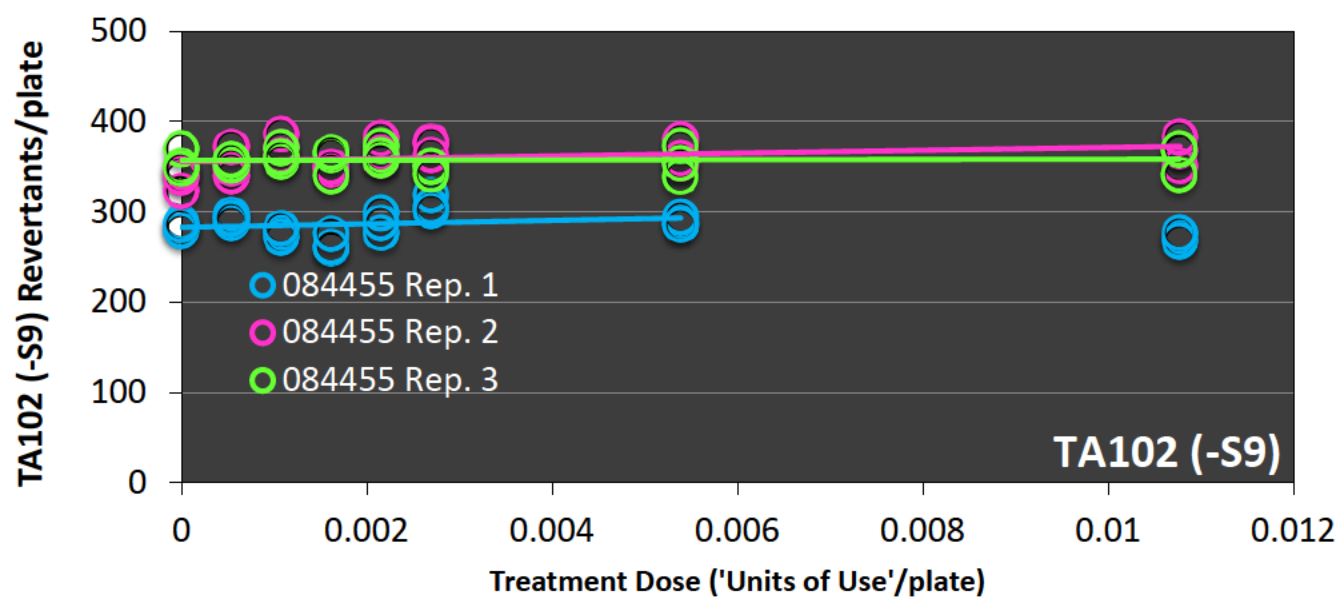
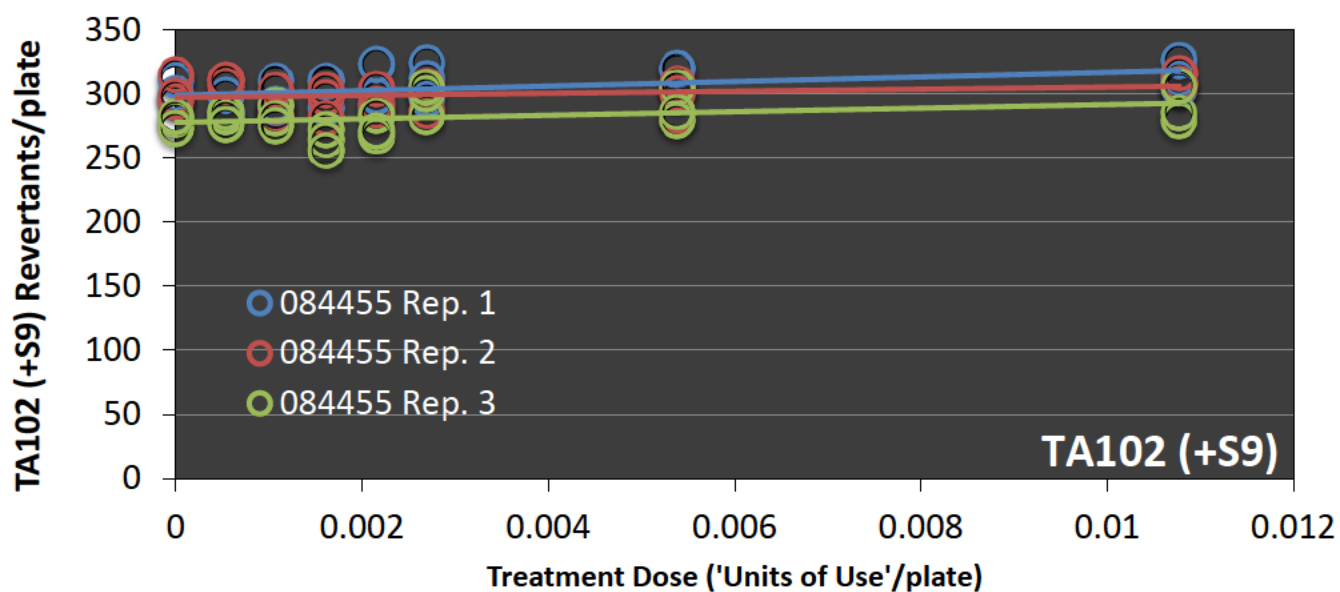
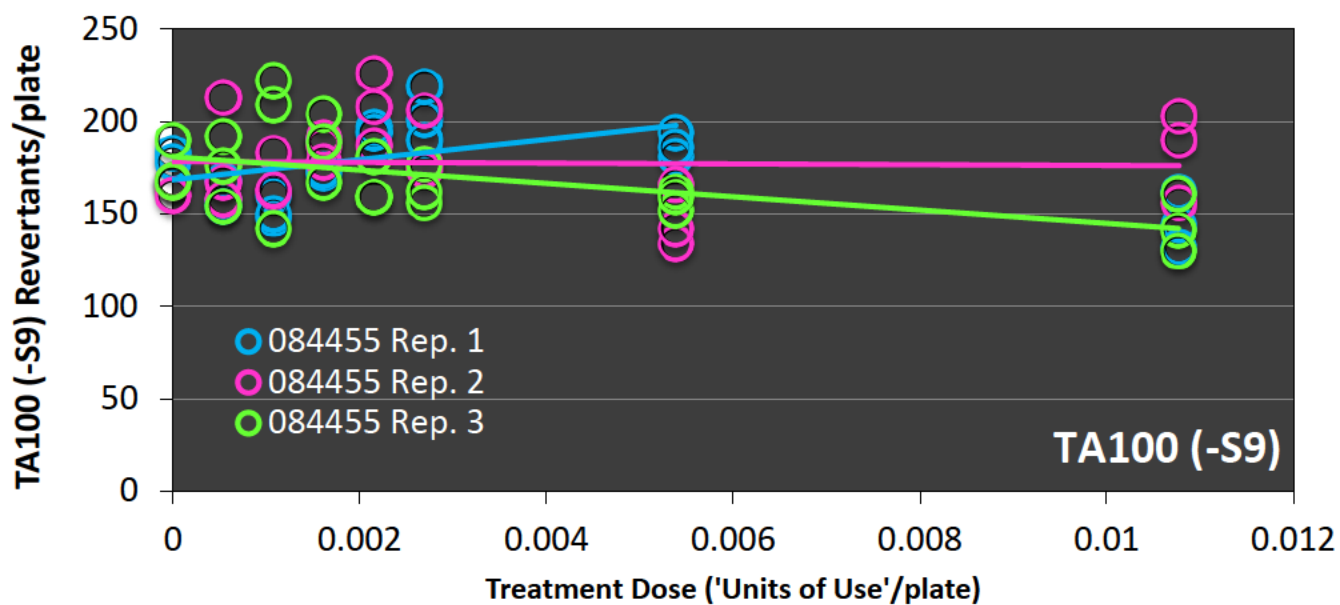


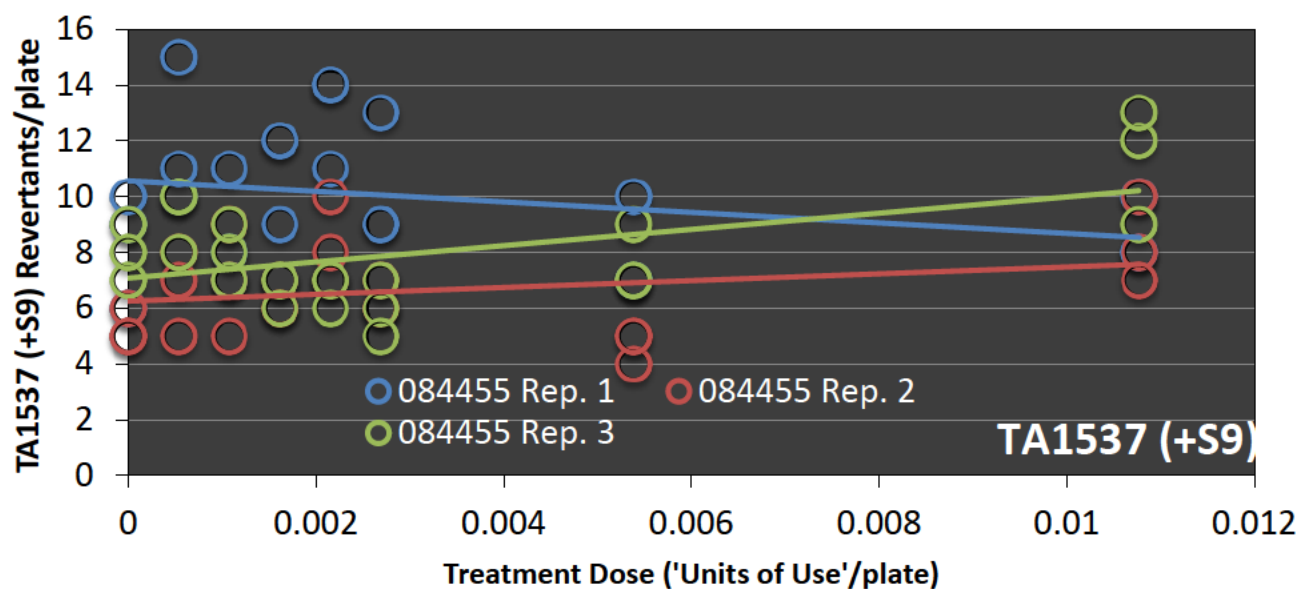
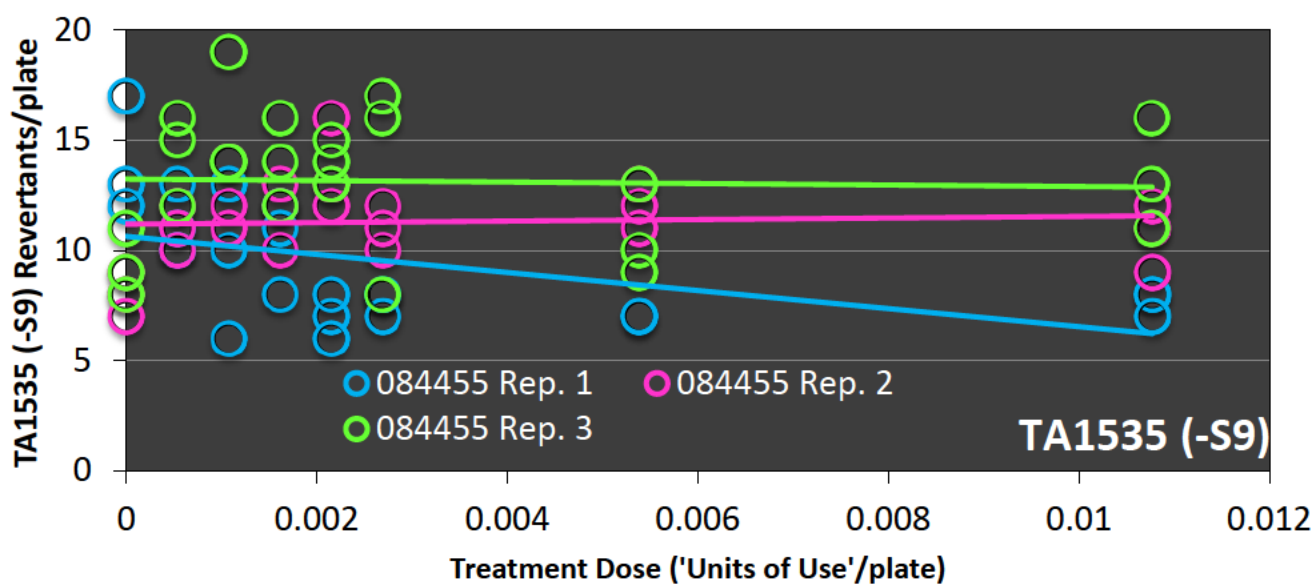
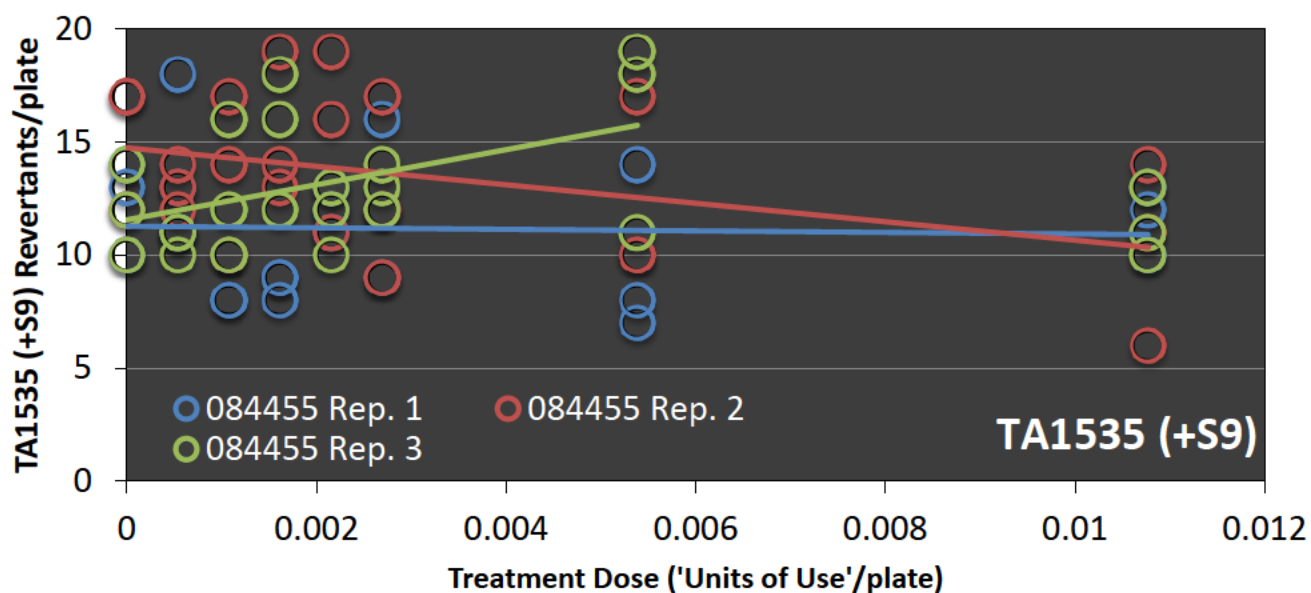


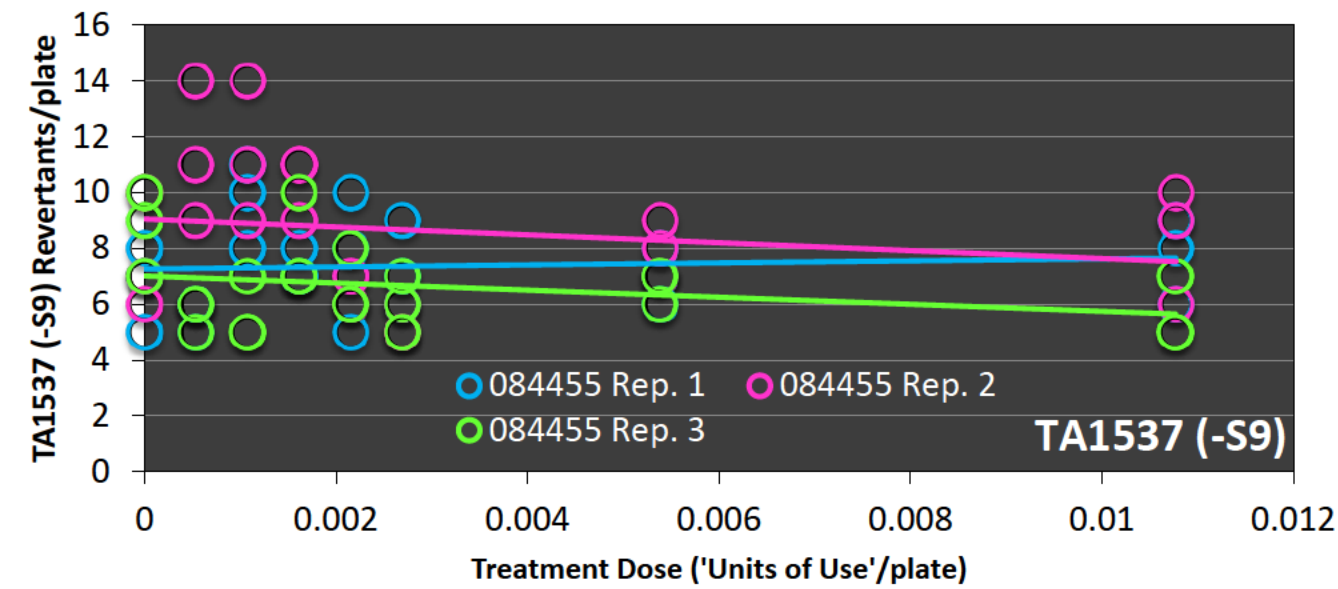


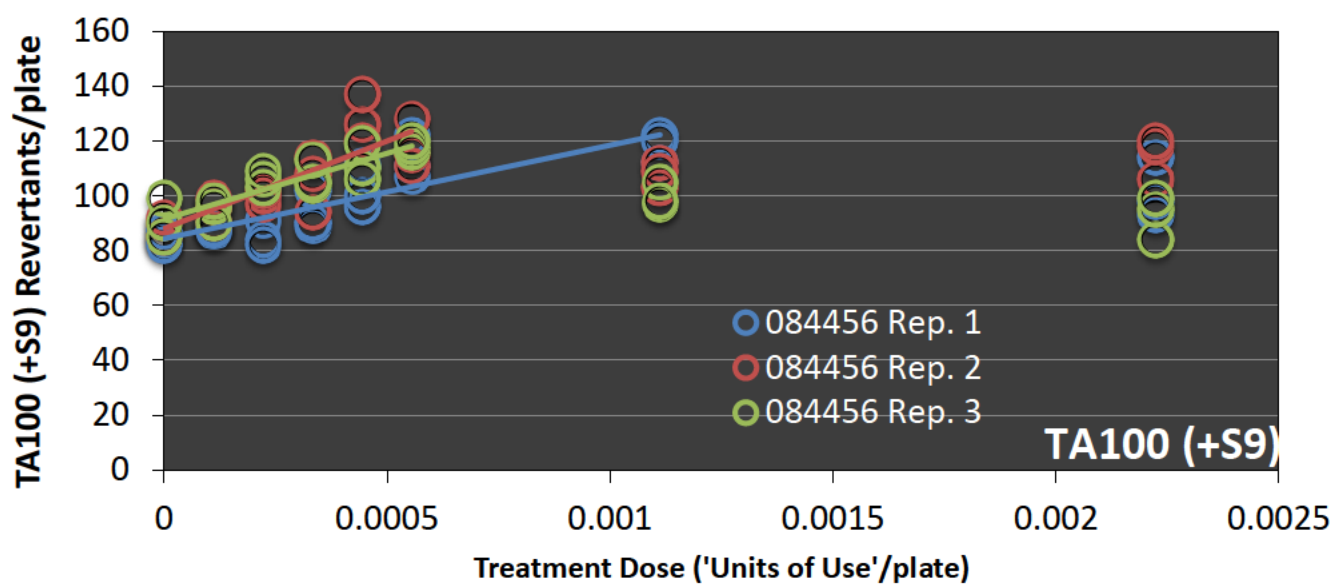
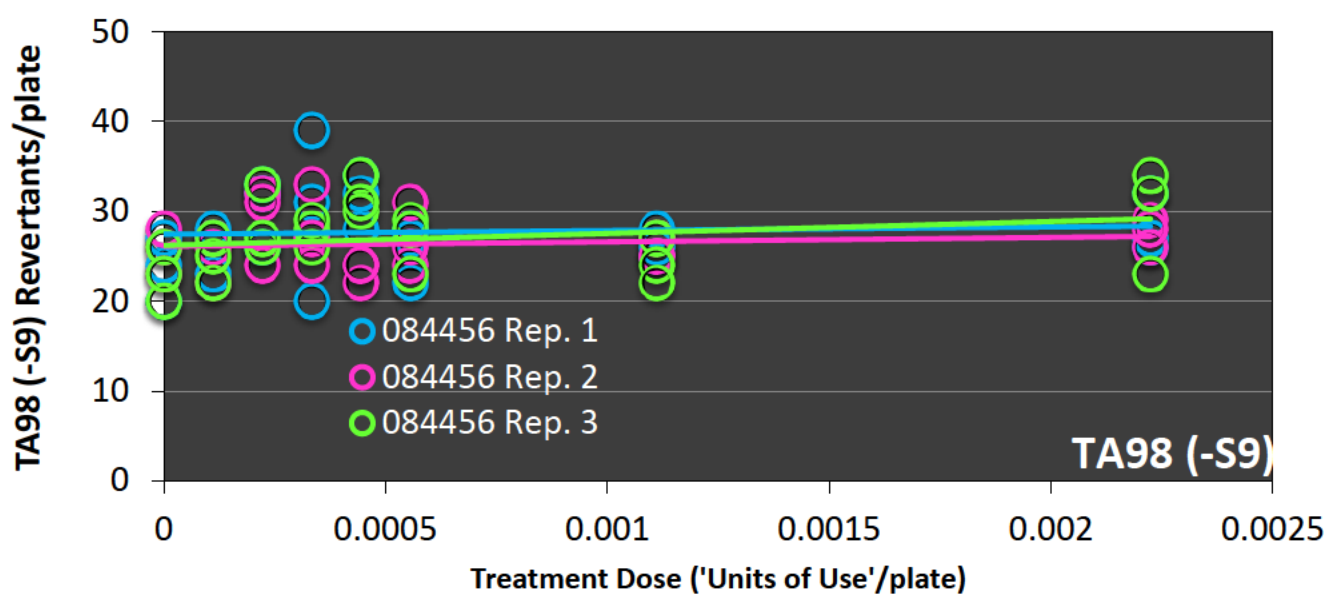
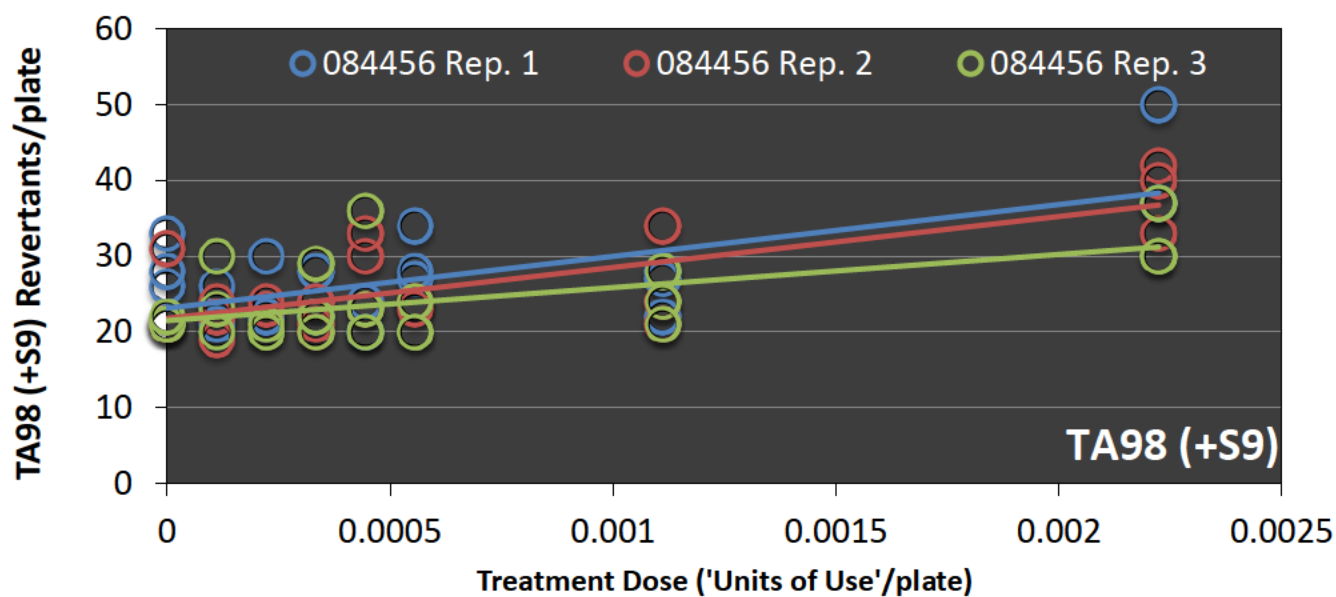


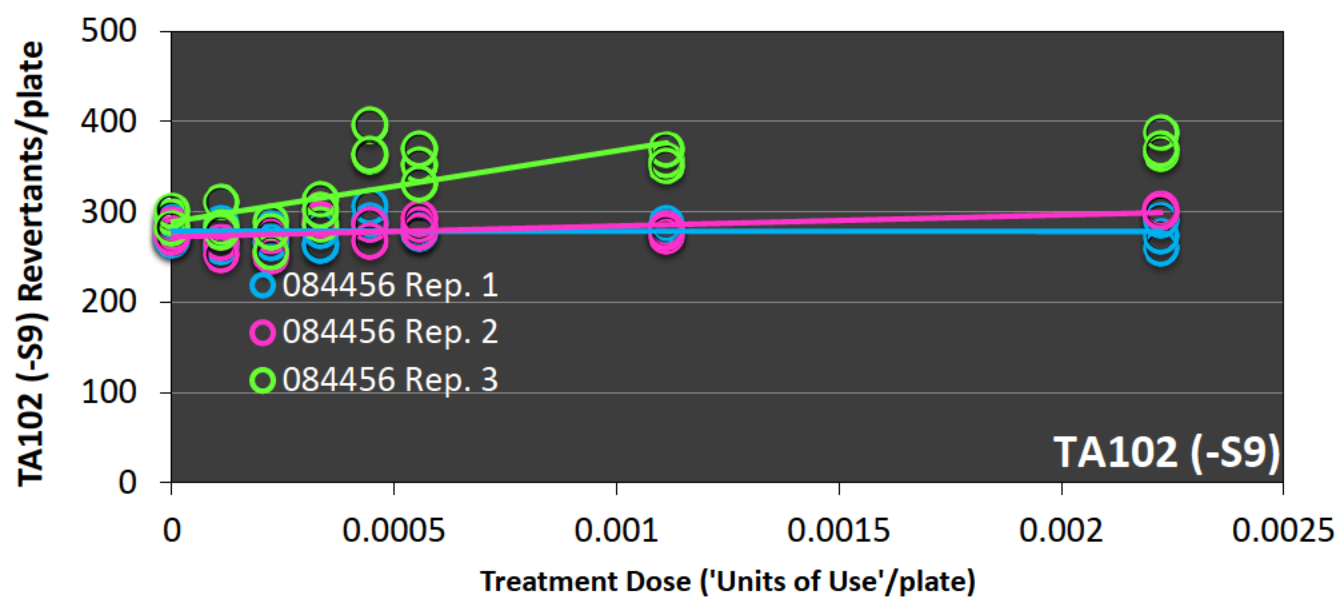
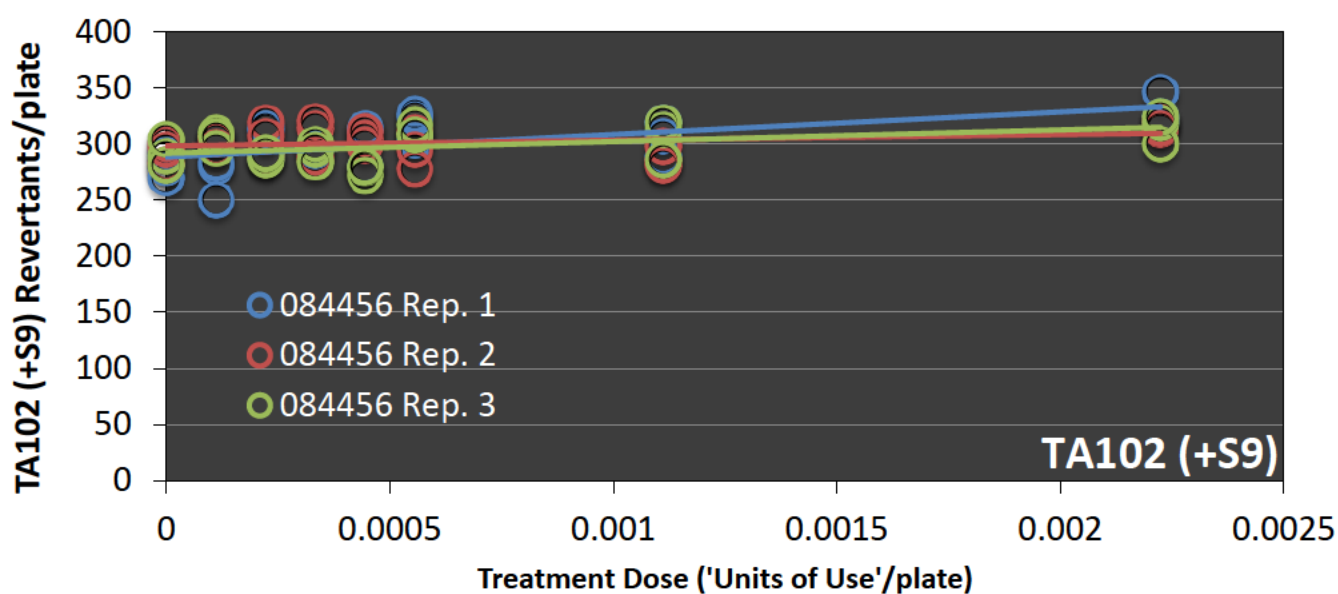
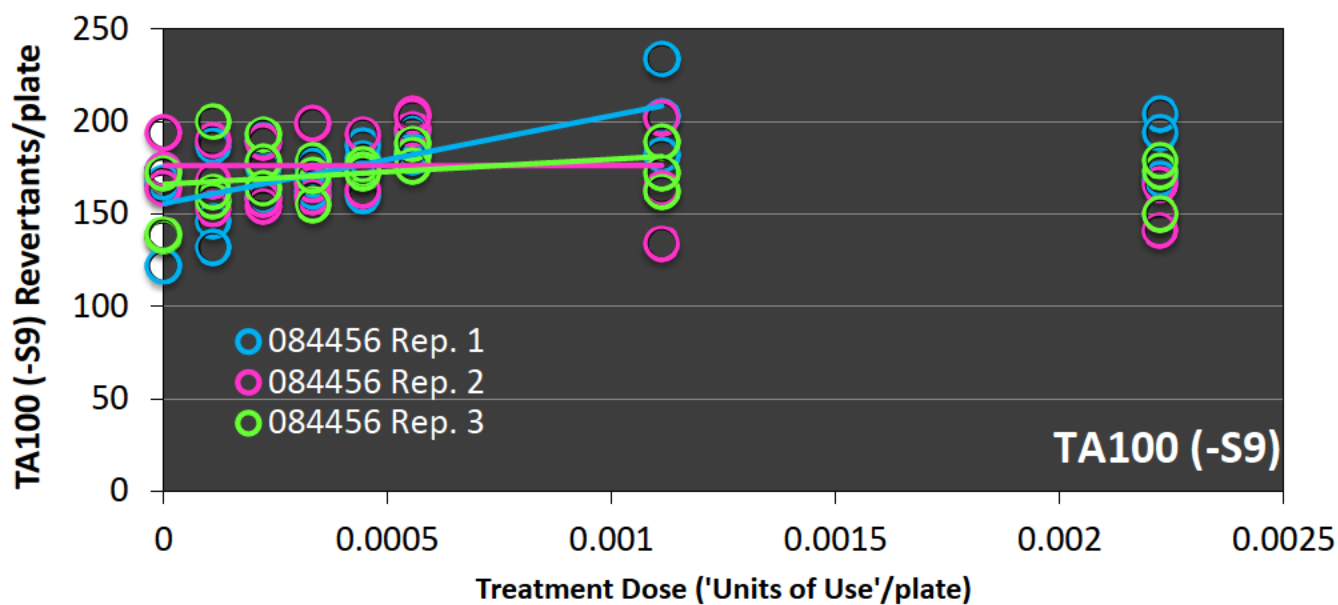


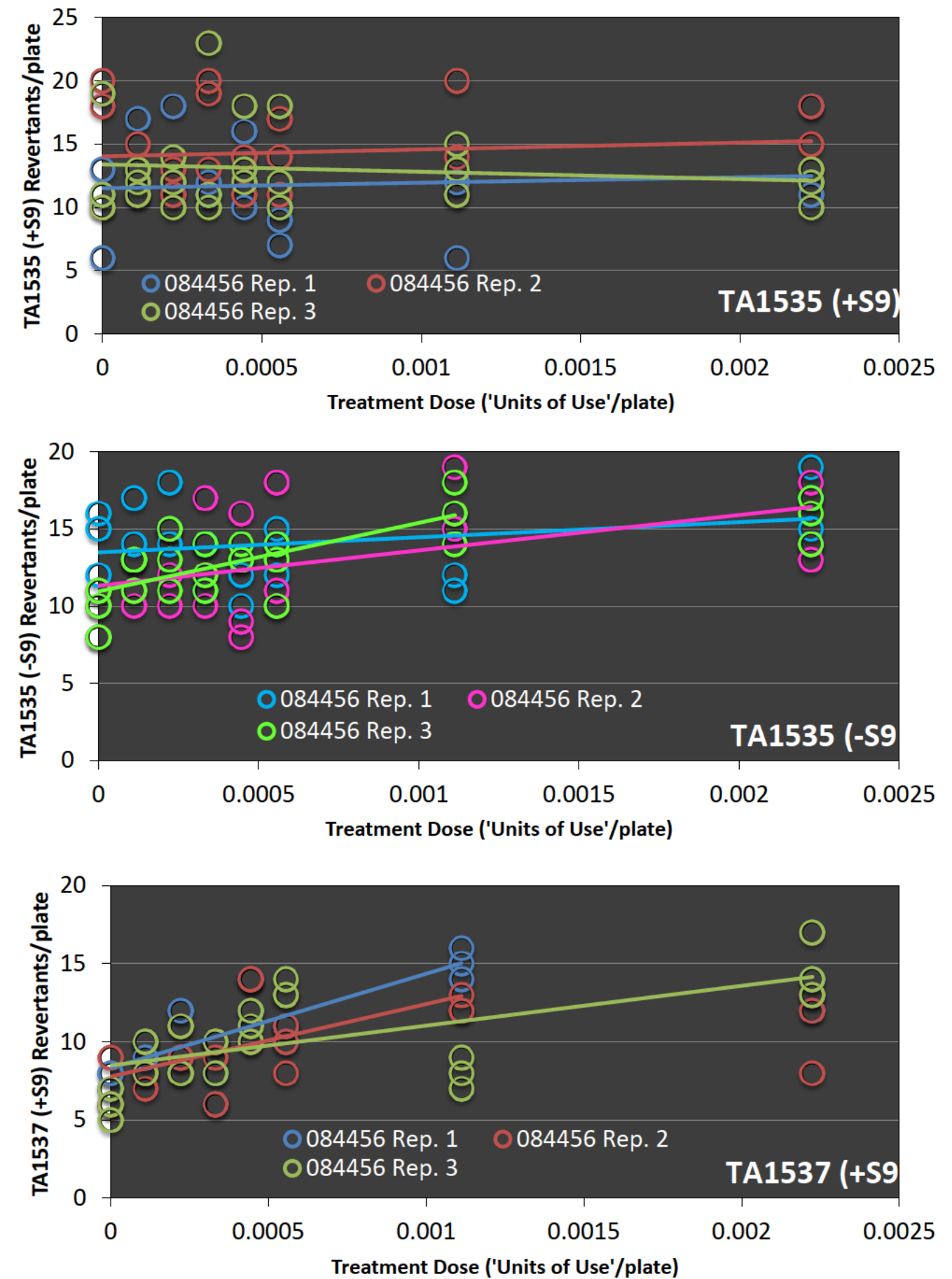


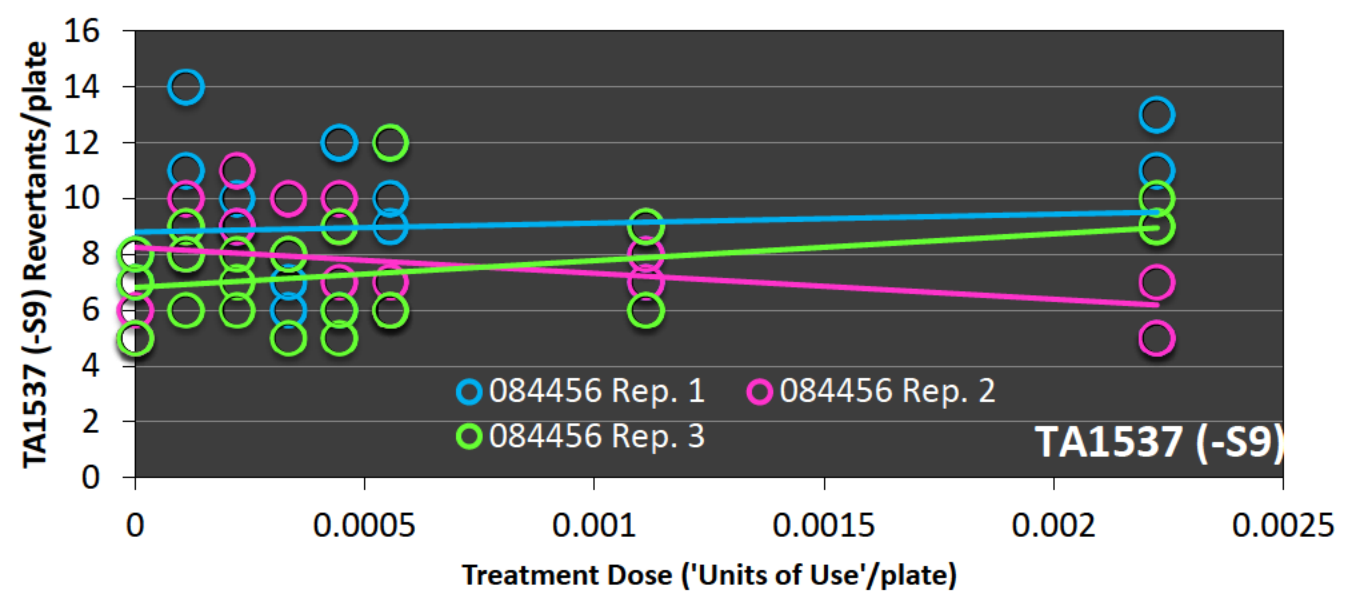




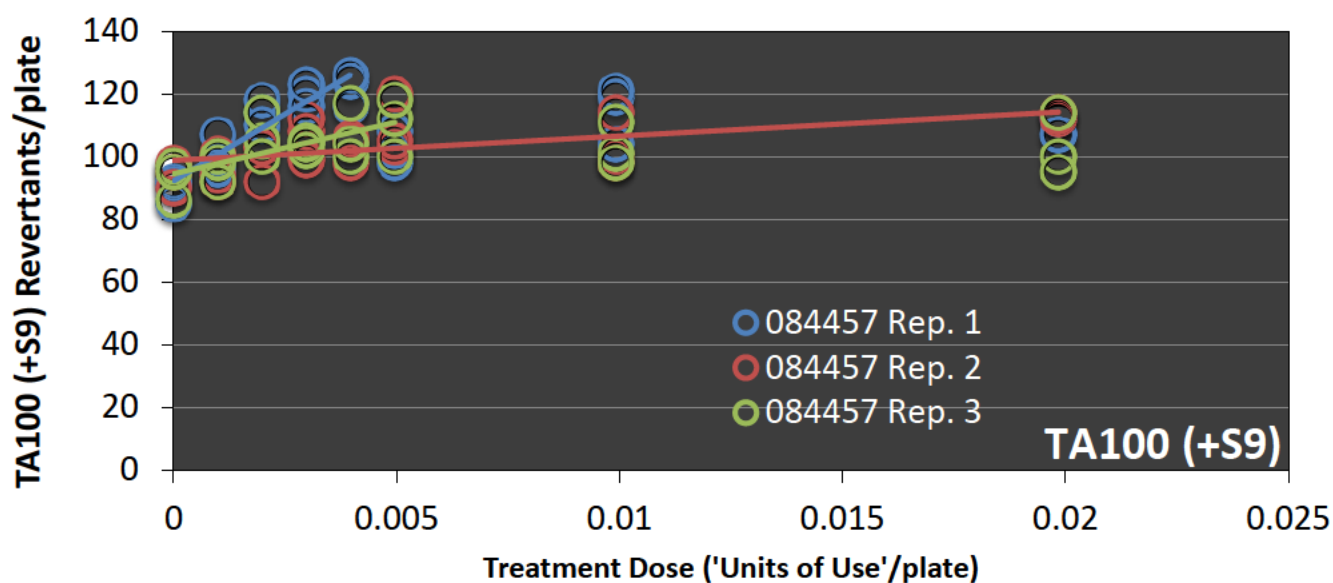
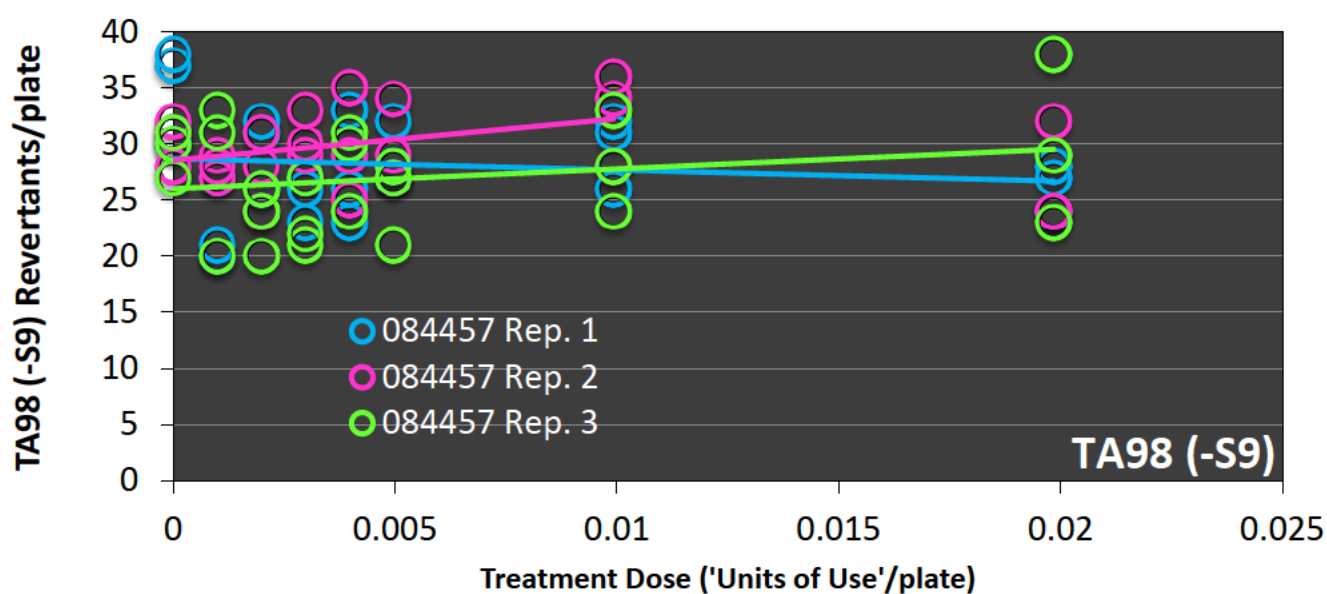
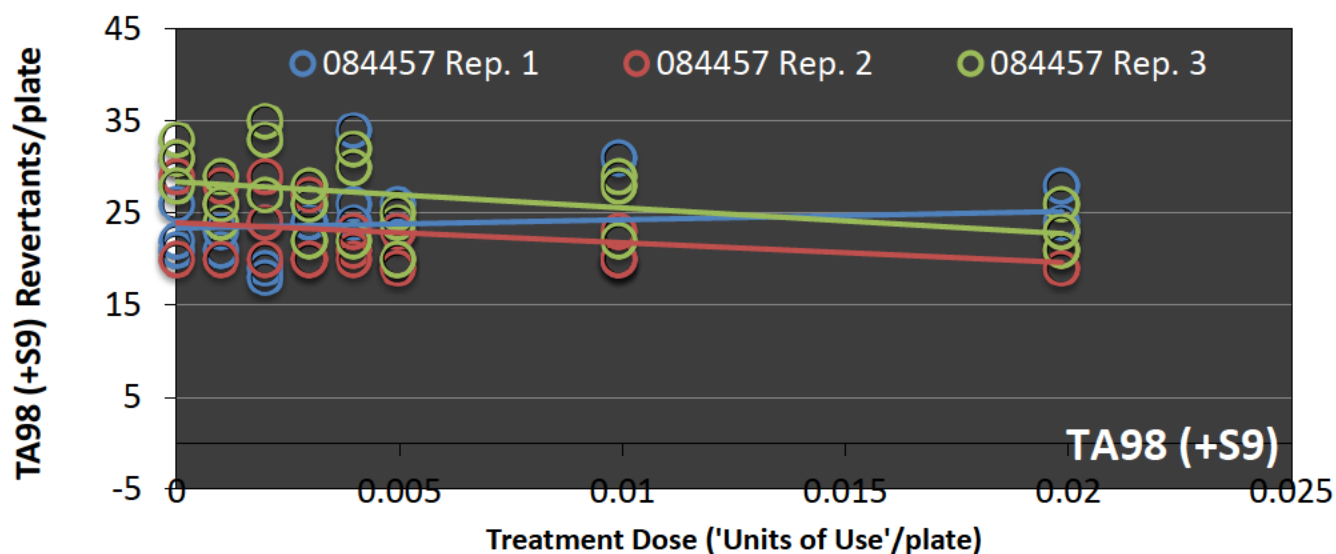




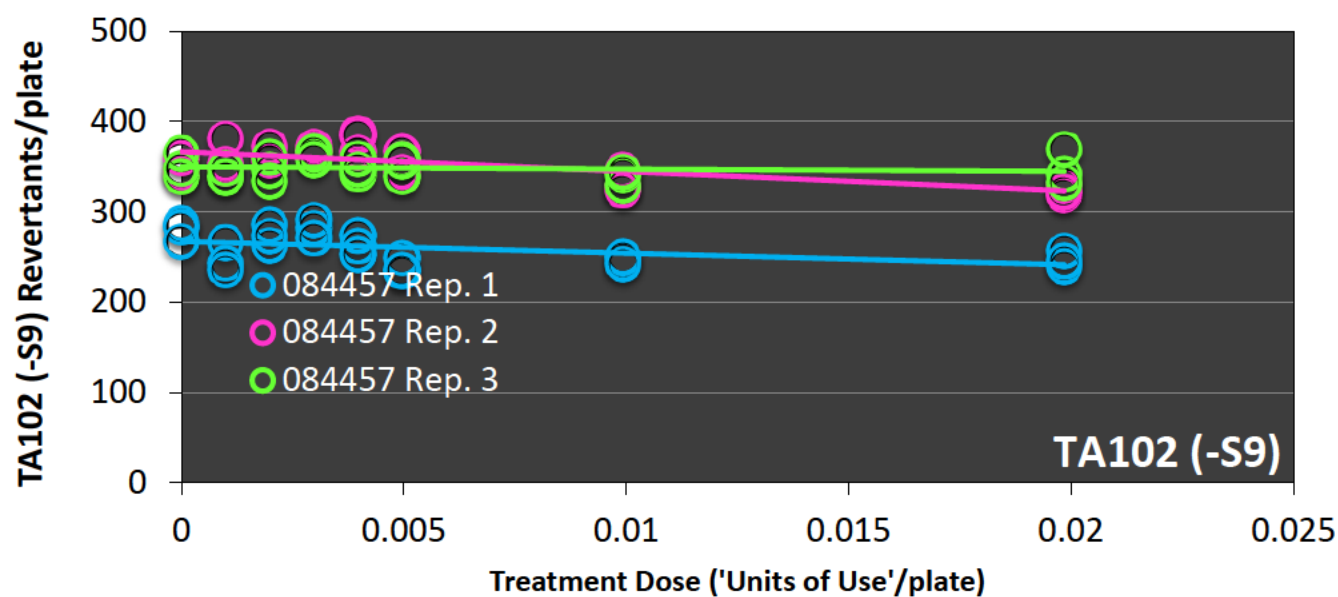
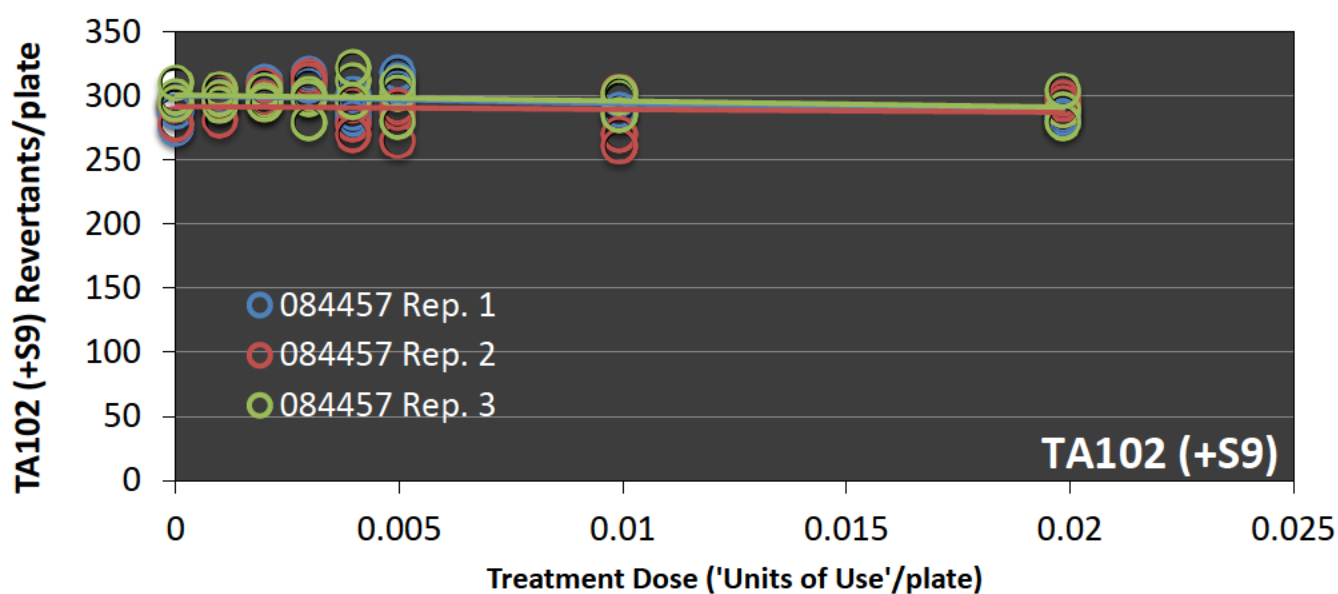
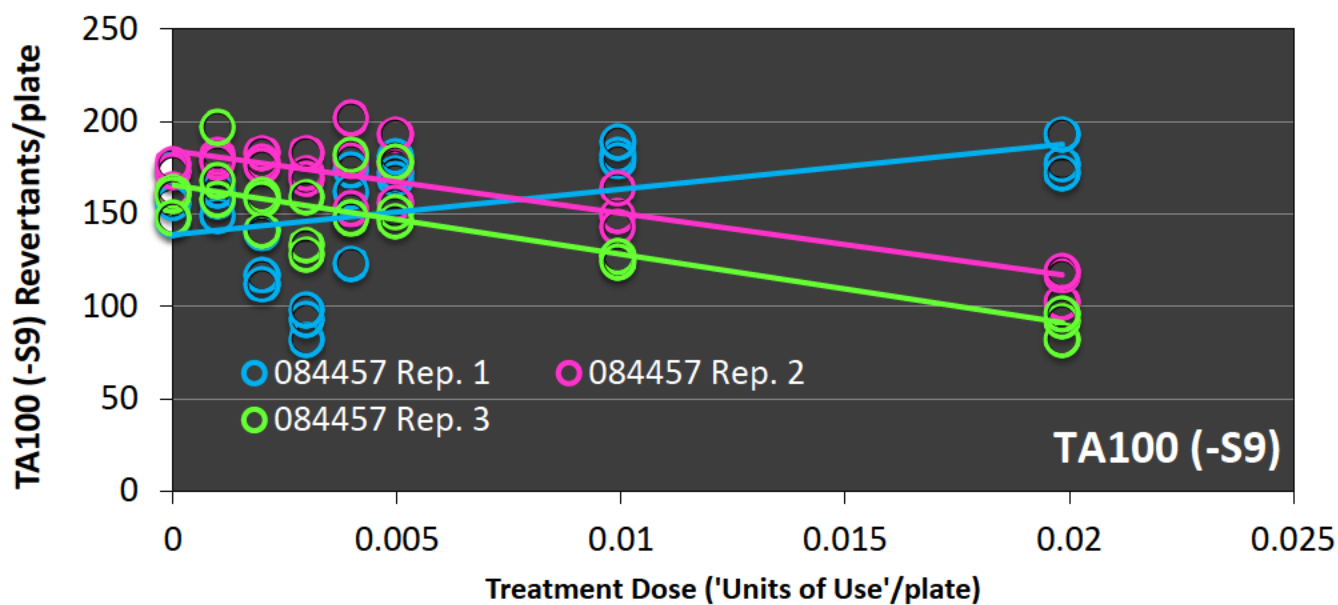


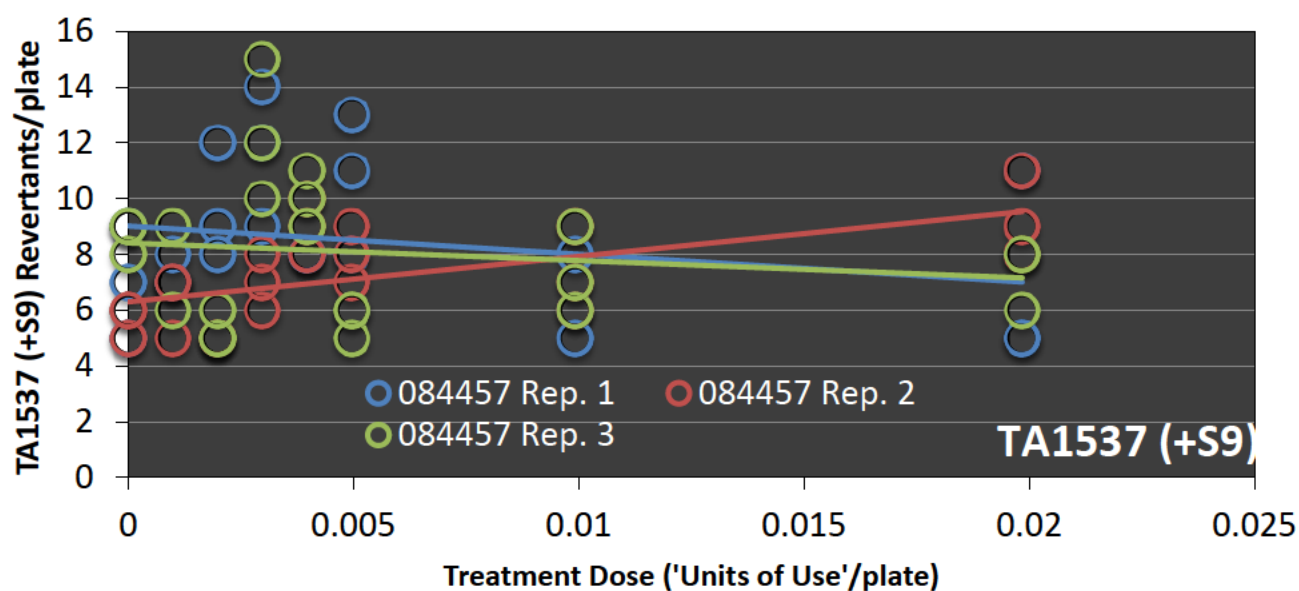
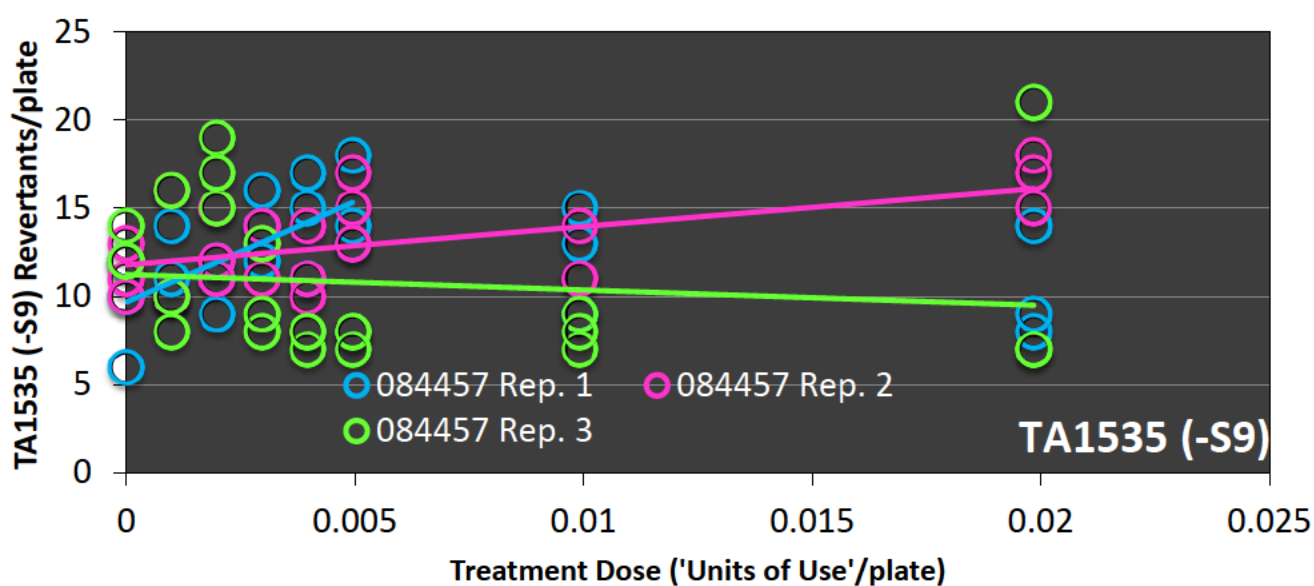
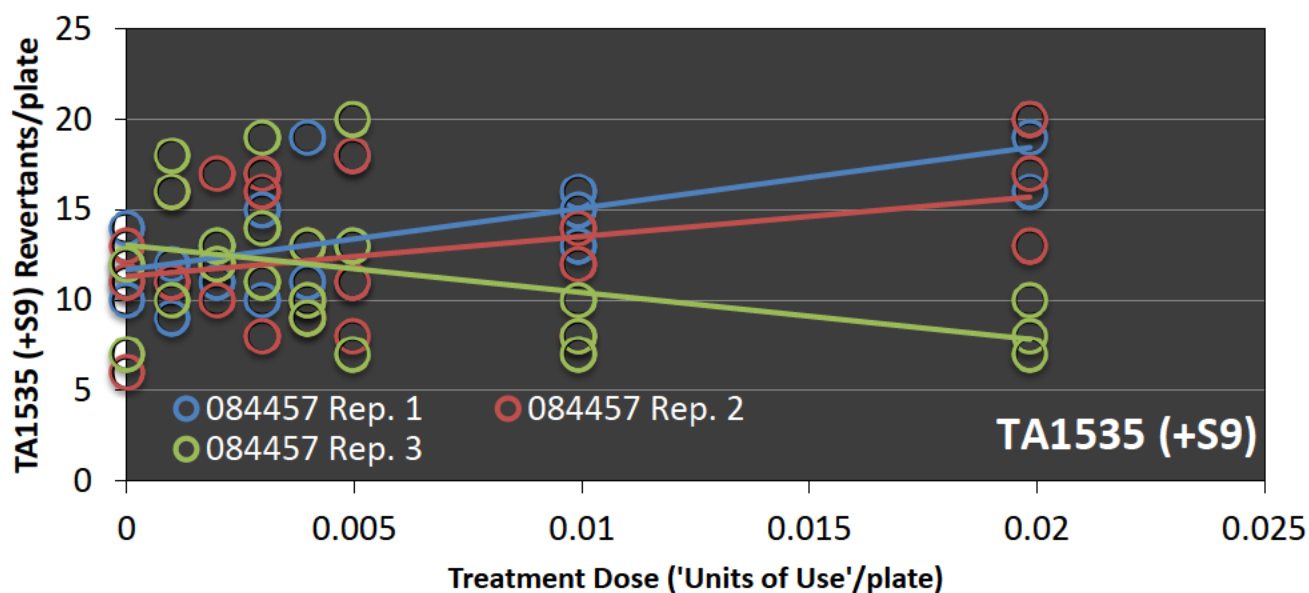


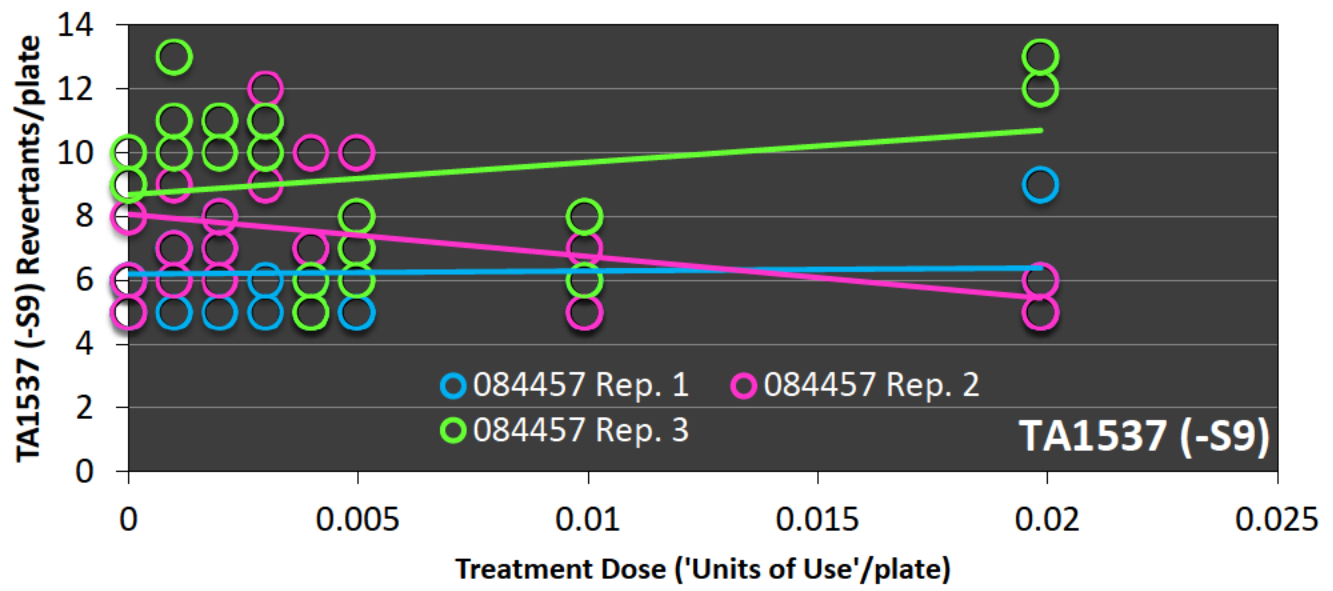


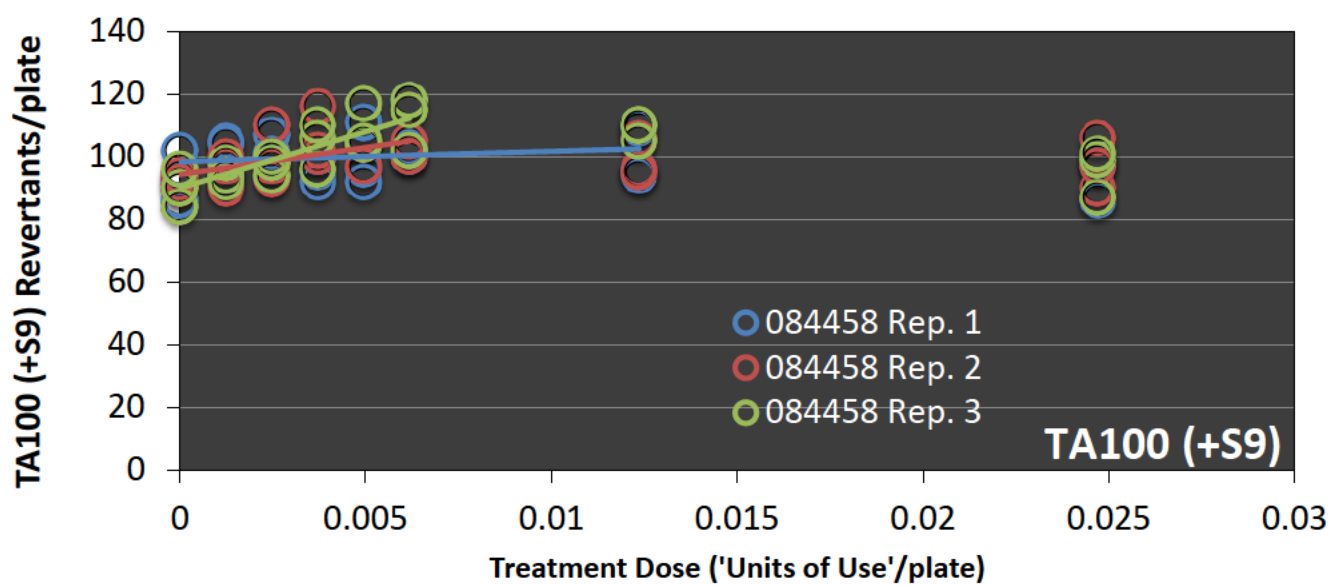
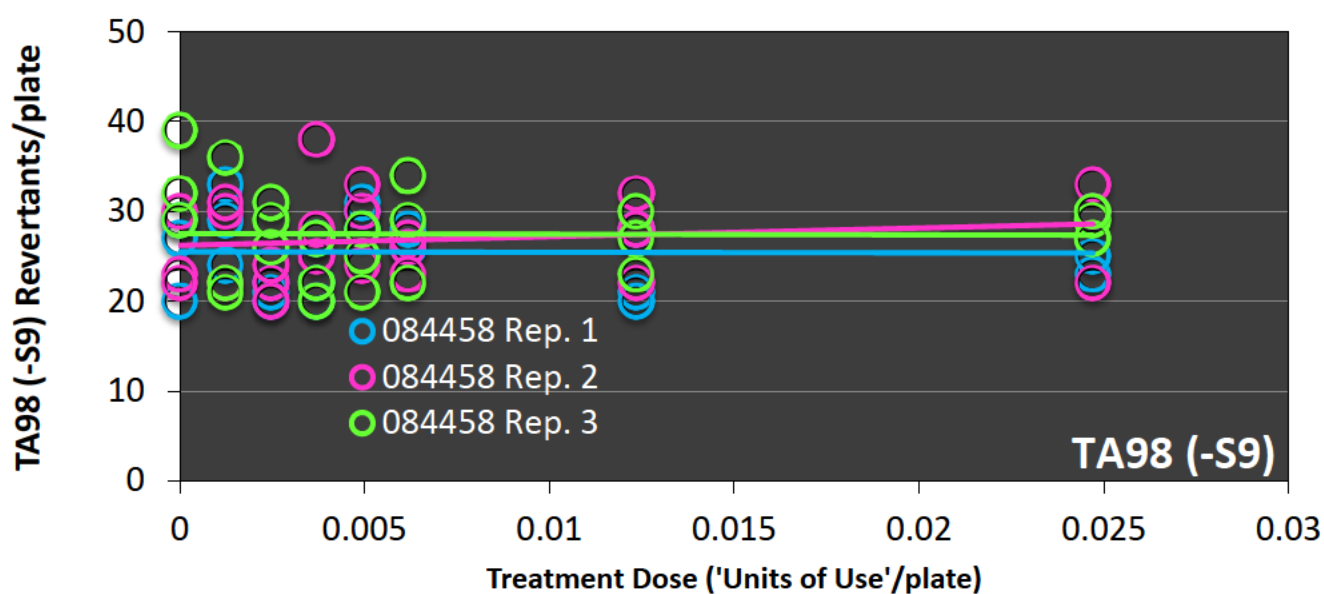
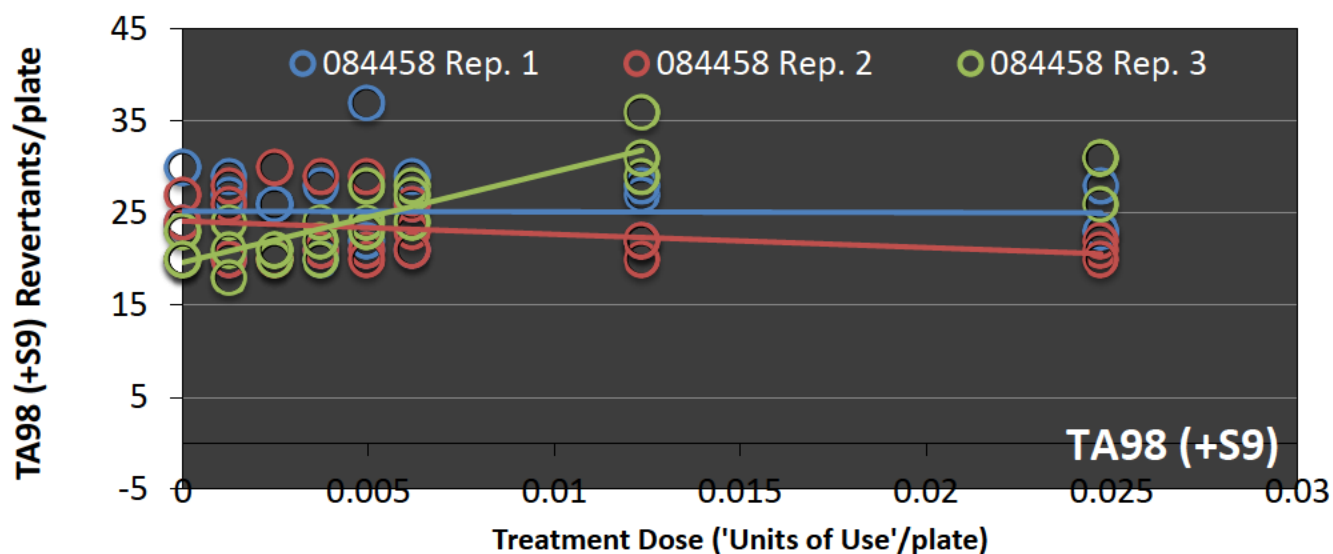


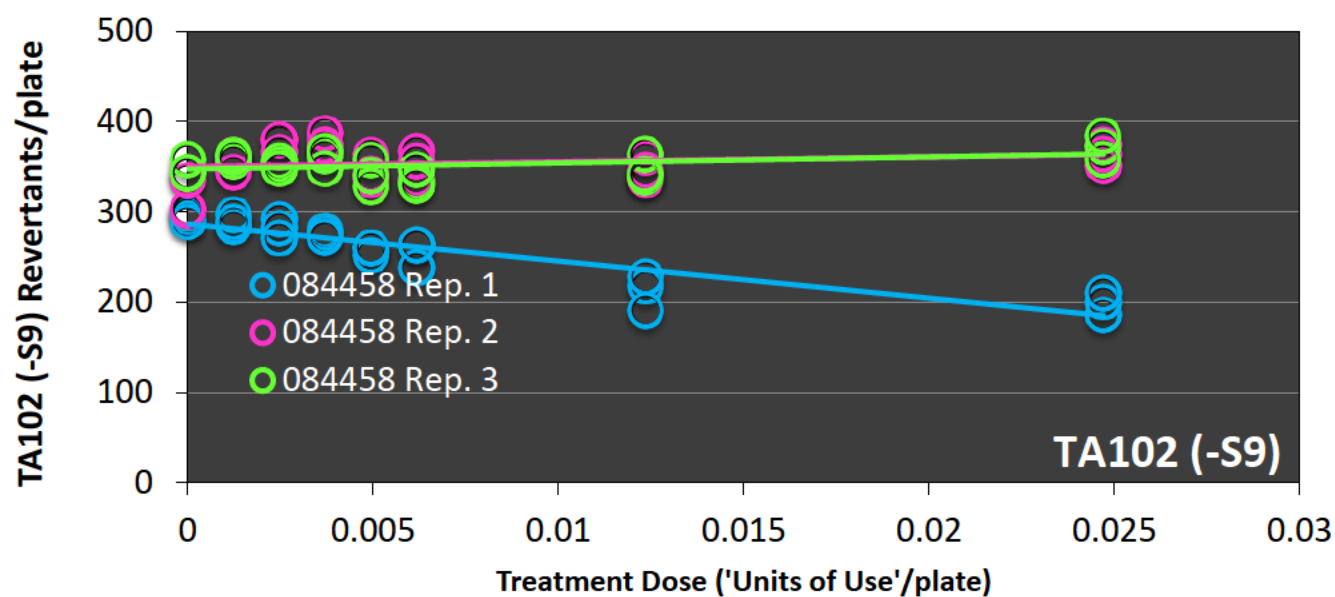
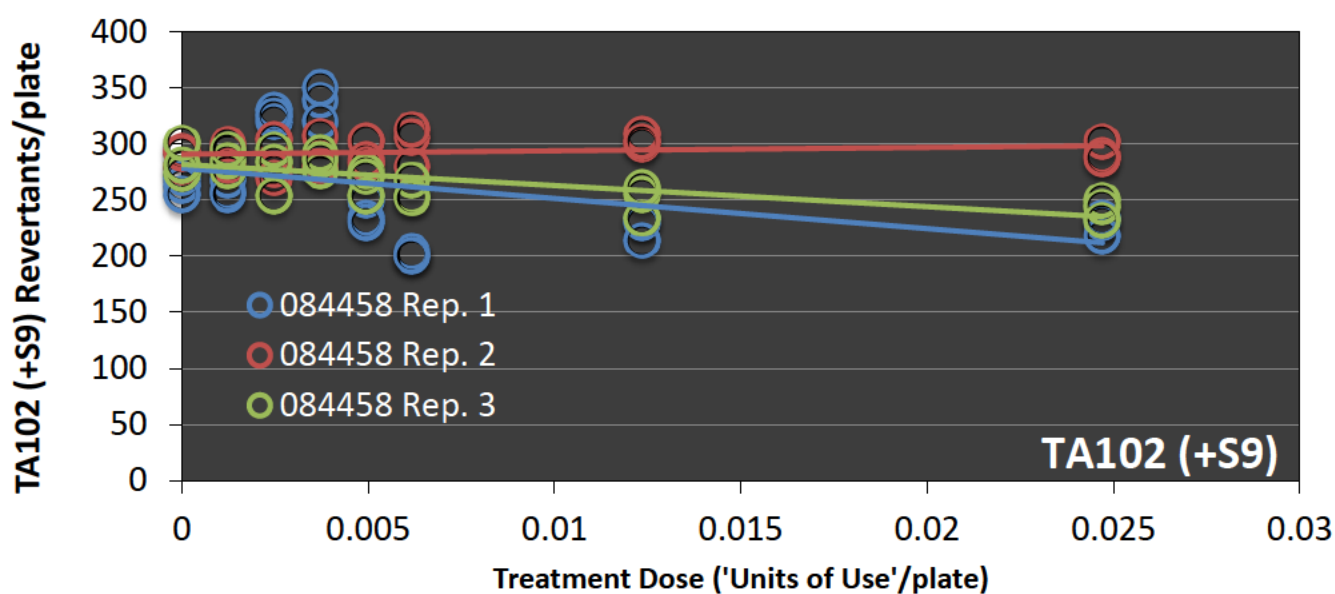
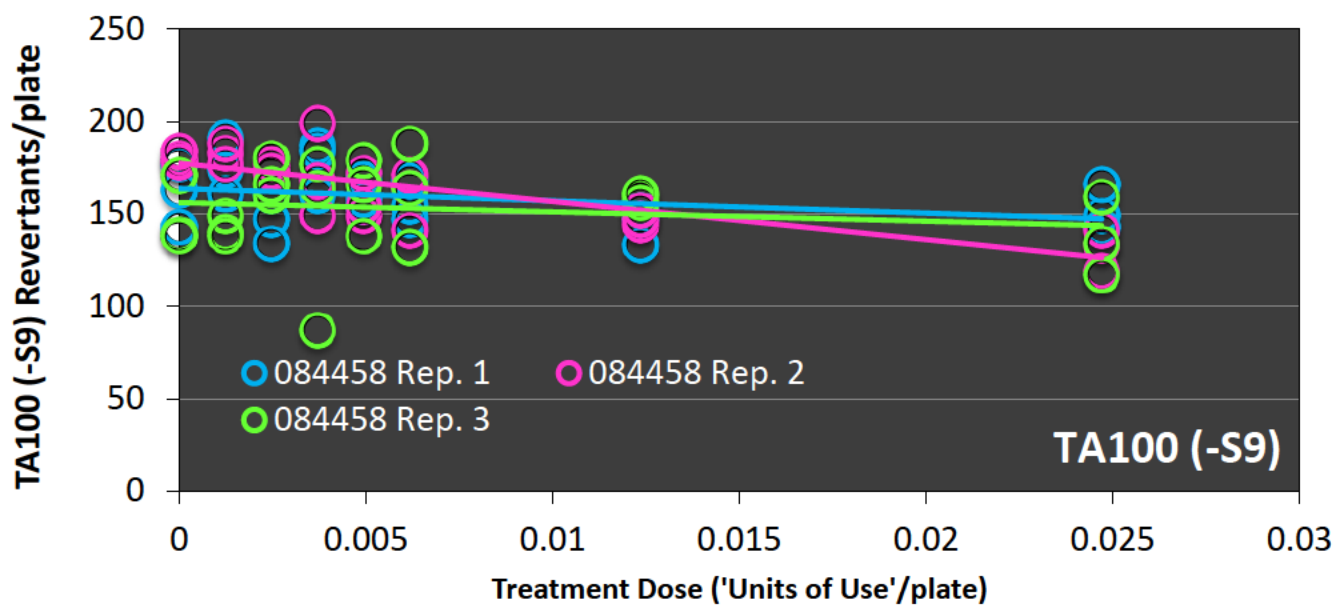


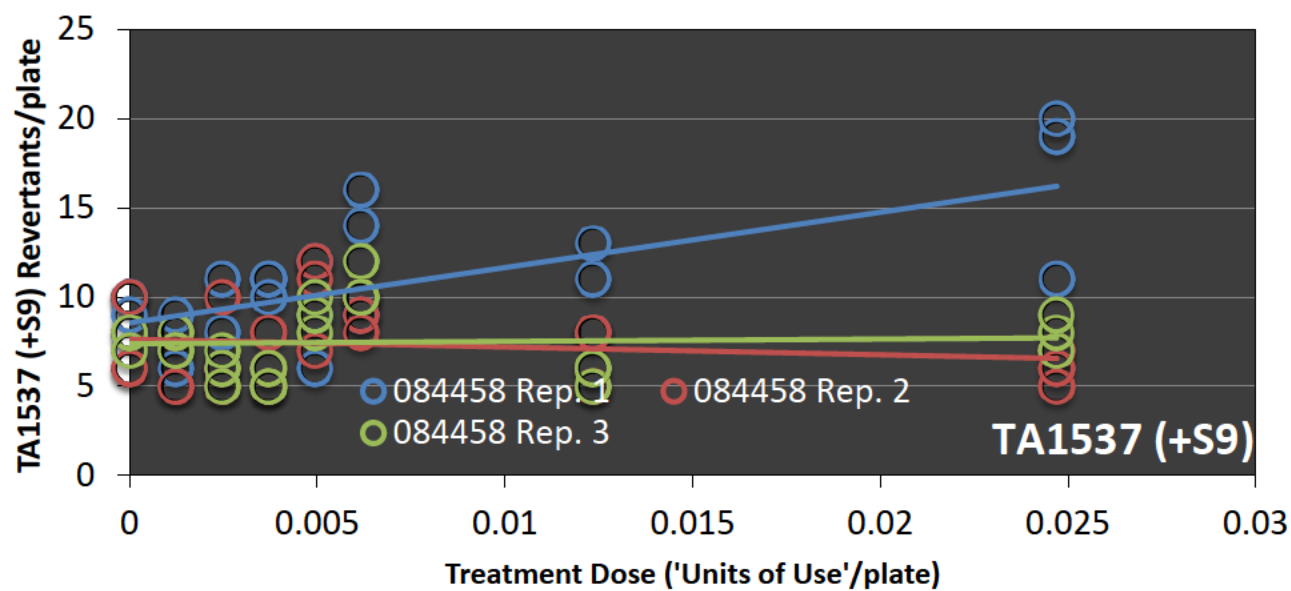
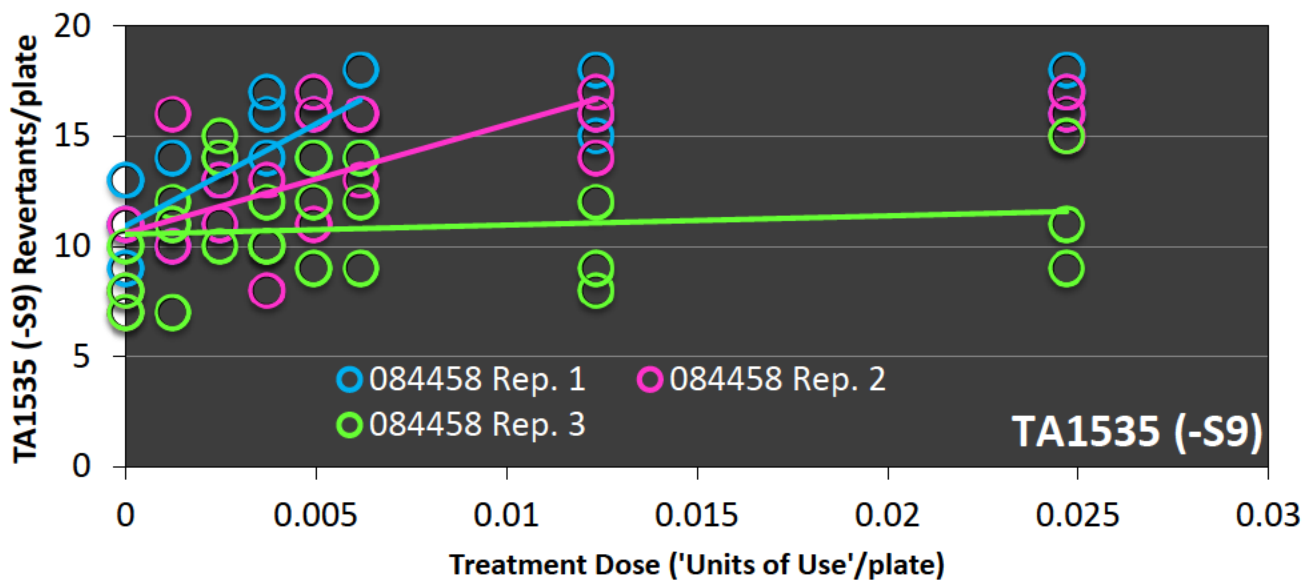
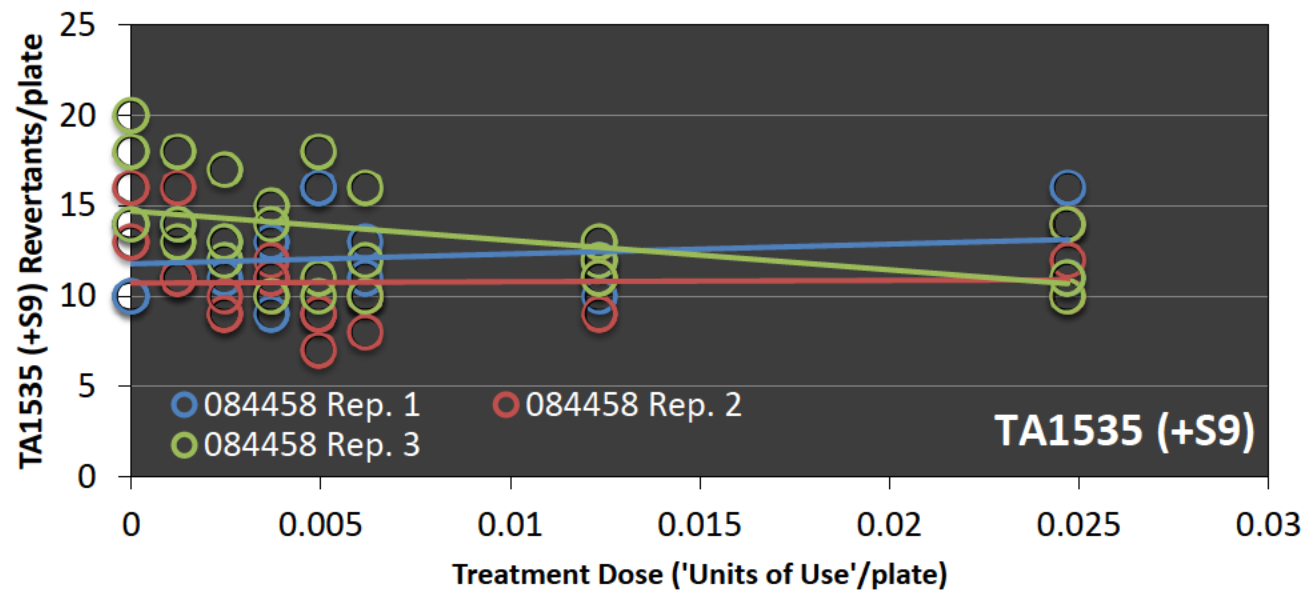


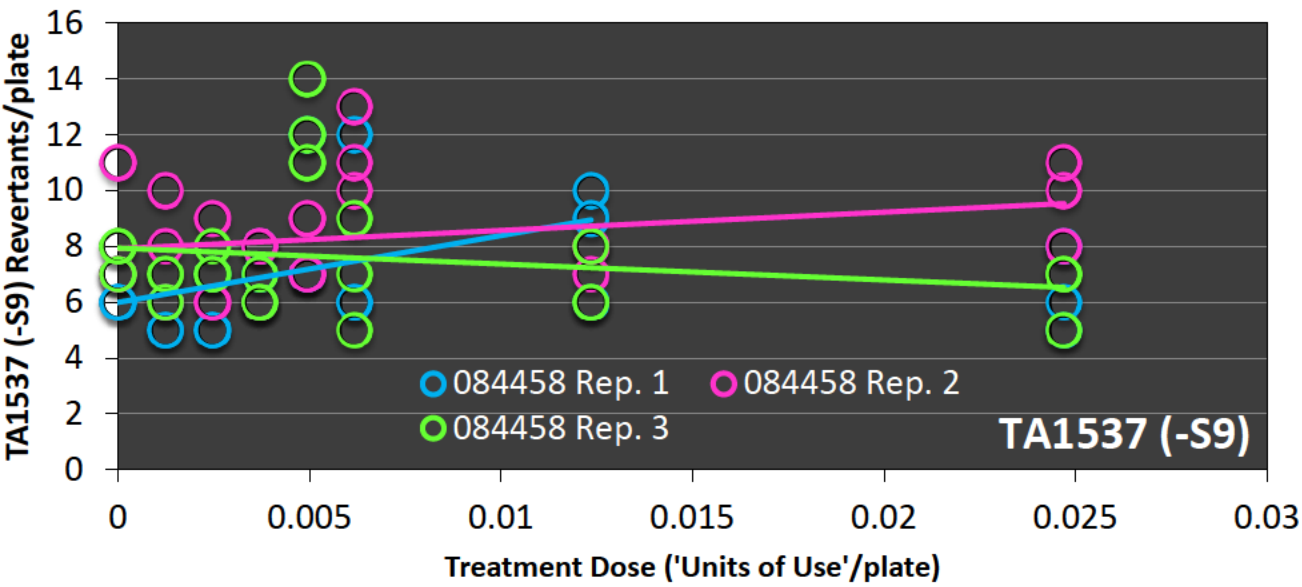








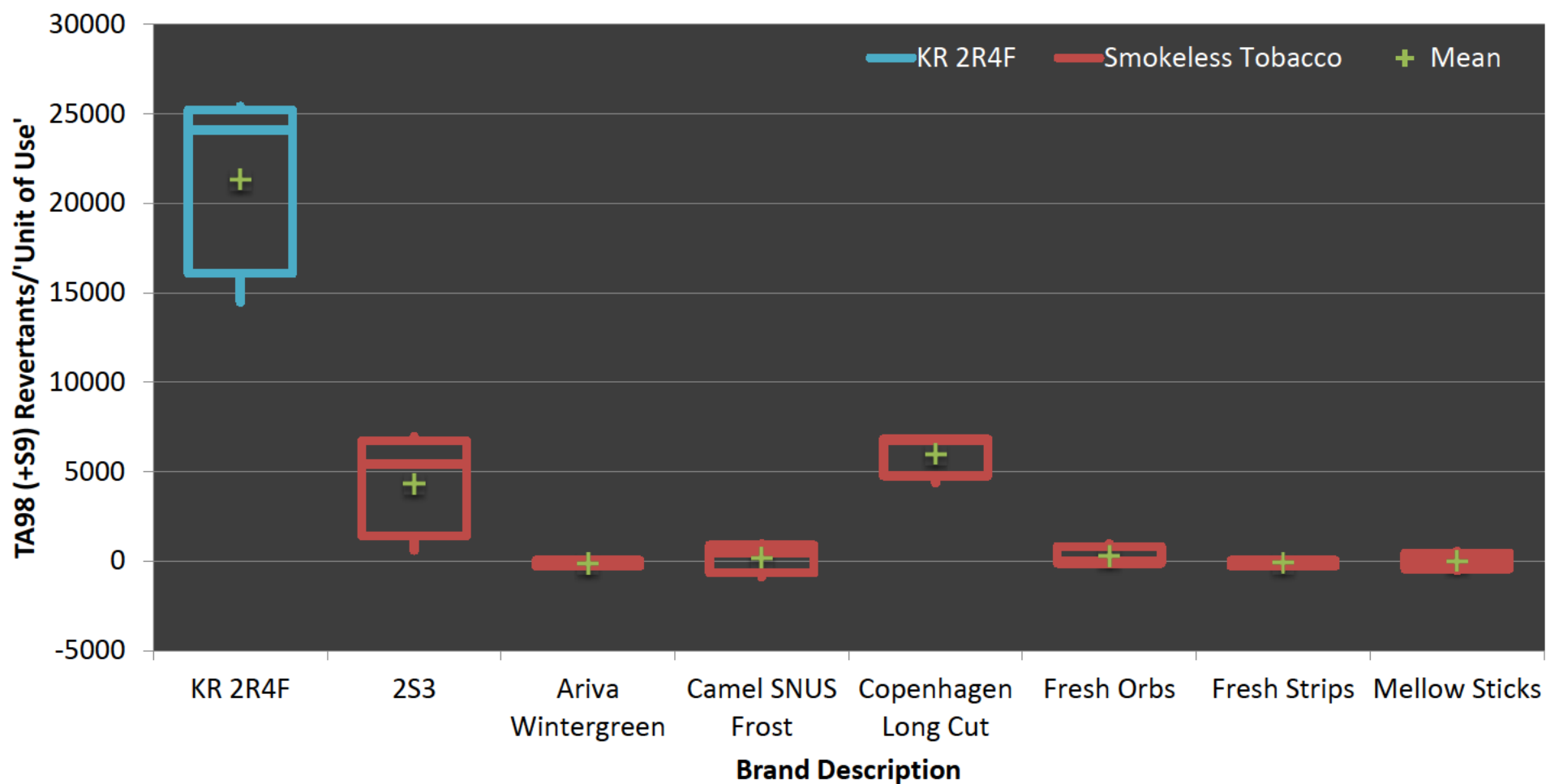




Test Describe - Comparative

Performed by TA98 (+S9): Revertants/'Unit of Use' Slope by Brand  
Wendy Wagstaff

Date 2 January 2012

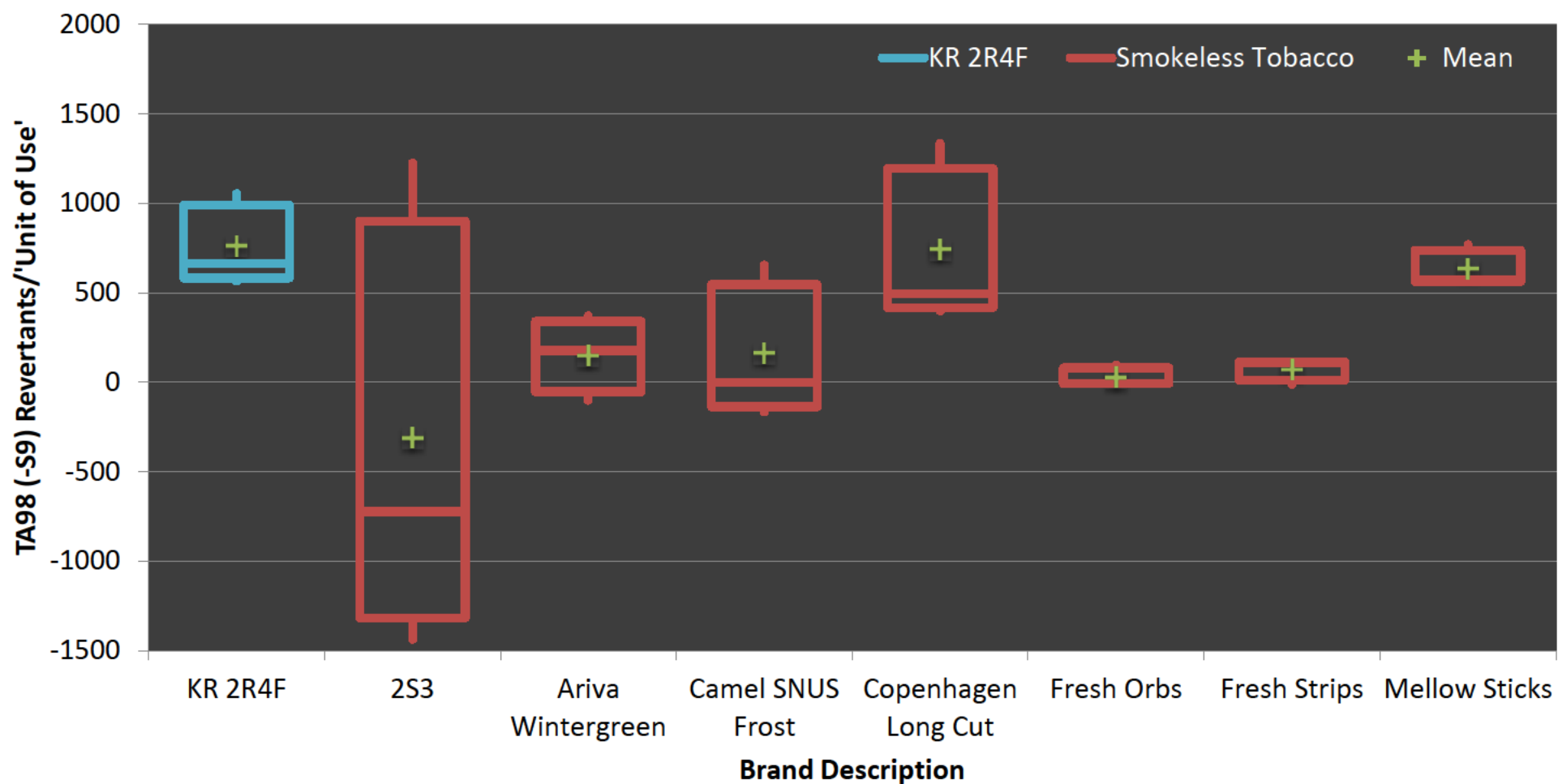




Test Describe - Comparative

Performed by TA98 (-S9): Revertants/'Unit of Use' Slope by Brand  
Wendy Wagstaff

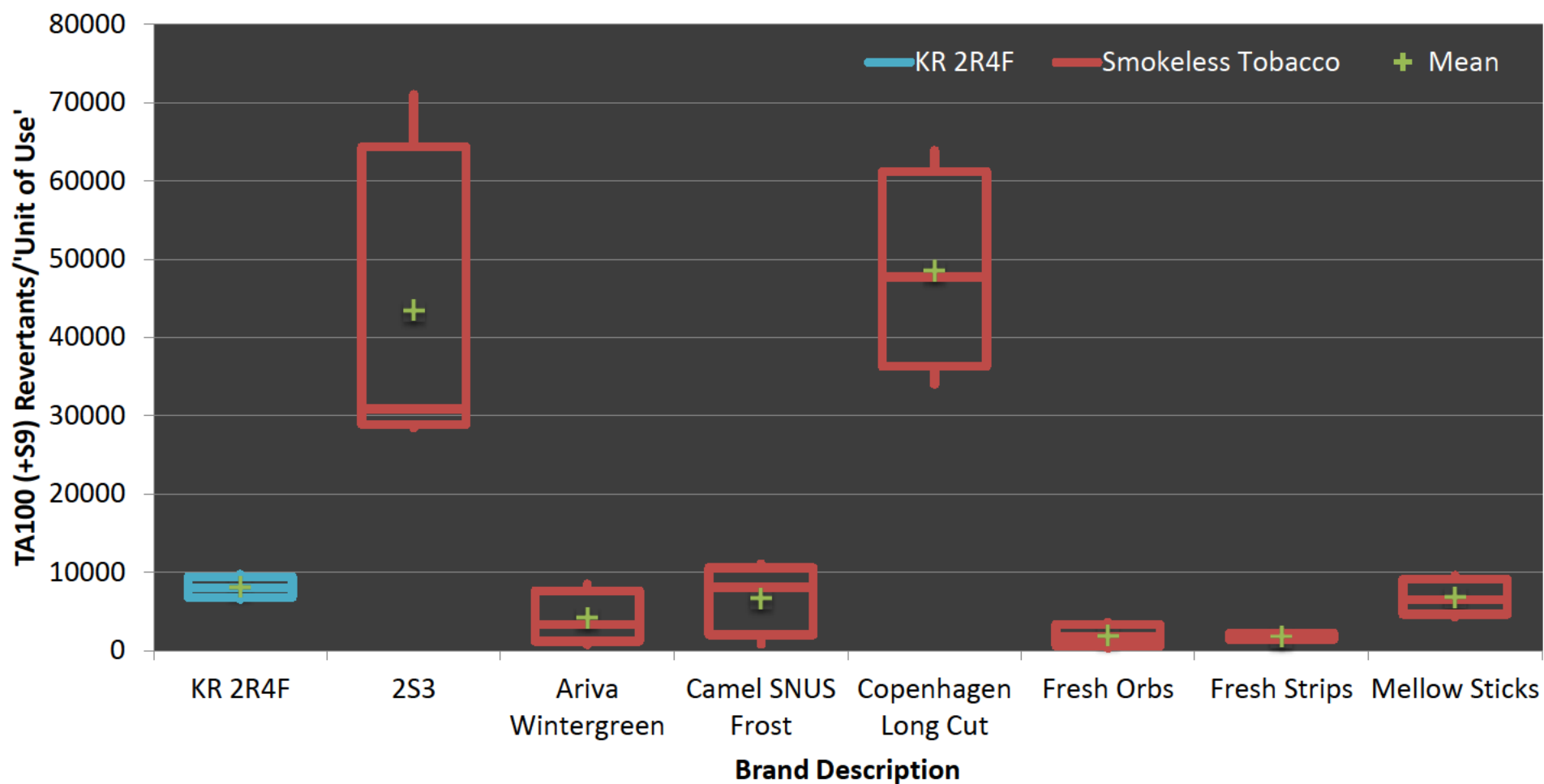
Date 2 January 2012



Test Describe - Comparative

Performed by TA100 (+S9): Revertants/'Unit of Use' Slope by Brand  
Wendy Wagstaff

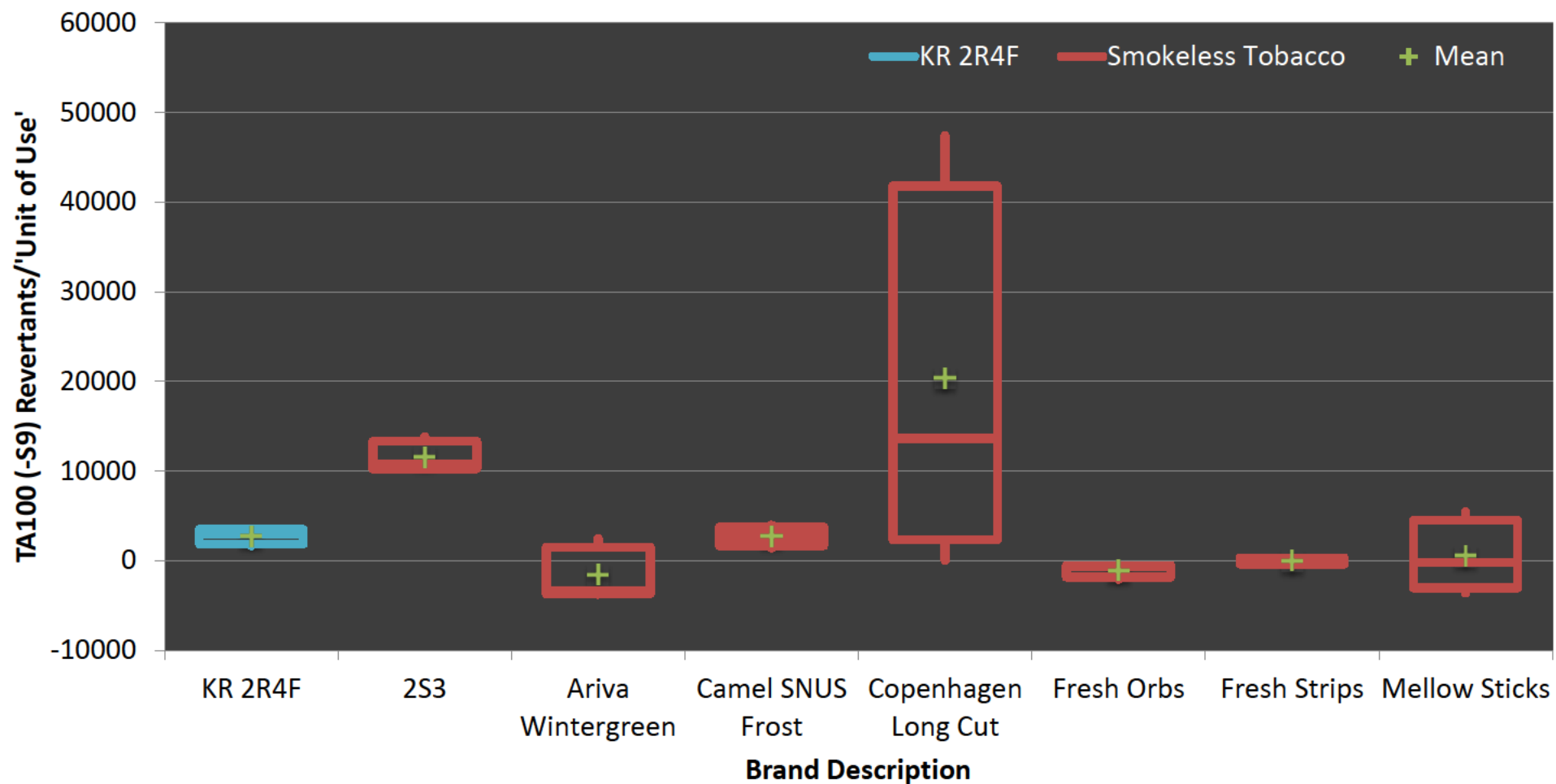
Date 2 January 2012



Test Describe - Comparative

Performed by TA100 (-S9): Revertants/'Unit of Use' Slope by Brand  
Wendy Wagstaff

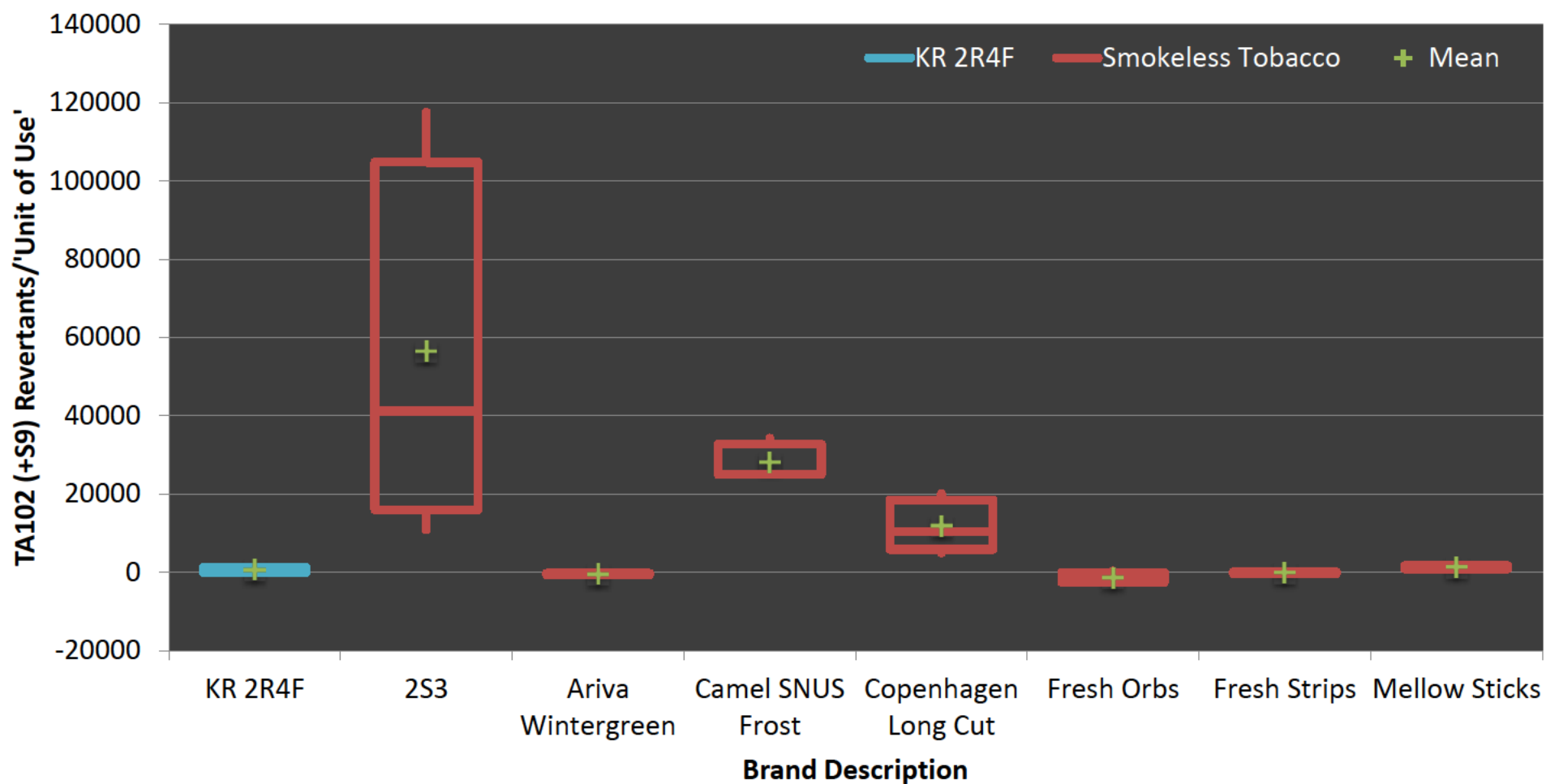
Date 2 January 2012



Test Describe - Comparative

Performed by TA102 (+S9): Revertants/'Unit of Use' Slope by Brand  
Wendy Wagstaff

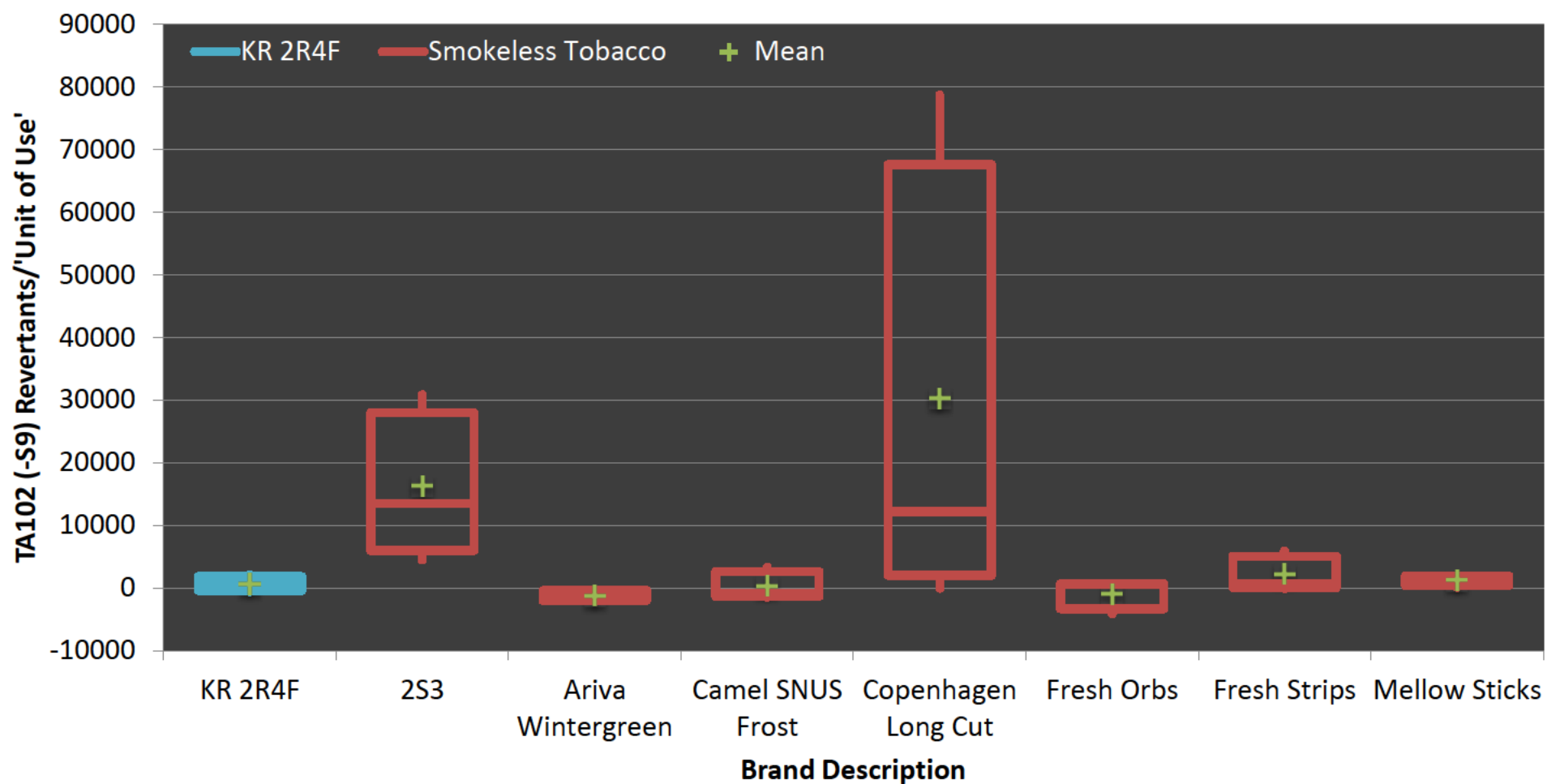
Date 2 January 2012



Test Describe - Comparative

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Wendy Wagstaff

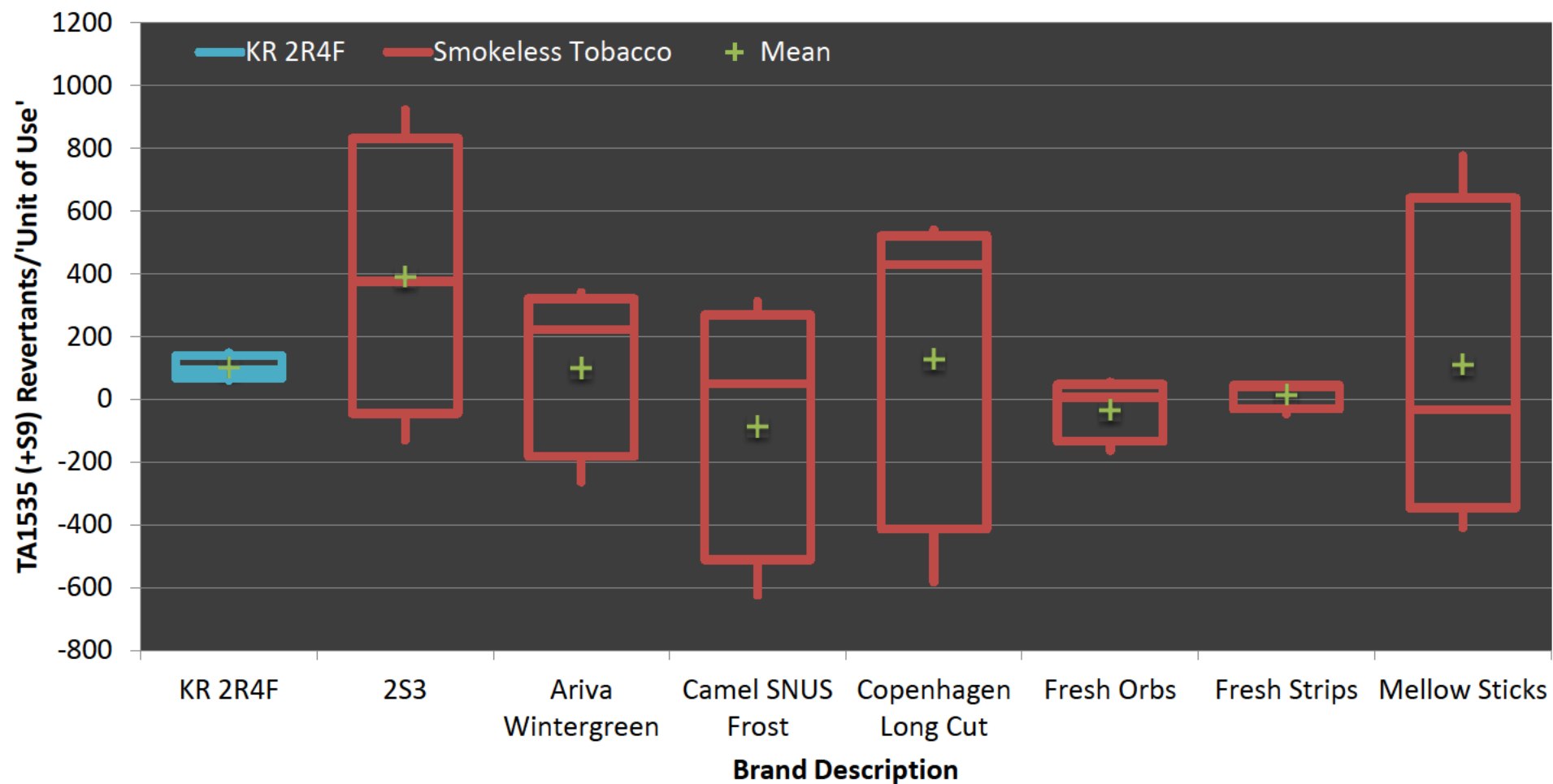
Date 2 January 2012



Test Describe - Comparative

Performed by TA1535 (+S9): Revertants/'Unit of Use' Slope by Brand  
Wendy Wagstaff

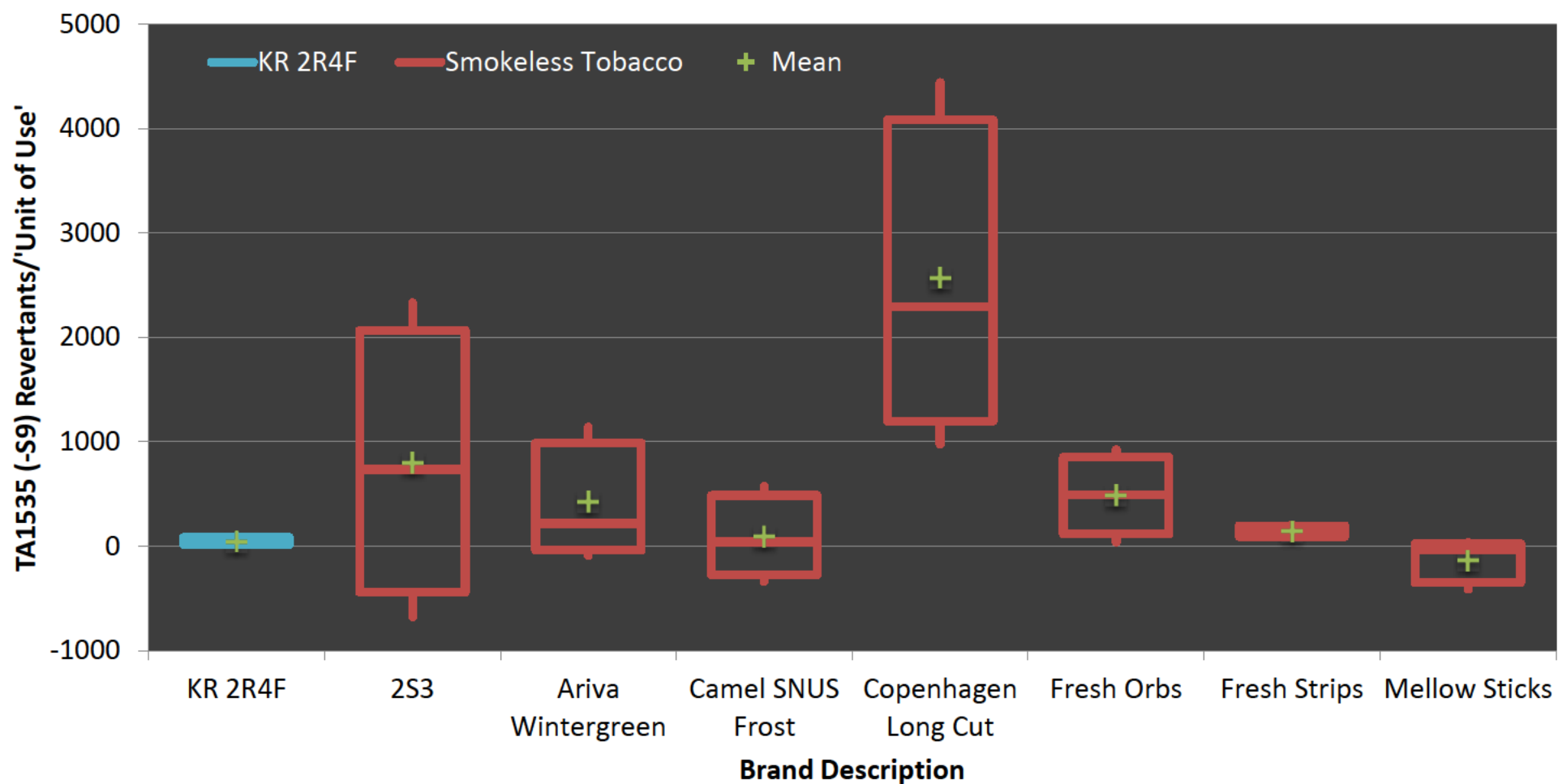
Date 2 January 2012



Test Describe - Comparative

Performed by TA1535 (-S9): Revertants/'Unit of Use' Slope by Brand  
Wendy Wagstaff

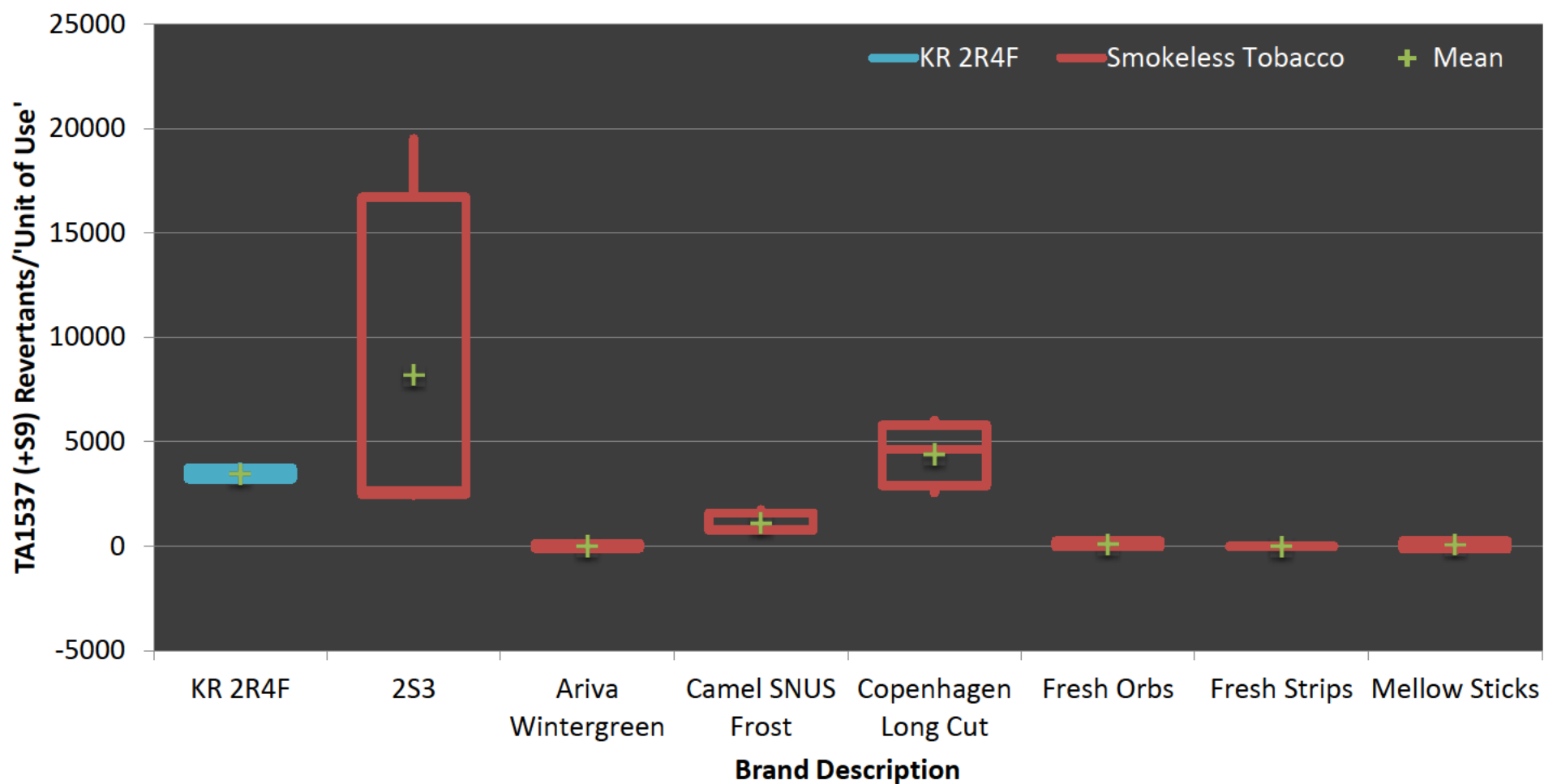
Date 2 January 2012



Test Describe - Comparative

Performed by TA1537 (+S9): Revertants/'Unit of Use' Slope by Brand  
Wendy Wagstaff

Date 2 January 2012

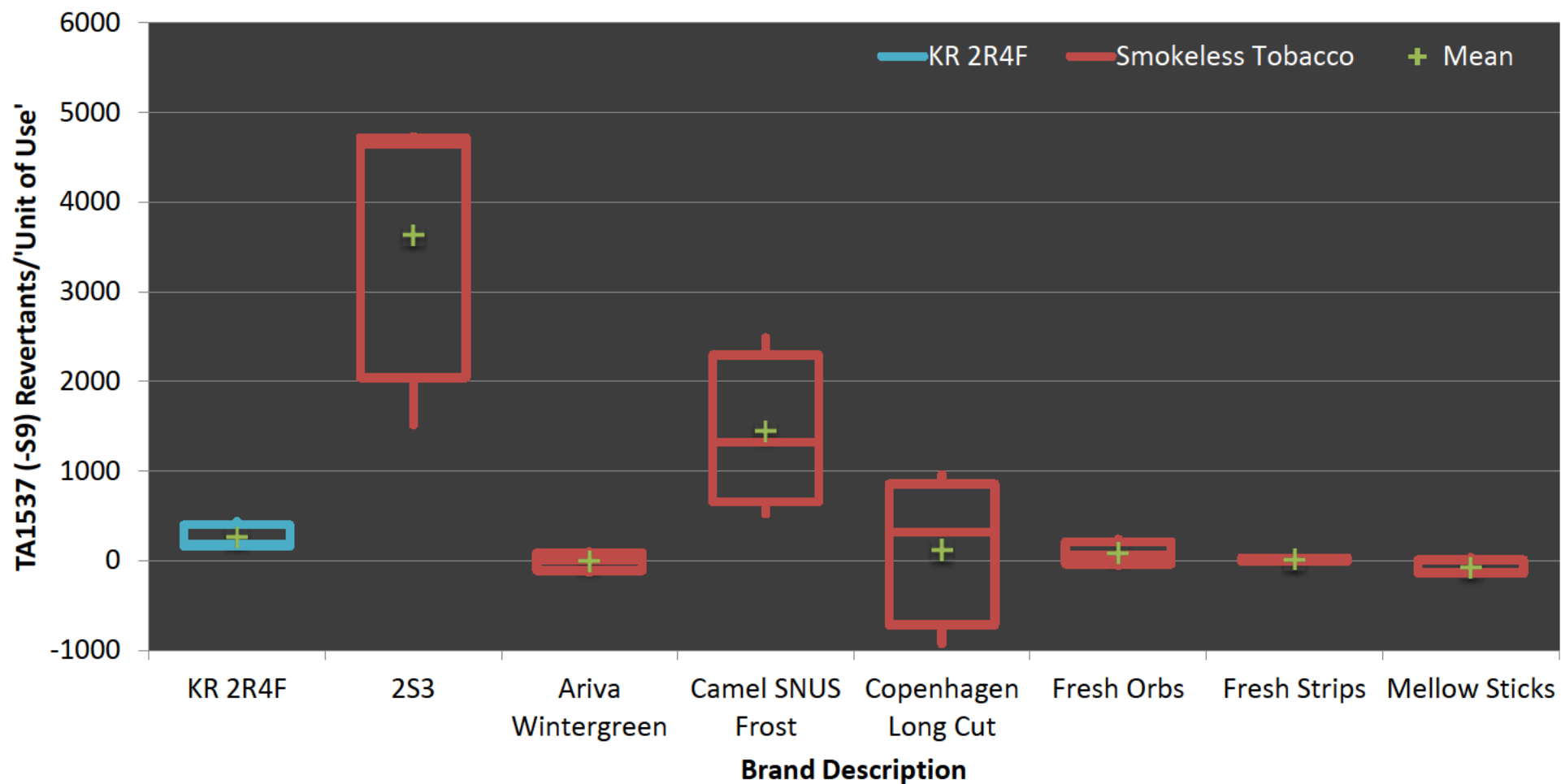




Test Describe - Comparative

Performed by TA1537 (-S9): Revertants/'Unit of Use' Slope by Brand  
Wendy Wagstaff

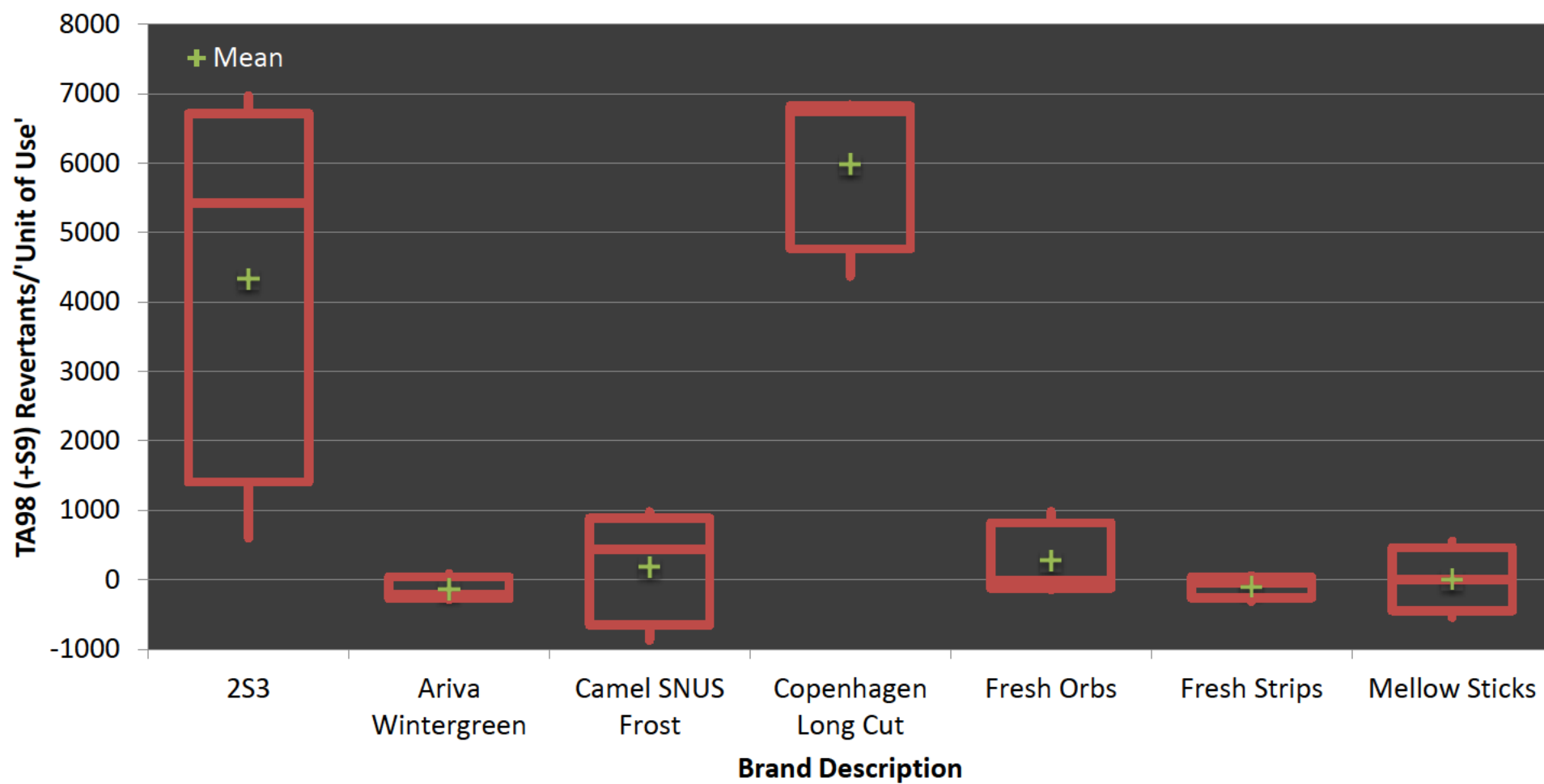
Date 2 January 2012



Test Describe - Comparative

Performed by TA98 (+S9): Revertants/'Unit of Use' Slope by Brand  
Wendy Wagstaff

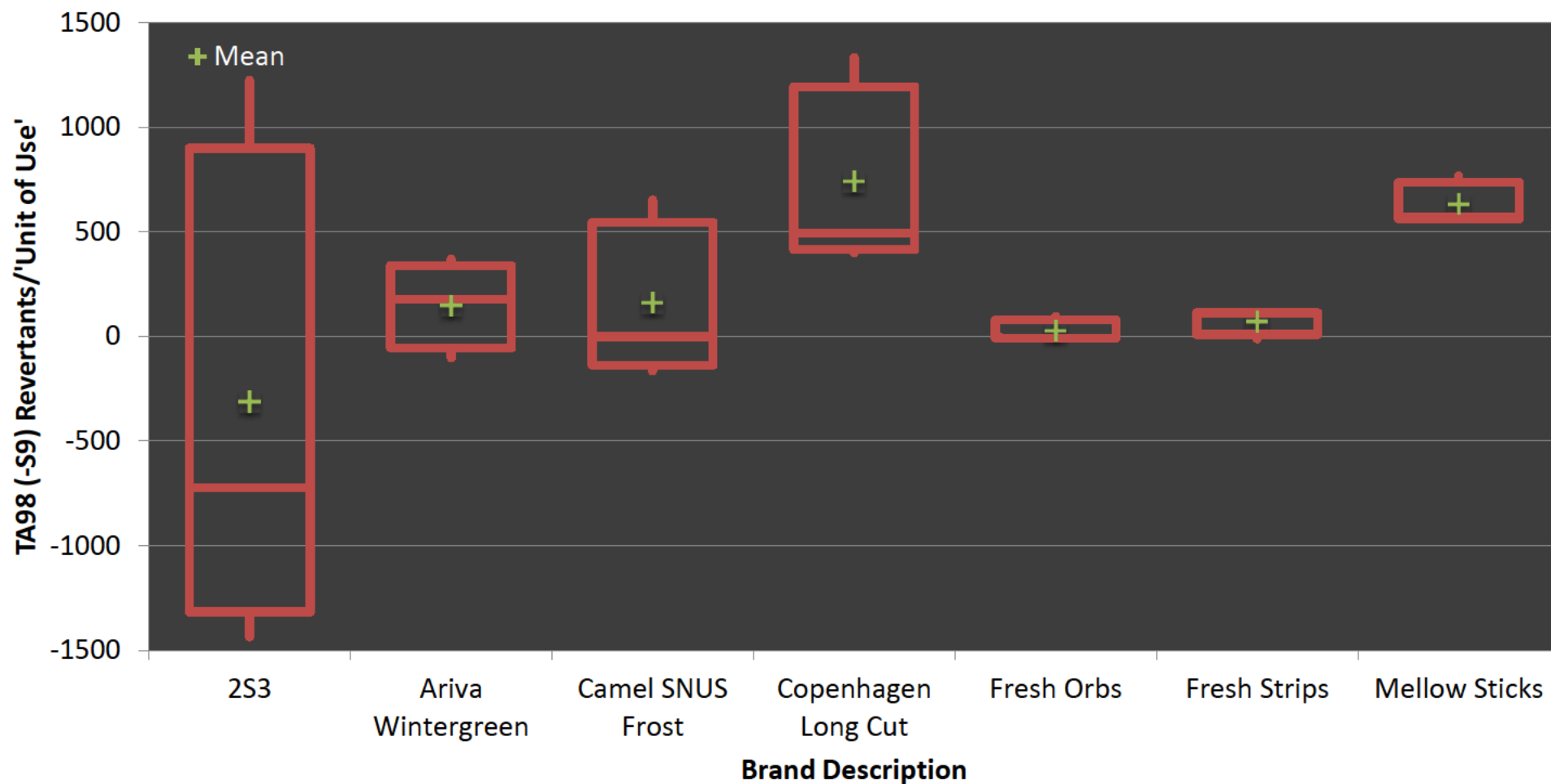
Date 2 January 2012



Test Describe - Comparative

Performed by TA98 (-S9): Revertants/'Unit of Use' Slope by Brand  
Wendy Wagstaff

Date 2 January 2012



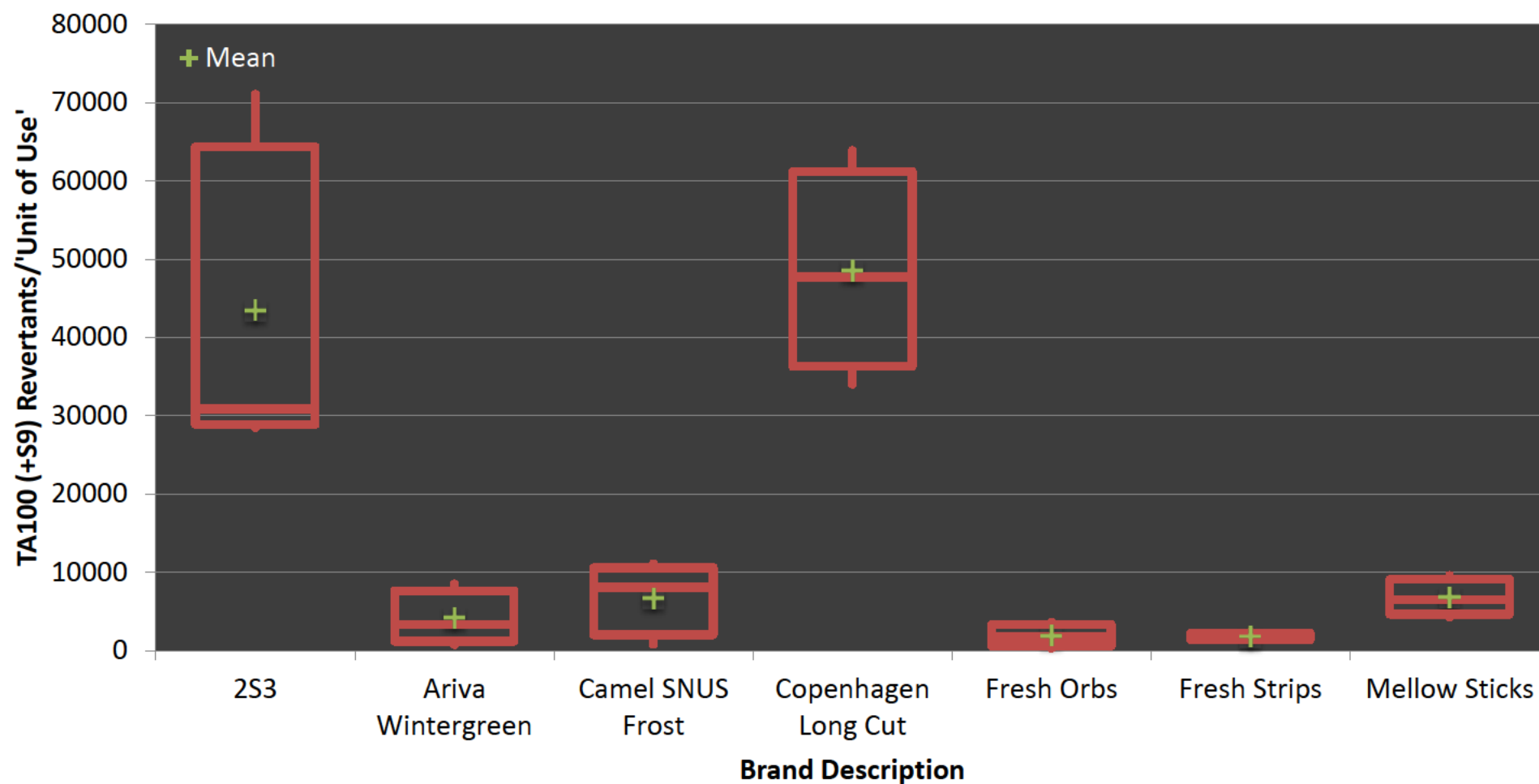
Test Describe - Comparative

Performed by

TA100 (+S9): Revertants/'Unit of Use' Slope by Brand  
Wendy Wagstaff

Date

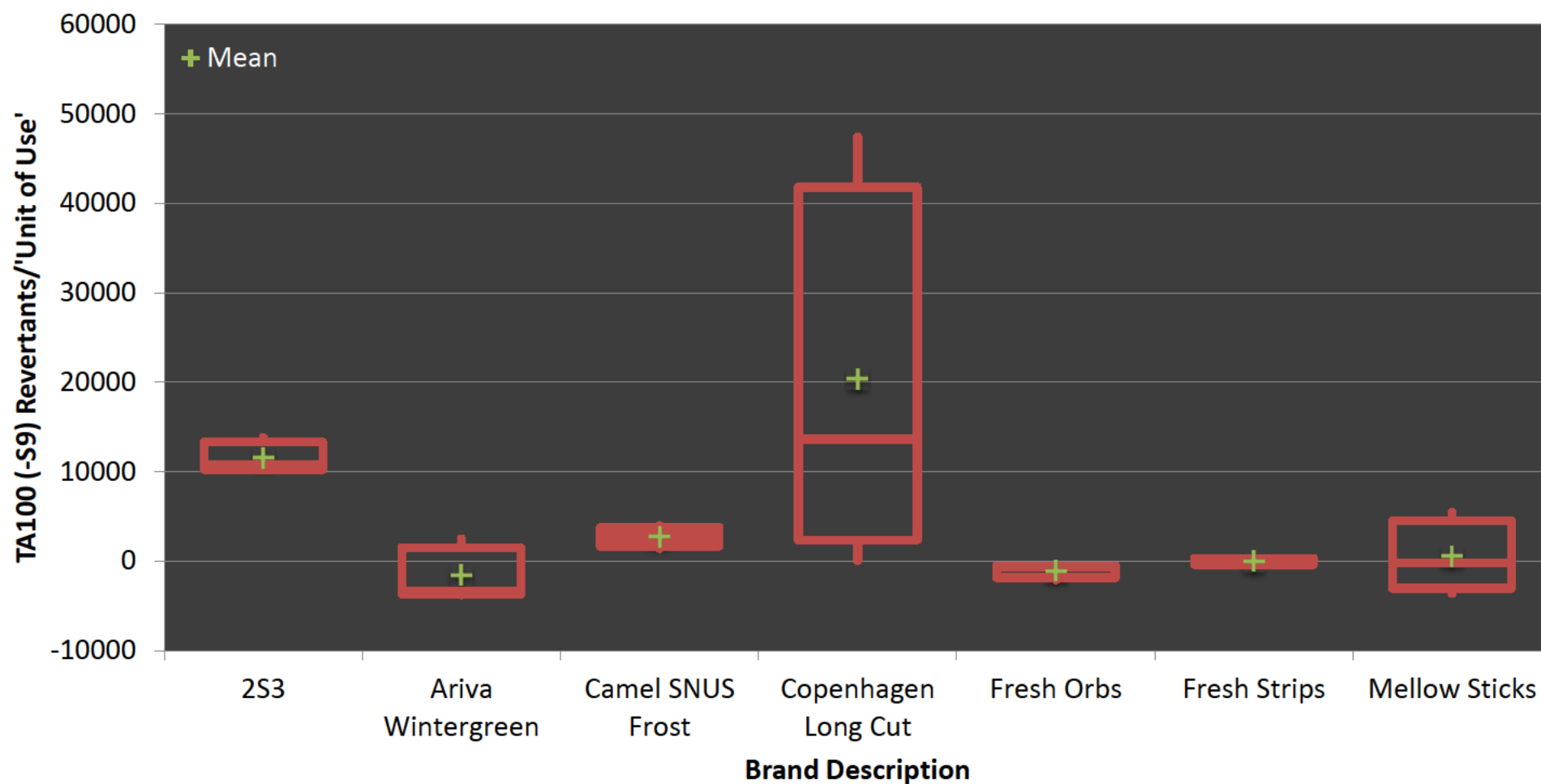
2 January 2012



Test Describe - Comparative

Performed by TA100 (-S9): Revertants/'Unit of Use' Slope by Brand  
Wendy Wagstaff

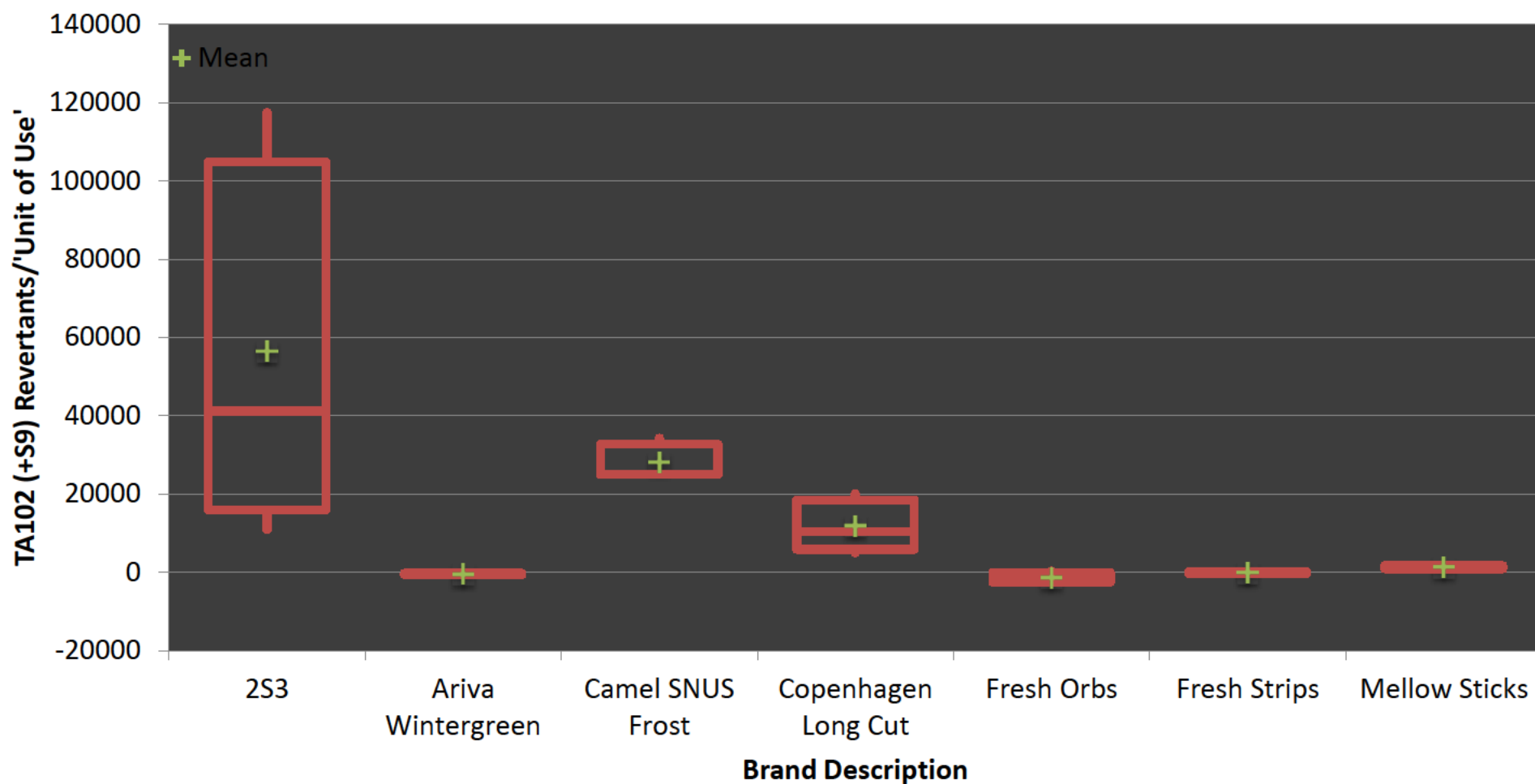
Date 2 January 2012



Test Describe - Comparative

Performed by TA102 (+S9): Revertants/'Unit of Use' Slope by Brand  
Wendy Wagstaff

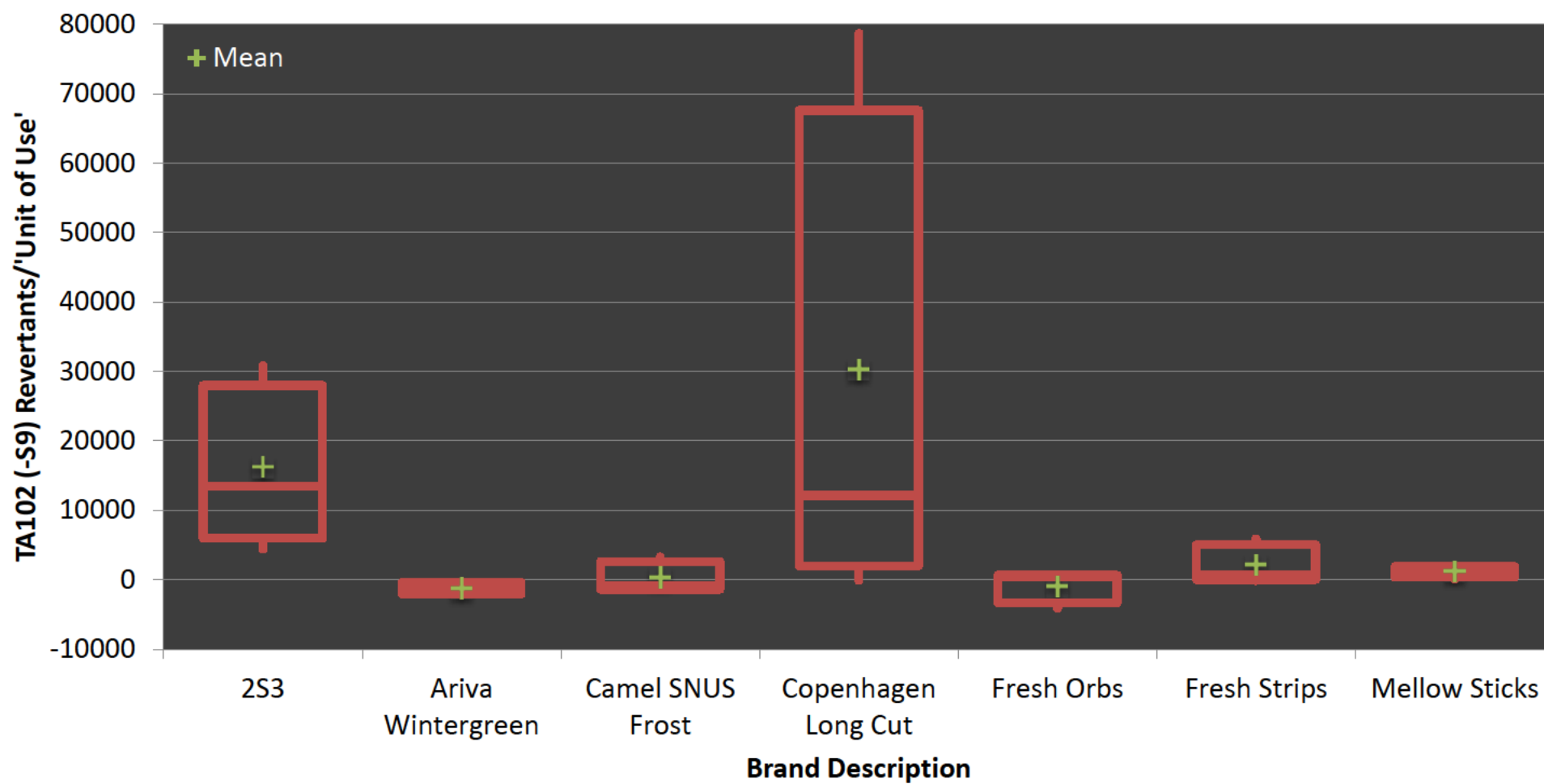
Date 2 January 2012



Test Describe - Comparative

Performed by TA102 (-S9): Revertants/'Unit of Use' Slope by Brand  
Wendy Wagstaff

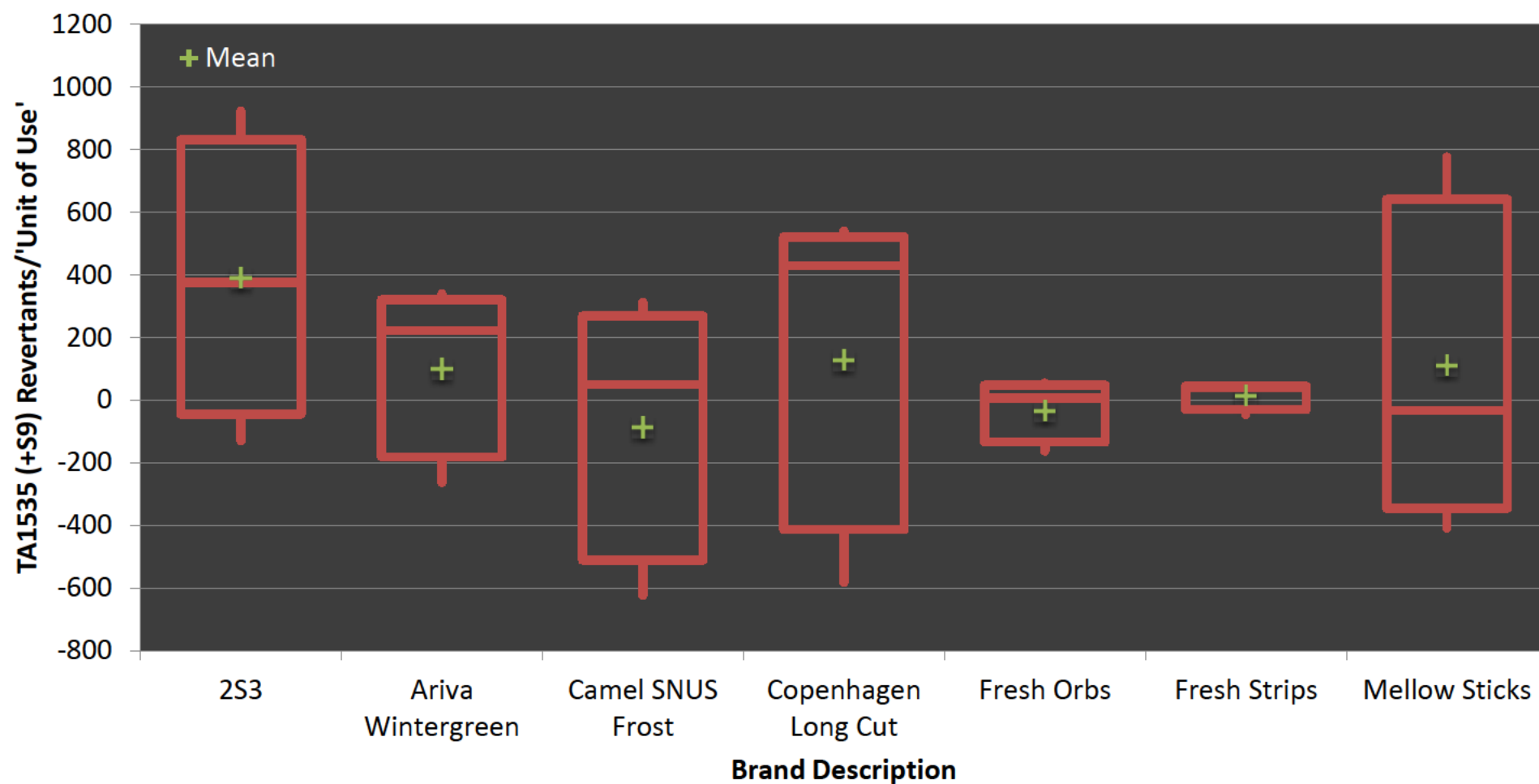
Date 2 January 2012



Test Describe - Comparative

Performed by TA1535 (+S9): Revertants/'Unit of Use' Slope by Brand  
Wendy Wagstaff

Date 2 January 2012

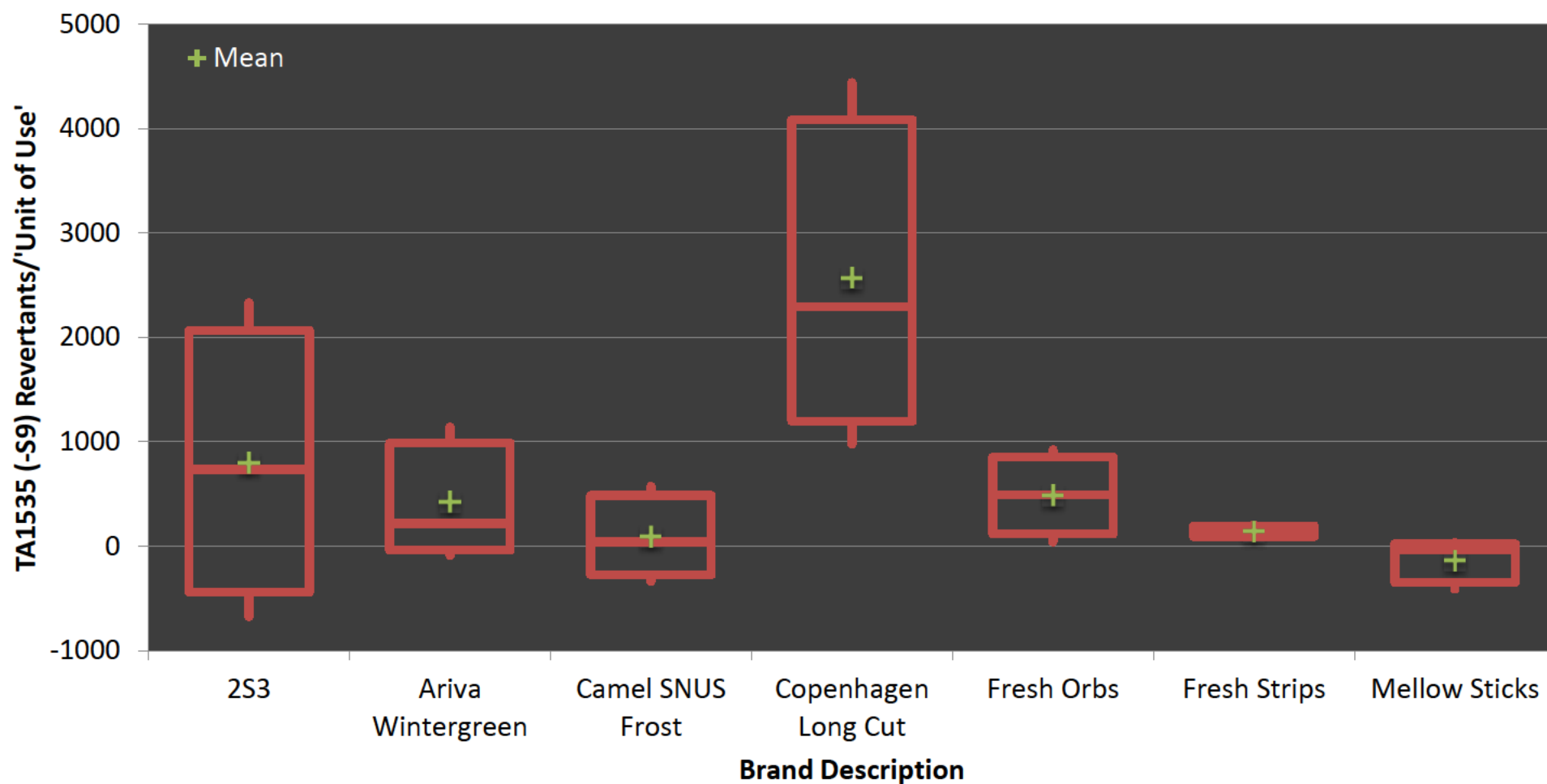




Test Describe - Comparative

Performed by TA1535 (-S9): Revertants/'Unit of Use' Slope by Brand  
Wendy Wagstaff

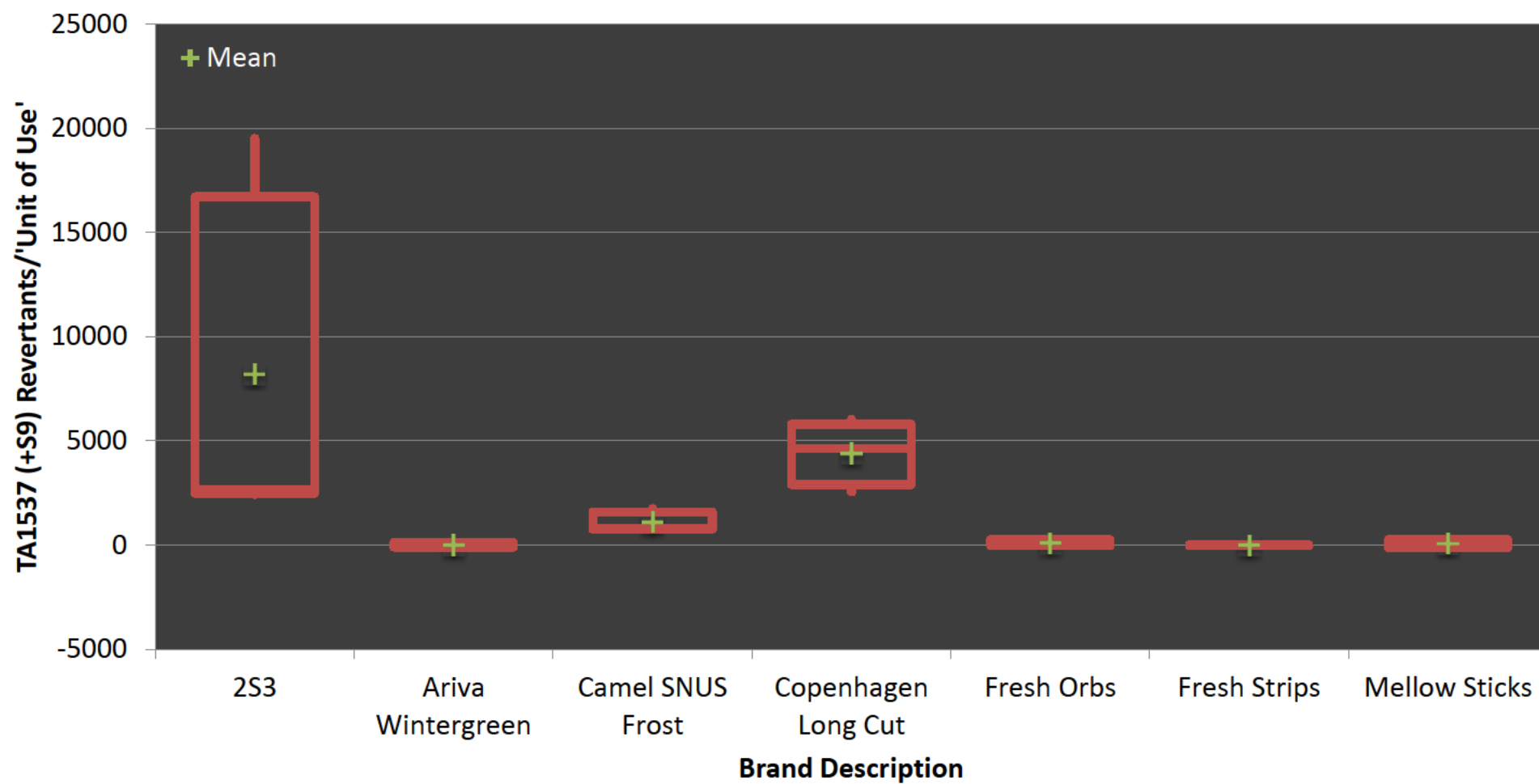
Date 2 January 2012



Test Describe - Comparative

Performed by TA1537 (+S9): Revertants/'Unit of Use' Slope by Brand  
Wendy Wagstaff

Date 2 January 2012



Test Describe - Comparative

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