

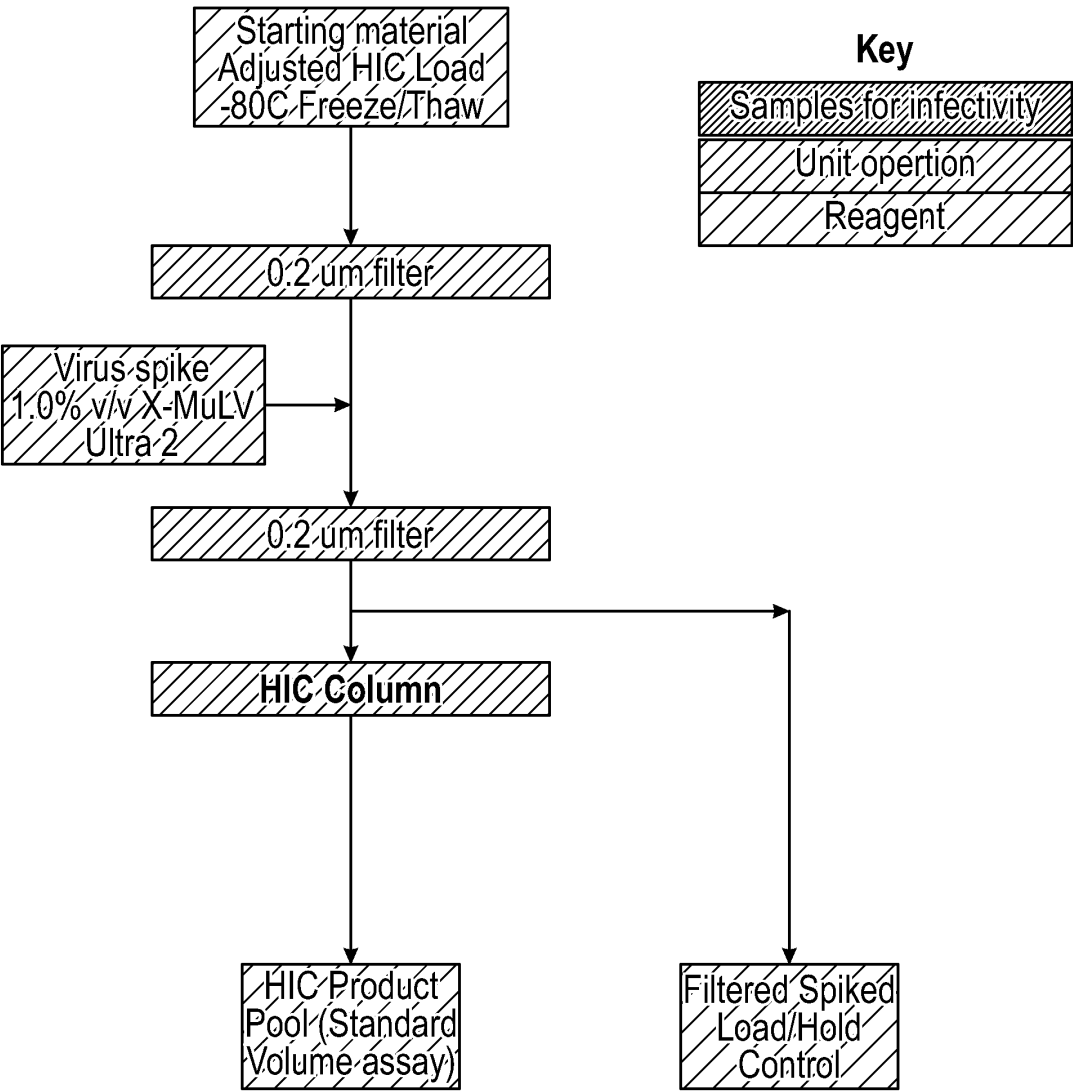


FIG. 1

2/25

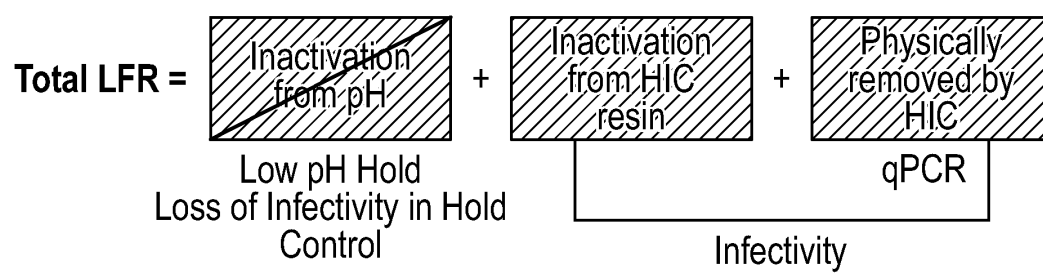


FIG. 2

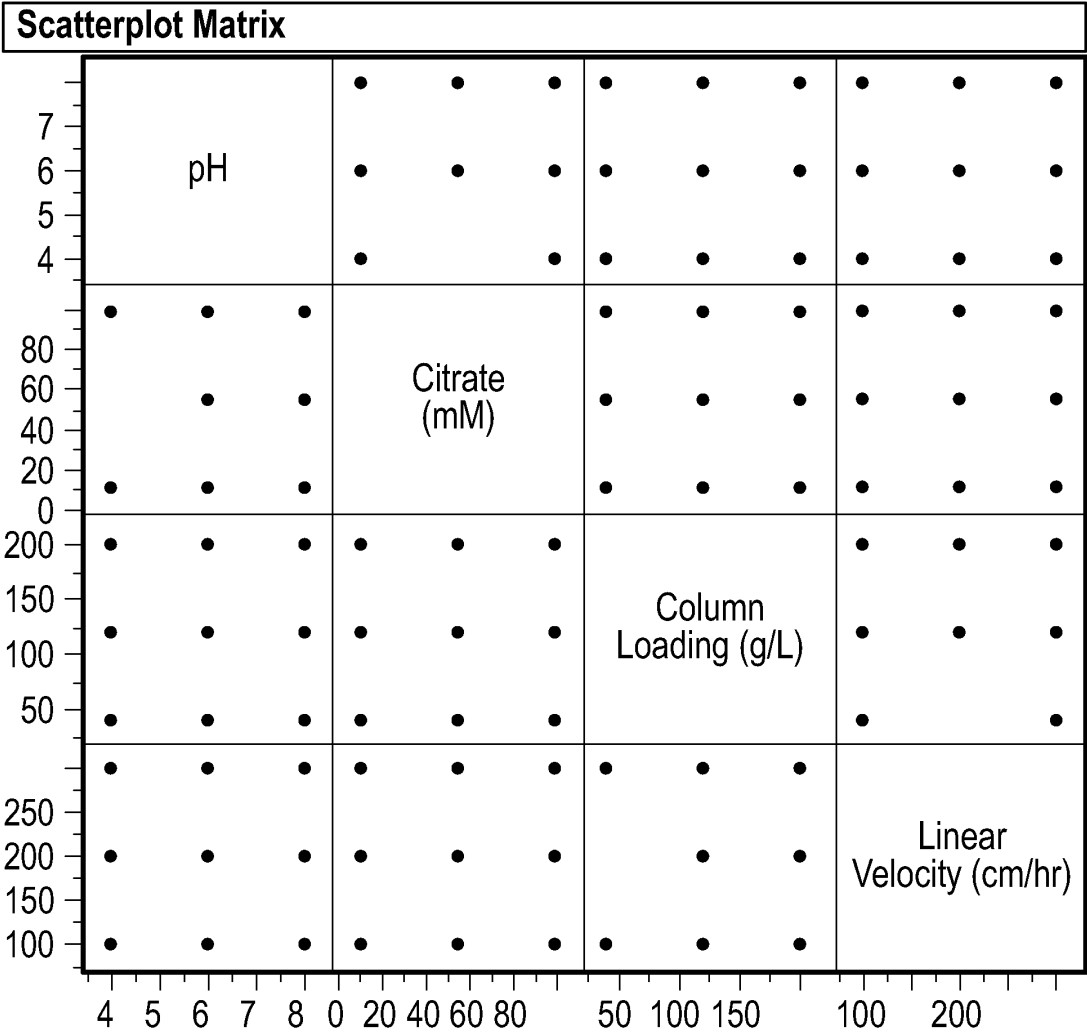


FIG. 3

4/25

	Log ₁₀ adjusted titer (PFU)	95% Conf. of Log ₁₀ adjusted titer	Log ₁₀ Reduction	95% Conf. of Log ₁₀ reduction
Stock virus control	8.13	0.17	NA	NA
HIC load hold control	3.33	0.35	4.80	0.39
HIC product pool	<3.47	NA	> None	0.35

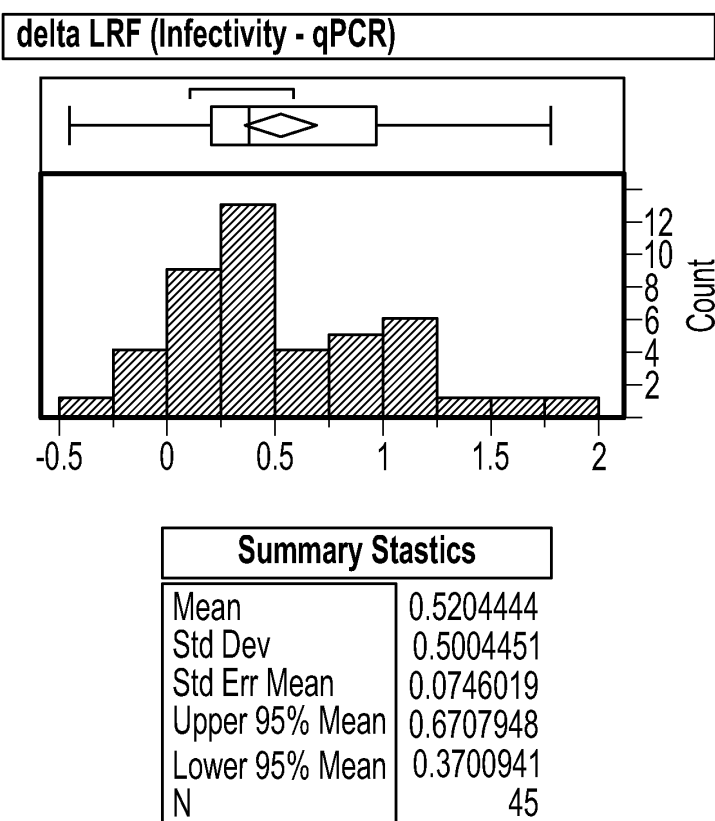
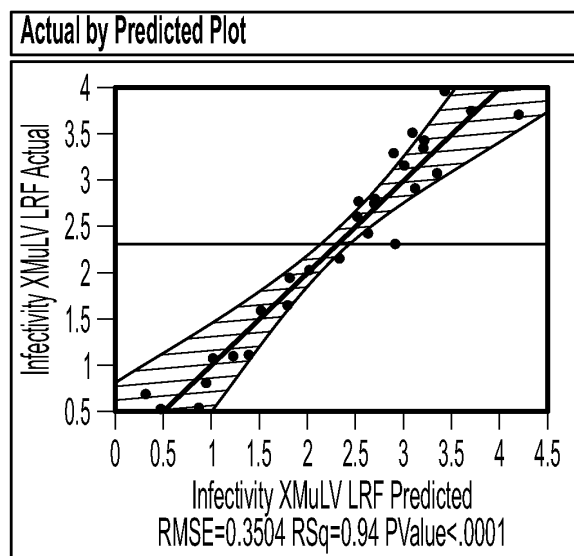


FIG. 4

5/25

**Summary of Fit**

RSquare	0.935825
RSquare Adj	0.891705
Root Mean Square Error	0.350429
Mean of Response	2.3175
Observations (or Sum Wgts)	28

Scaled Estimates

Nominal factors expanded to all levels

Continuous factors centered by mean, scaled by range/2

Term	Scaled Estimate	Std Error	Prob> t
Load pH	-0.646652	0.077686	<.0001 *
Isotype[IgG4]	-0.309316	0.068483	0.0004 *
Actual Loading	-0.295325	0.078163	0.0016 *
Load Linear Velocity (cmh)	-0.291998	0.067744	0.0005 *
(Load pH-6.23036)*(Actual Loading-130.911)	-0.279022	0.084232	0.0044 *
Resin[PS6FFHS]	-0.277465	0.067414	0.0008 *
(Load pH-6.23036)*Resin[PS6FFHS]	-0.234759	0.076489	0.0073 *
([mM Citrate]-98.2143)*(Load Linear Velocity (cmh)-192.857)	-0.221741	0.073586	0.0082 *
([mM Citrate]-98.2143)*(Actual Loading-130.911)	-0.208124	0.081534	0.0213 *
[mM Citrate]	-0.108531	0.078945	0.1882
(Load pH-6.23036)*Resin[CPHS]	0.2347587	0.076489	0.0073 *
Resin[CPHS]	0.2774654	0.067414	0.0008 *
Isotype[IgG1]	0.3093164	0.068483	0.0004 *
([mM Citrate]-98.2143)*([mM Citrate]-98.2143)	1.005377	0.197641	0.0001 *
Intercept	1.4694785	0.181215	<.0001 *

FIG. 5

6/25

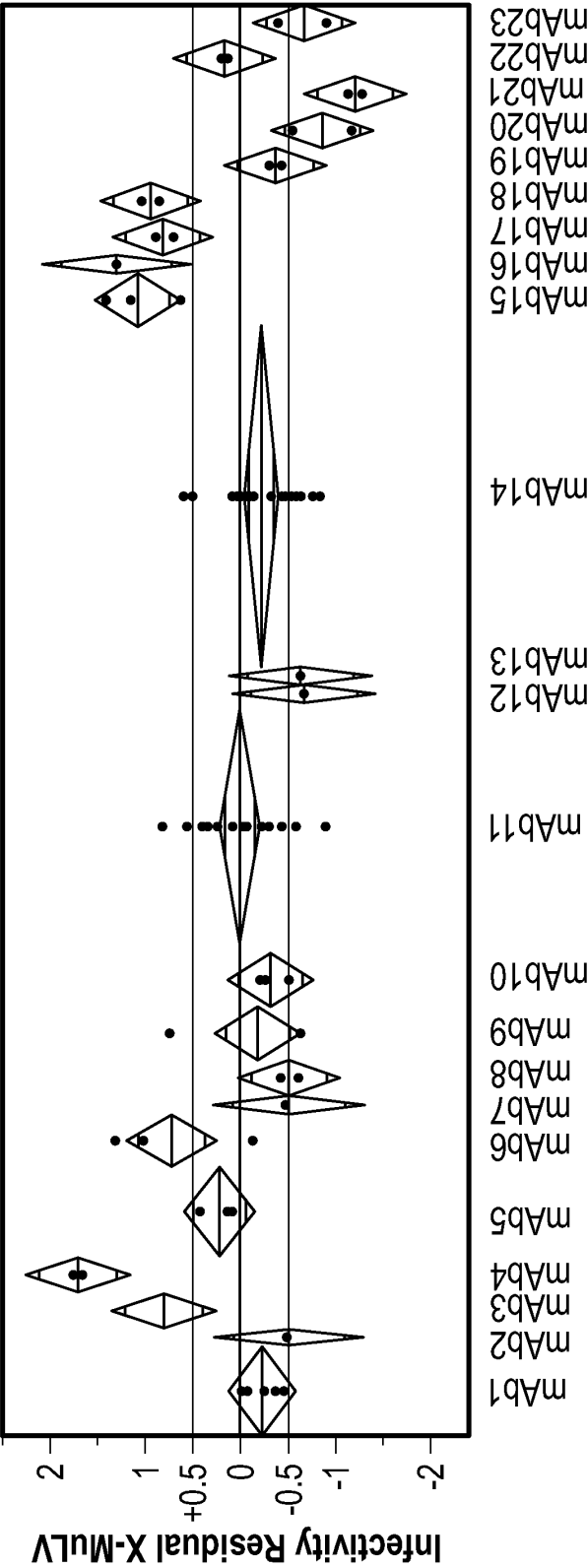
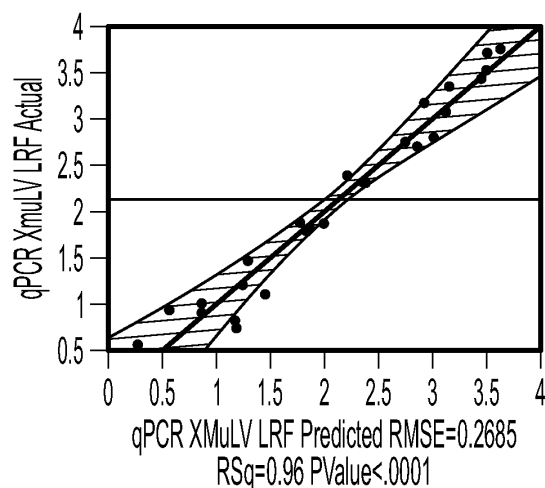


FIG. 6

7/25

Actual by Predicted Plot



Summary of Fit

RSquare	0.961739
RSquare Adj	0.931676
Root Mean Square Error	0.268474
Mean of Response	2.122692
Observations (or Sum Wgts)	26

Scaled Estimates

Nominal factors expanded to all levels

Continuous factors centered by mean, scaled by range/2

Term	Scaled Estimate		Std Error	t Ratio	Prob> t
Intercept	2.1214534		0.053334	39.78	<.0001 *
Isotype[IgG1]	0.2247768		0.054302	4.14	0.0010 *
Resin[Capto Phenyl HS]	0.1415737		0.053872	2.63	0.0199 *
(Load pH-6.24385)*Resin[Capto Phenyl HS]	0.1114237		0.058589	1.90	0.0780
Resin[PS6FFHS]*(Load Linear Velocity (cmh)-200)	0.0926505		0.05356	1.73	0.1056
[mM Citrate]	0.0186909		0.059071	0.32	0.7564
Resin[Capto Phenyl HS]*(Load Linear Velocity (cmh)-200)	-0.09265		0.05356	-1.73	0.1056
(Load pH-6.24385)*Resin[PS6FFHS]	-0.111424		0.058589	-1.90	0.0780
[mM Citrate]-101.346*(Load Linear Velocity (cmh)-200)	-0.115767		0.057548	-2.01	0.0639
Resin[PS6FFHS]	-0.141574		0.053872	-2.63	0.0199 *
(Actual Loading-131.52)*(Load Linear Velocity (cmh)-200)	-0.177887		0.058966	-3.02	0.0092 *
(Load pH-6.24385)*(Actual Loading-131.52)	-0.210714		0.064876	-3.25	0.0058 *
Isotype[IgG4]	-0.224777		0.054302	-4.14	0.0010 *
Load Linear Velocity (cmh)	-0.2701		0.053608	-5.04	0.0002 *
Actual Loading	-0.323665		0.058946	-5.49	<.0001 *
Load pH	-0.903634		0.057297	-15.77	<.0001 *

FIG. 7

8/25

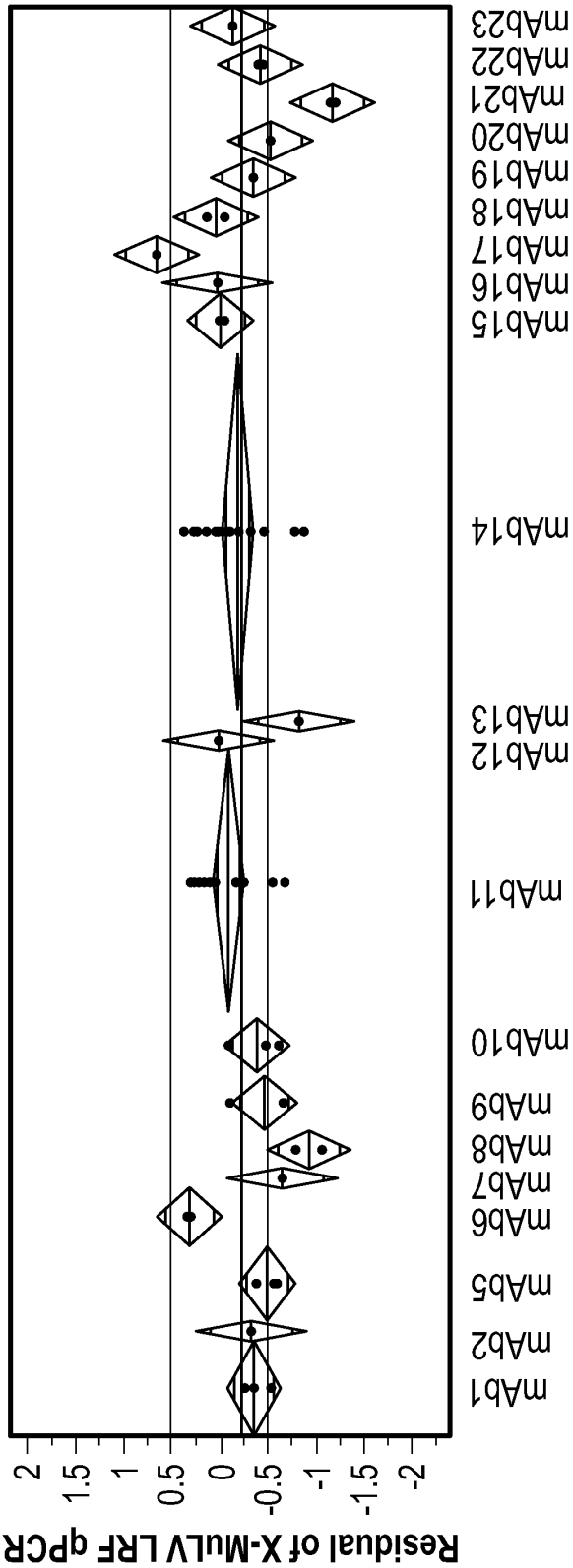
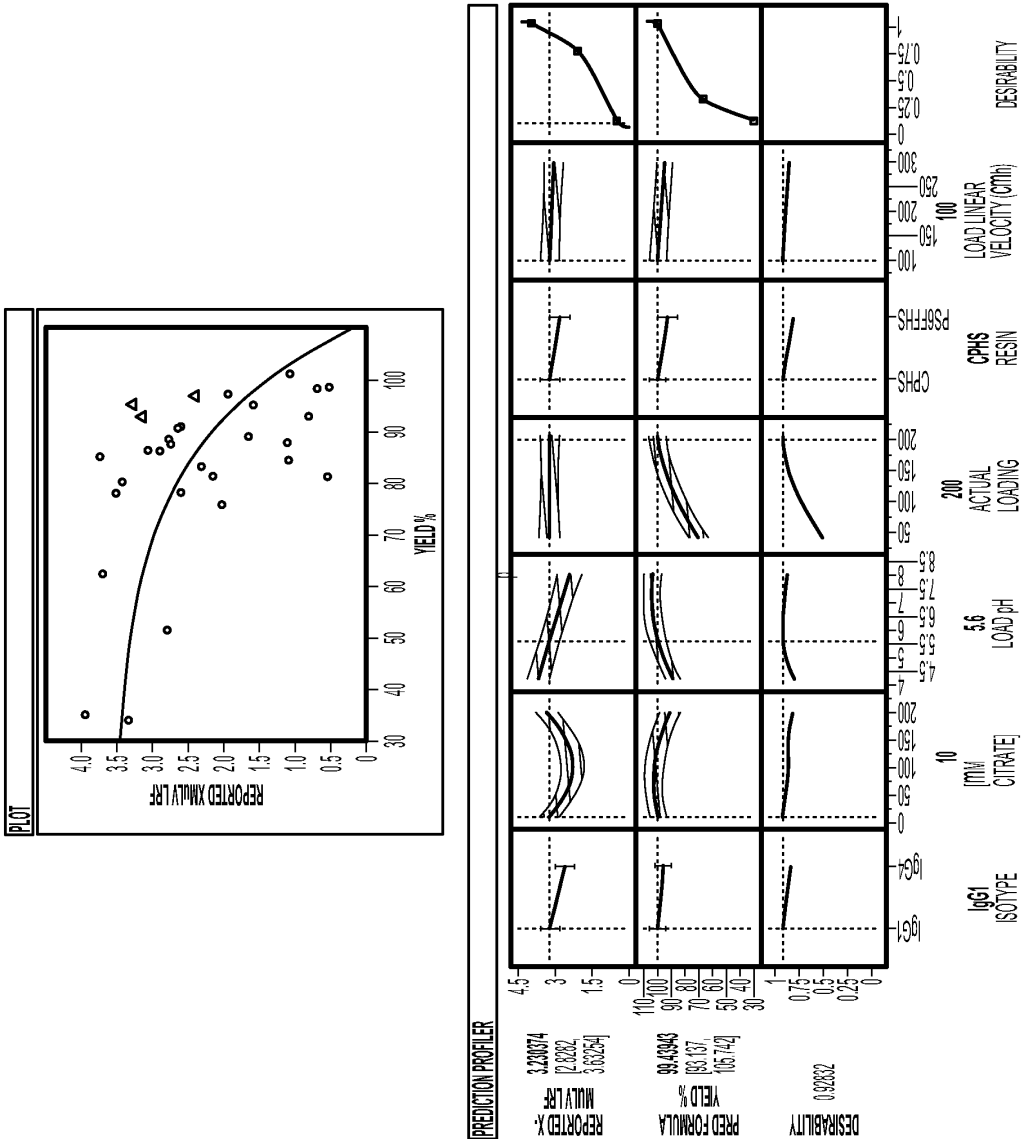


FIG. 8

9/25



10/25

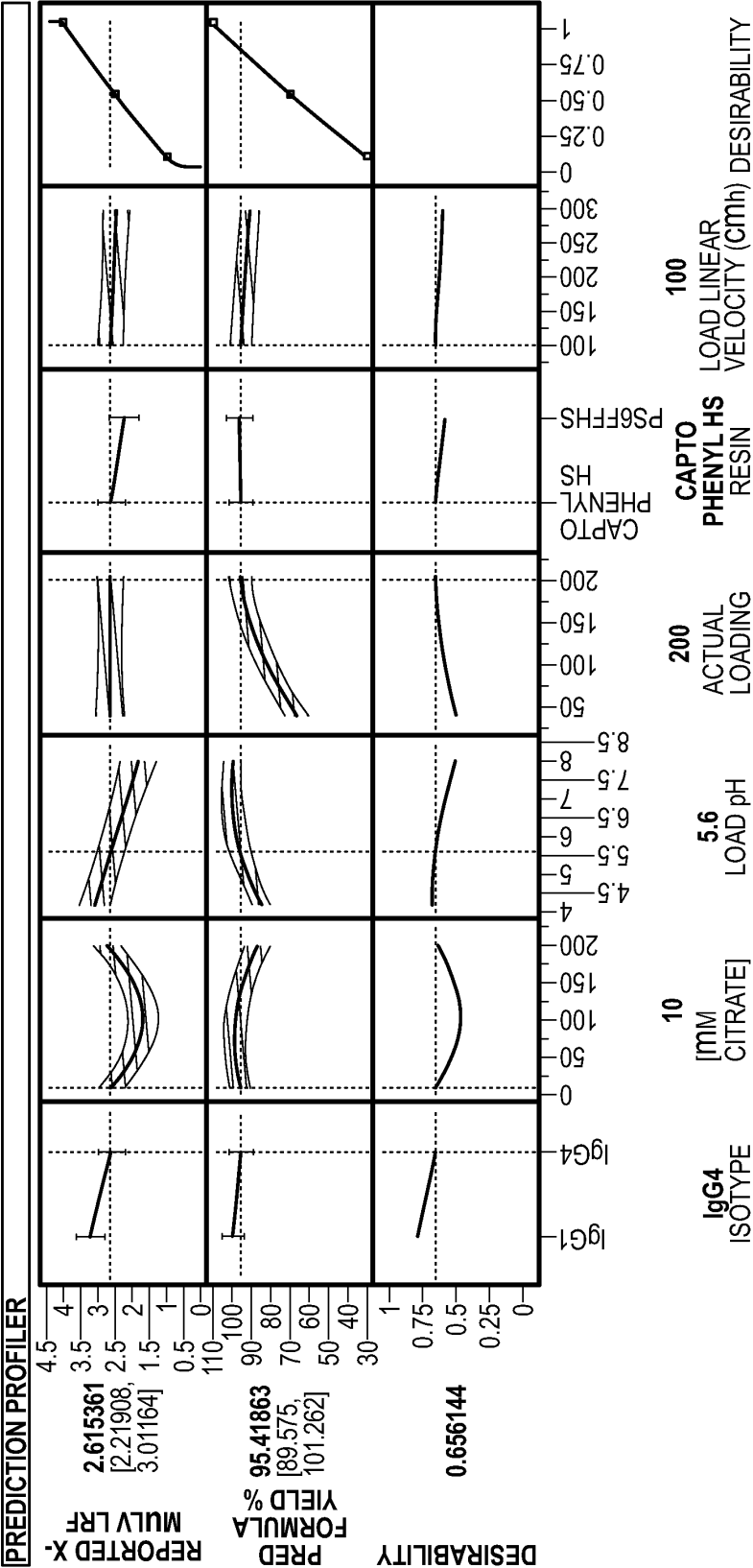


FIG. 9B

11/25

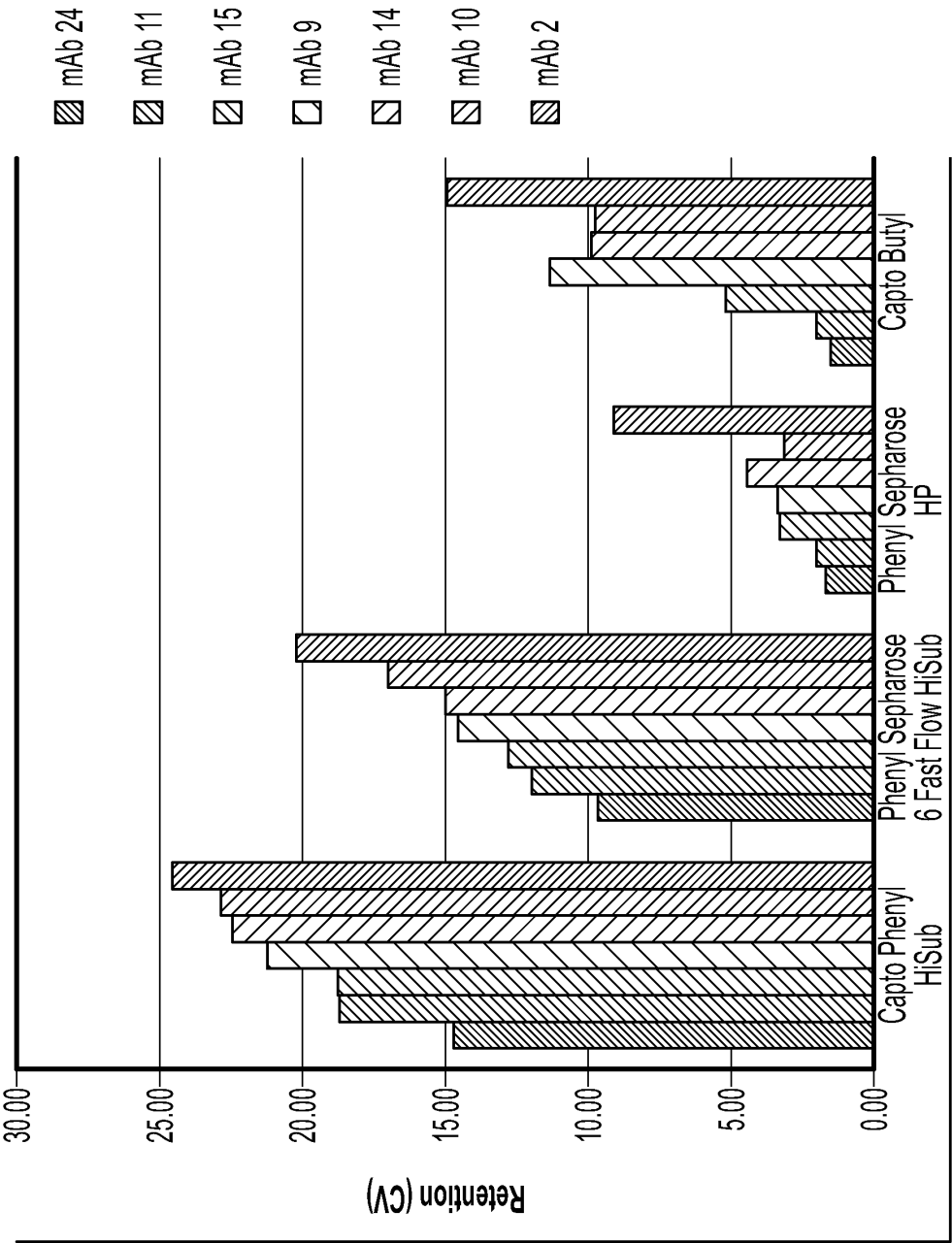


FIG. 10

12/25

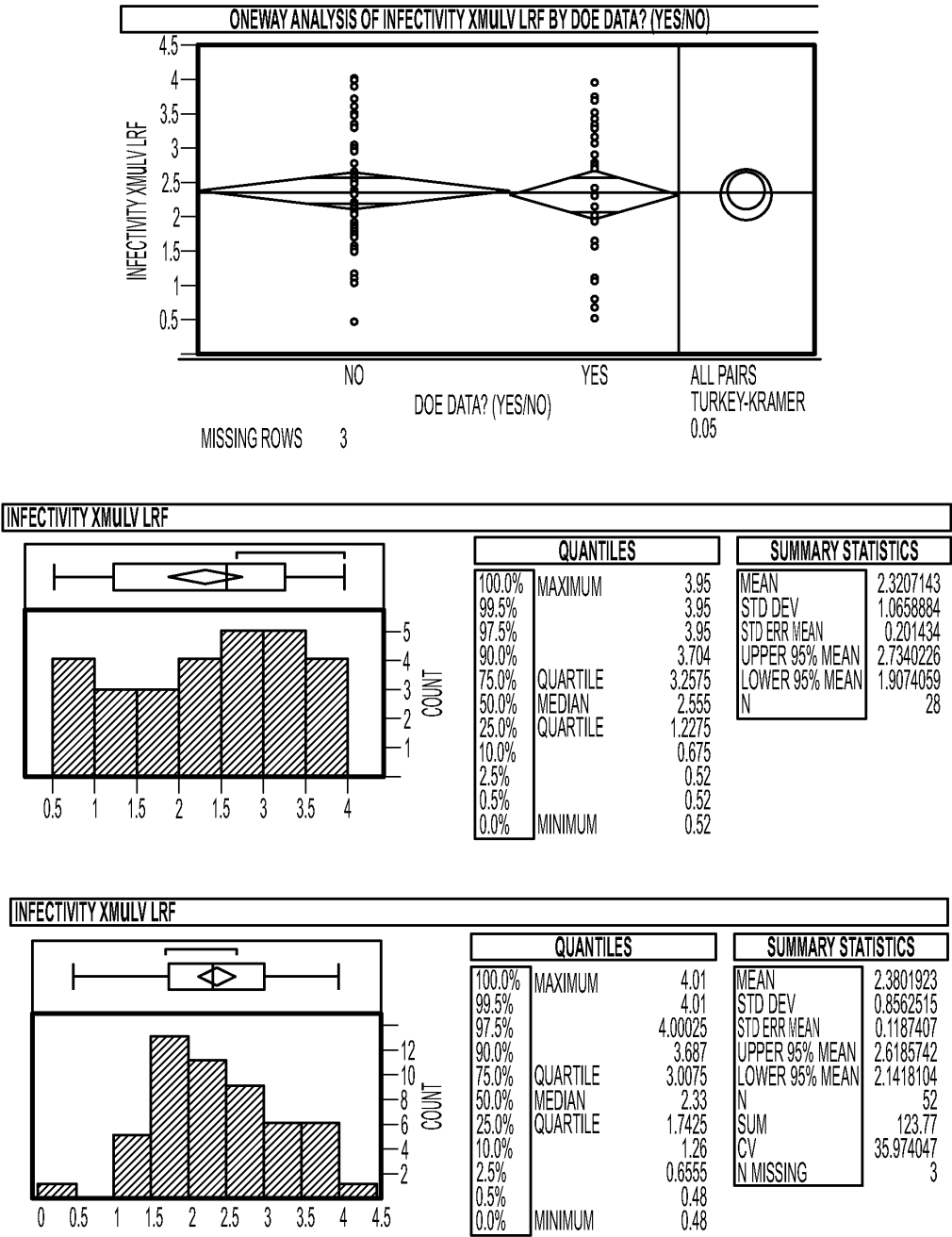
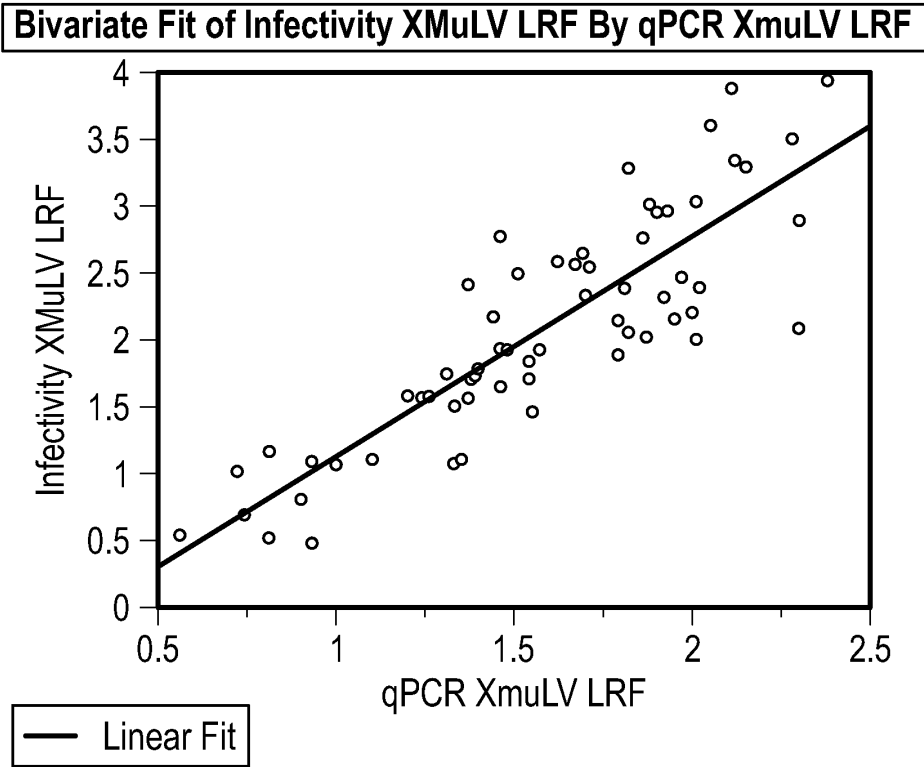


FIG. 11



Summary of Fit	
RSquare	0.73649
RSquare Adj	0.732098
Root Mean Square Error	0.434463
Mean of Response	2.085161
Observations (or Sum Wgts)	62

FIG. 12

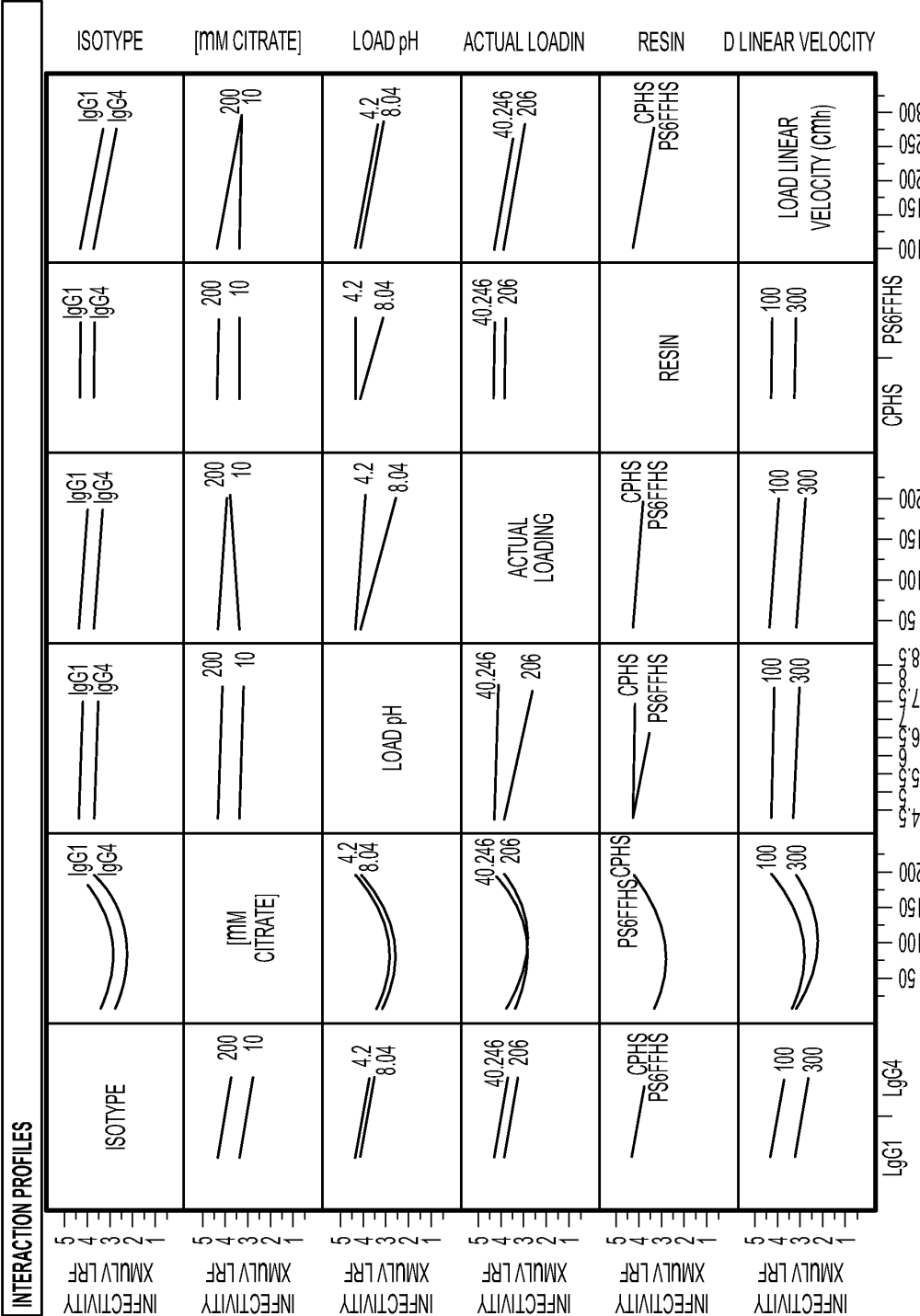
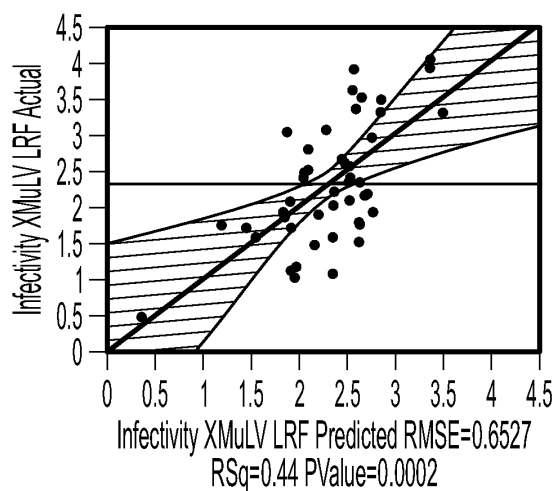


FIG. 13

15/25

Actual by Predicted Plot



Summary of Fit

RSquare	0.442568
RSquare Adj	0.364786
Root Mean Square Error	0.652715
Mean of Response	2.3214
Observations (or Sum Wgts)	50

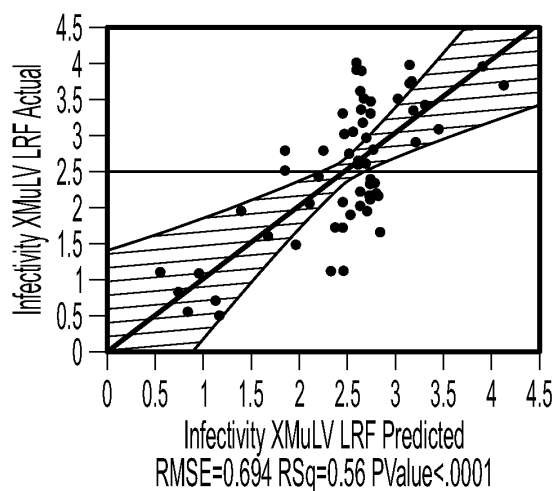
Scaled Estimates

Term	Estimate	Std Error	t Ratio	Prob> t	VIF
[mM Citrate]	0.0182235	0.004511	4.04	0.0002*	1.7115157
Actual Loading	-0.013599	0.00353	-3.85	0.0004*	2.5069875
Intercept	4.1889276	1.395733	3.00	0.0045*	.
Isotype[IgG1]	0.6890127	0.265014	2.60	0.0127*	2.9673096
([mM Citrate]-41.3)*(Actual Loading-119.748)	0.0003119	0.00013	2.39	0.0213*	1.6030162
Load pH	-0.254398	0.15366	-1.66	0.1051	1.8591425
Load Linear Velocity (cmh)	0.0055556	0.006429	0.86	0.3923	1.0914692

FIG. 14A

16/25

Actual by Predicted Plot



Summary of Fit

RSquare	0.561226
RSquare Adj	0.476846
Root Mean Square Error	0.69403
Mean of Response	2.48926
Observations (or Sum Wgts)	63

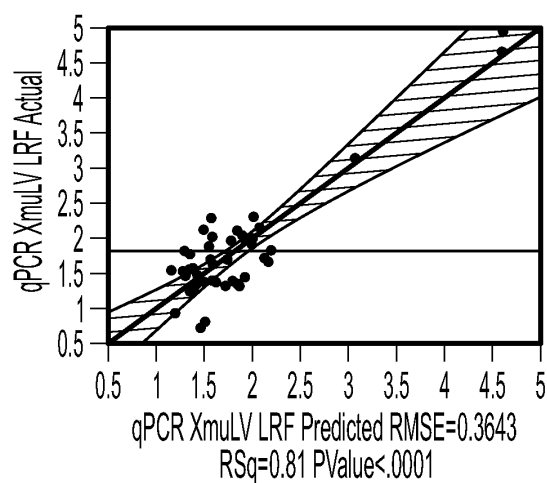
Scaled Estimates

Term	Estimate	Std Error	t Ratio	Prob> t	VIF
Intercept	5.2564777	0.533905	9.85	<.0001*	.
Isotype[IgG1]	0.1931753	0.104003	1.86	0.0689	1.1919576
[mM Citrate]	0.0016132	0.001395	1.16	0.2528	1.2027004
Load pH	-0.320798	0.068947	-4.65	<.0001*	1.1143738
Actual Loading	-0.005525	0.001647	-3.36	0.0015*	1.1766006
Resin[Capto Phenyl HS]	0.03157272	0.113452	2.78	0.0075*	1.1638796
Load Linear Velocity (cmh)	-0.001584	0.00139	-1.14	0.2597	1.145904
([mM Citrate]-66.1111)*(Actual Loading-122.275)	-1.836e-5	0.000019	-0.96	0.3395	1.130044
([mM Citrate]-66.1111)*(Load Linear Velocity (cmh)-194.444)	-2.73e-5	1.516e-5	-1.80	0.0776	1.1619228
(Load pH-6.10222)*(Actual Loading-122.275)	-0.002423	0.00095	-2.55	0.0137*	1.0544607
(Load pH-6.10222)*Resin[Capto Phenyl HS]	0.1391314	0.070442	1.98	0.0536	1.1632253

FIG. 14B

17/25

Actual by Predicted Plot



Summary of Fit

RSquare	0.810867
RSquare Adj	0.778576
Root Mean Square Error	0.364317
Mean of Response	1.841837
Observations (or Sum Wgts)	49

Scaled Estimates

Nominal factors expanded to all levels

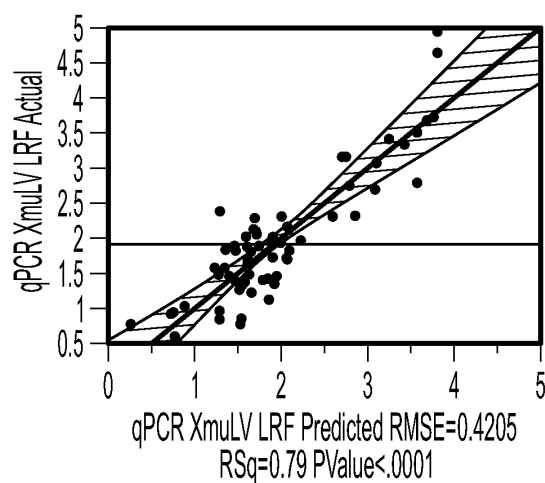
Continuous factors centered by mean, scaled by range/2

Term	Scaled Estimate		Std Error	t Ratio	Prob> t
Intercept	1.7698405		0.113227	15.63	<.0001 *
(Load pH-5.9049)*(Load pH-5.9049)	1.4875583		0.190619	7.80	<.0001 *
Yield %	0.6261473		0.175922	3.56	0.0010 *
Isotype[IgG1]	0.3340423		0.114503	2.92	0.0057 *
Carta pl	0.1867508		0.094504	1.98	0.0549
0	0		0	0.00	<.0001 *
Load Linear Velocity (cmh)	-0.028155		0.097228	-0.29	0.7736
Isotype[IgG4]	-0.334042		0.114503	-2.92	0.0057 *
Target Column Loading (g/L-resin)	-0.928742		0.185822	-5.00	<.0001 *
Load pH	-1.470515		0.167872	-8.76	<.0001 *

FIG. 15A

18/25

Actual by Predicted Plot



Summary of Fit

RSquare	0.789147
RSquare Adj	0.764341
Root Mean Square Error	0.420504
Mean of Response	1.925584
Observations (or Sum Wgts)	77

Scaled Estimates

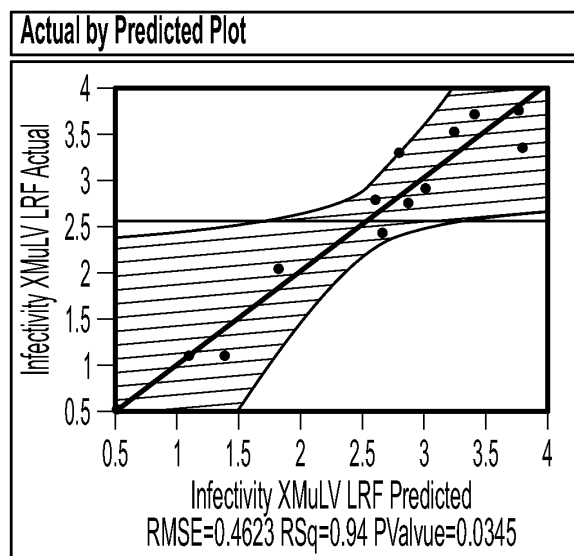
Nominal factors expanded to all levels

Continuous factors centered by mean, scaled by range/2

Term	Scaled Estimate		Std Error	t Ratio	Prob> t
Intercept	1.3307279		0.112918	11.78	<.0001*
(Load pH-6.02325)*(Load pH-6.02325)	1.2247685		0.159149	7.70	<.0001*
Yield %	0.5085596		0.189558	2.68	0.0092*
Resin[Capto Phenyl Hs]	0.3039153		0.073364	4.14	<.0001*
Isotype[IgG1]	0.2158708		0.065474	3.30	0.0016*
Carta pl	0.1384423		0.09655	1.43	0.1562
Load Linear Velocity (cmh)	-0.184566		0.078944	-2.34	0.0223*
Isotype[IgG4]	-0.215871		0.065474	-3.30	0.0016*
Resin[PS6FFHS]	-0.303915		0.073364	-4.14	<.0001*
Target Column Loading (g/L-resin)	-0.610456		0.12037	-5.07	<.0001*
Load pH	-1.149347		0.086098	-13.35	<.0001*

FIG. 15B

19/25

**Summary of Fit**

RSquare	0.937371
RSquare Adj	0.812114
Root Mean Square Error	0.462338
Mean of Response	2.550769
Observations (or Sum Wgts)	13

Scaled Estimates

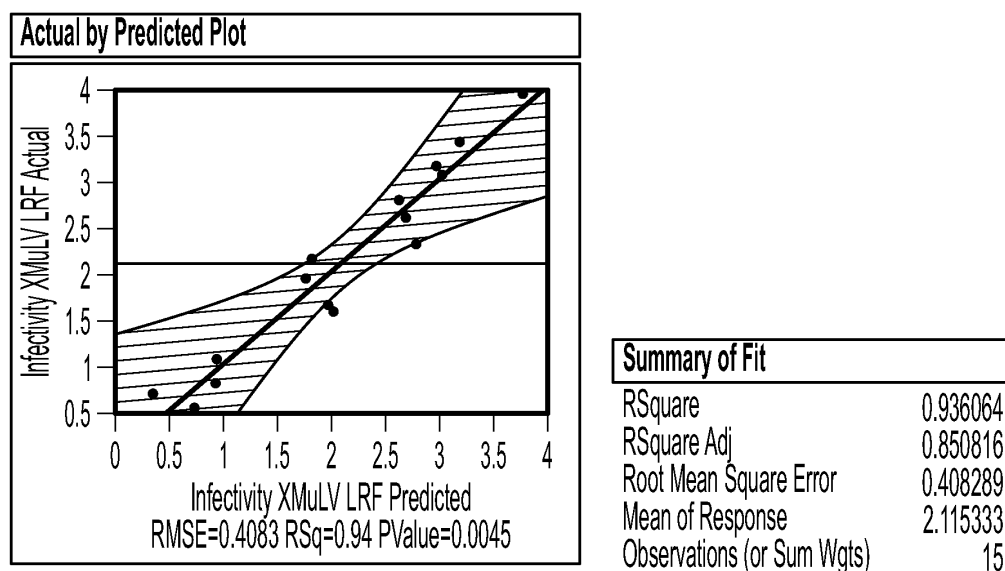
Nominal factors expanded to all levels

Continuous factors centered by mean, scaled by range/2

Term	Scaled Estimate		Std Error	Prob> t
Load pH	-0.659953		0.1625	0.0153*
Resin[PS6FFHS]	-0.359408		0.132149	0.0530
Actual Loading	-0.202466		0.149919	0.2482
[mM Citrate]	-0.193134		0.152747	0.2747
Load Linear Velocity (cmh)	-0.160022		0.131883	0.2917
(Load pH-6.25)*(Actual Loading-128.775)	-0.01078		0.160973	0.9498
([mM Citrate]-97.6923)*(Actual Loading-128.775)	0.0773832		0.154846	0.6435
Resin[CPHS]	0.3594077		0.132149	0.0530
([mM Citrate]-97.6923)*([mM Citrate]-97.6923)	1.2940374		0.409046	0.0341*
Intercept	1.5042462		0.371368	0.0155*

FIG. 16

20/25

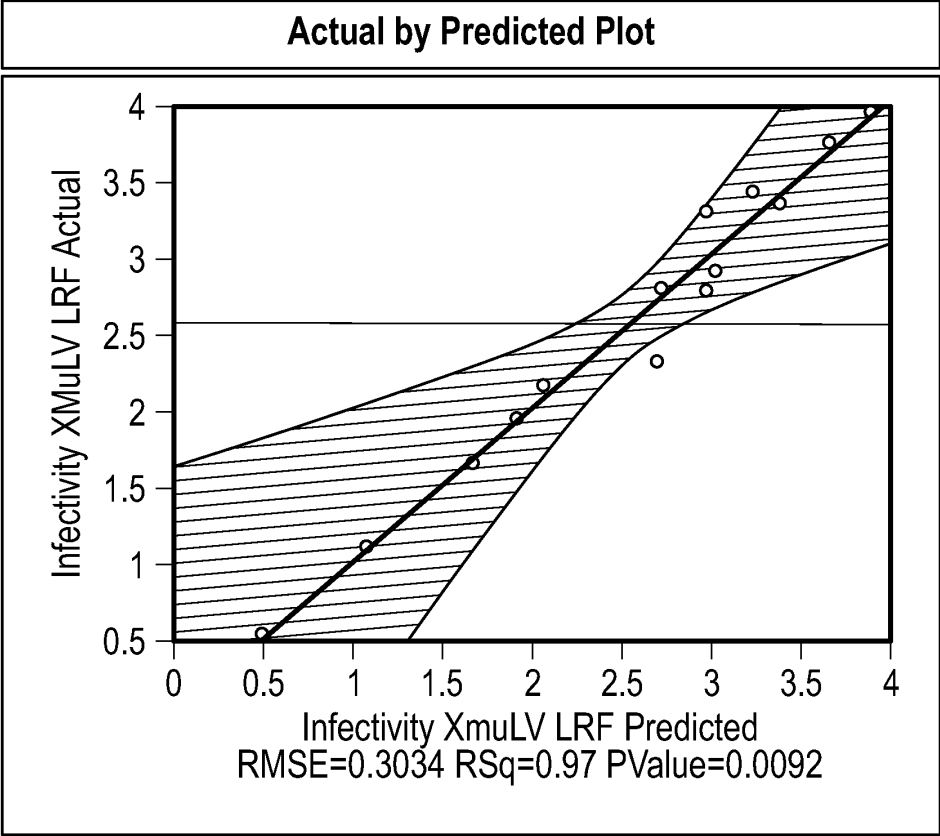
**Scaled Estimates**

Nominal factors expanded to all levels

Continuous factors centered by mean, scaled by range/2

Term	Scaled Estimate		Std Error	Prob> t
Load pH	-0.523094		0.121605	0.0051*
(Load pH-6.21333)*(Actual Loading-132.762)	-0.416391		0.134634	0.0213*
(mM Citrate]-98.6667)*(Actual Loading-132.762)	-0.398288		0.131794	0.0233*
Actual Loading	-0.377996		0.123334	0.0221*
Load Linear Velocity (cmh)	-0.35225		0.109745	0.0184*
Resin[PS6FFHS]	-0.2511		0.106755	0.0569
[mM Citrate]	0.0656154		0.125892	0.6209
Resin[CPHS]	0.2511005		0.106755	0.0569
(mM Citrate]-98.6667)*(mM Citrate]-98.6667)	0.8682188		0.315792	0.0333*
Intercept	1.3502834		0.292103	0.0036*

FIG. 17



Summary of Fit	
Rsquare	0.971775
Rsquare Adj	0.908268
Root Mean Square Error	0.303381
Mean of Response	2.564286
Observations (or Sum Wgts)	14

FIG. 18A

PARAMETER ESTIMATES					
TERM	ESTIMATE	Std ERROR	t RATIO	PROB> t	VIF
INTERCEPT	4.45441	0.446394	9.98	0.0006*	
([MM CITRATE]-91.4286)*([MM CITRATE]-91.4286)	0.0001409	2.617E-5	5.38	0.0058*	1.5200752
LOAD LINEAR VELOCITY (cmh)	-0.004278	0.000842	-5.08	0.0071*	1.0553282
ISOTYPE[lgG1]	0.3836797	0.08525	4.50	0.0108*	1.0828925
LOAD pH	-0.204897	0.050758	-4.04	0.0156*	1.1320731
ACTUAL LOADING	-0.04258	0.001121	-3.80	0.0191*	1.0560158
([MM CITRATE]-91.4286)*(LOAD LINEAR VELOCITY (cmh)-185.714)	-4.057E-5	1.18E-5	-3.44	0.0263*	1.5514466
([MM CITRATE]-91.4286)*(ACTUAL LOADING-133.939)	-4.244E-5	1.239E-5	-3.43	0.0266*	1.1250284
[MM CITRATE]	-0.002691	0.001191	-2.26	0.0867	1.6285024
(LOAD pH-6.35429)*(ACTUAL LOADING-133.939)	-0.000839	0.000775	-1.08	0.3402	1.5696998

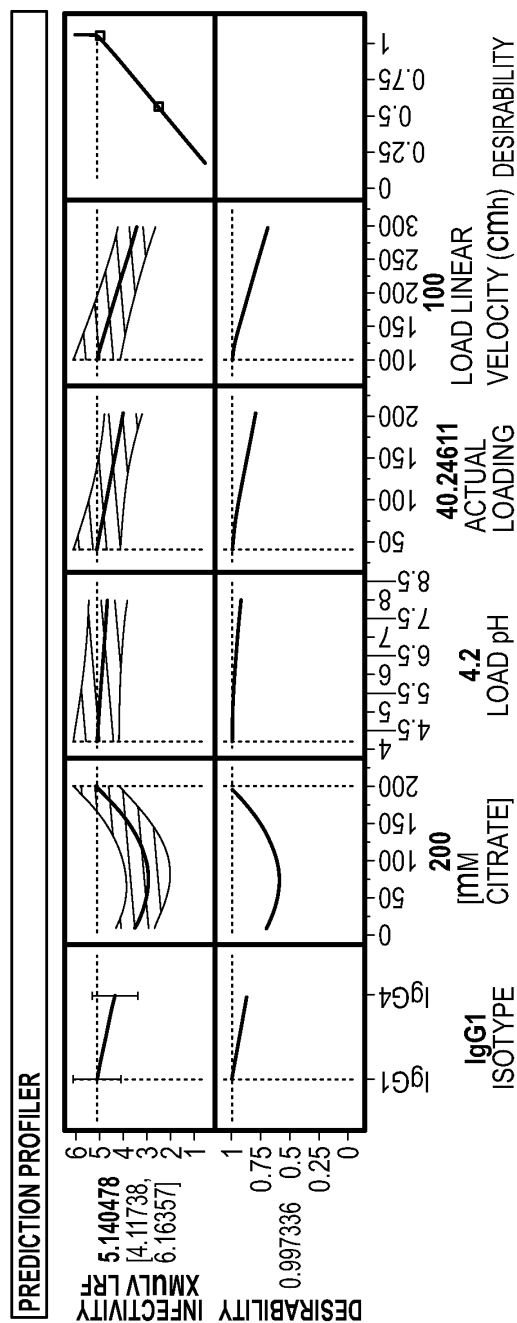
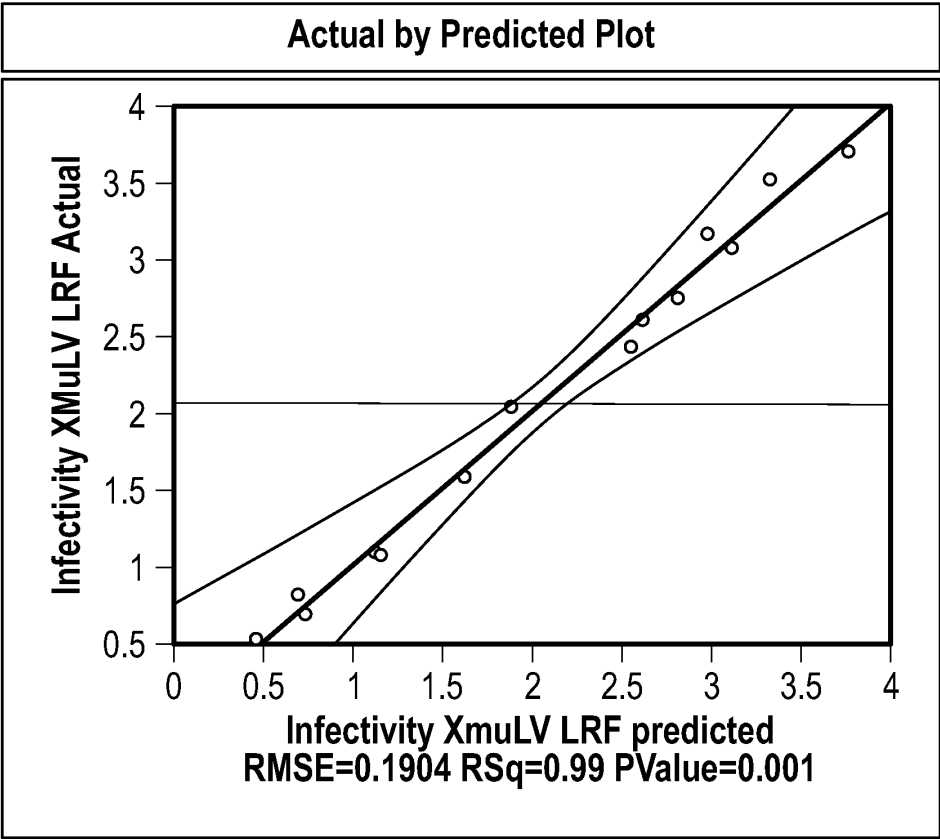


FIG. 18B

23/25



Summary of Fit	
RSquare	0.990865
RSquare Adj	0.970312
Root Mean Square Error	0.190358
Mean of Response	2.070714
Observations (or Sum Wgts)	14

FIG. 19A

PARAMETER ESTIMATES					
TERM	ESTIMATE	Std ERROR	t RATIO	PROB> t	VIF
LOAD pH	-0.479224	0.032026	-14.96	0.0001*	1.1912779
INTERCEPT	5.3086768	0.359427	14.77	0.0001*	.
ISOTYPE[lgG1]	0.249966	0.053029	4.71	0.0092*	1.0864592
ACTUAL LOADING	-0.003765	0.000818	-4.60	0.0100*	1.3343698
(([mm CITRATE]-105)*([mm CITRATE]-105)	8.0048E-5	1.931E-5	4.15	0.0143*	1.4367341
LOAD LINEAR VELOCITY (cmh)	-0.001724	0.000518	-3.33	0.0292*	1.0368236
(LOAD pH-6.10643)*(ACTUAL LOADING-127.883)	-0.00172	0.000587	-2.93	0.0428*	2.151491
(([mm CITRATE]-105)*(LOAD LINEAR VELOCITY (cmh)-200)	-1.631E-5	8.19E-6	-1.99	1.1174	2.0072074
(([mm CITRATE]-105)*(ACTUAL LOADING-127.883)	-1.37E-5	8.644E-6	-1.58	0.1882	1.1114233
(([mm CITRATE]-105)*(ACTUAL LOADING-127.883)	-0.000685	-0.000609	-1.12	0.3239	1.109493
([mm CITRATE]					

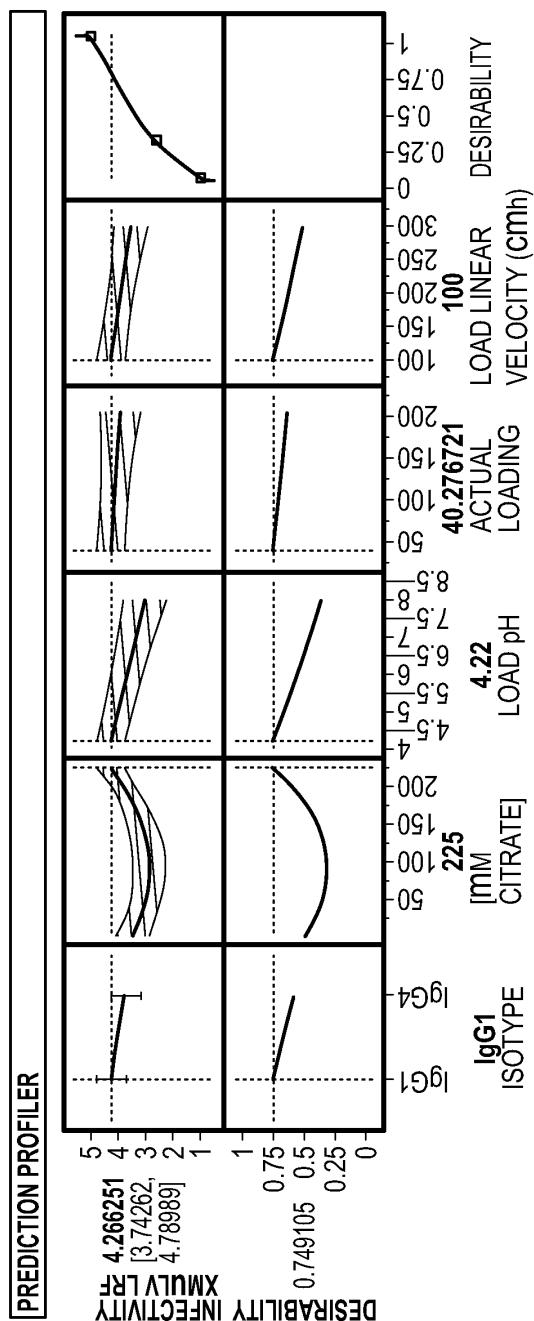


FIG. 19B

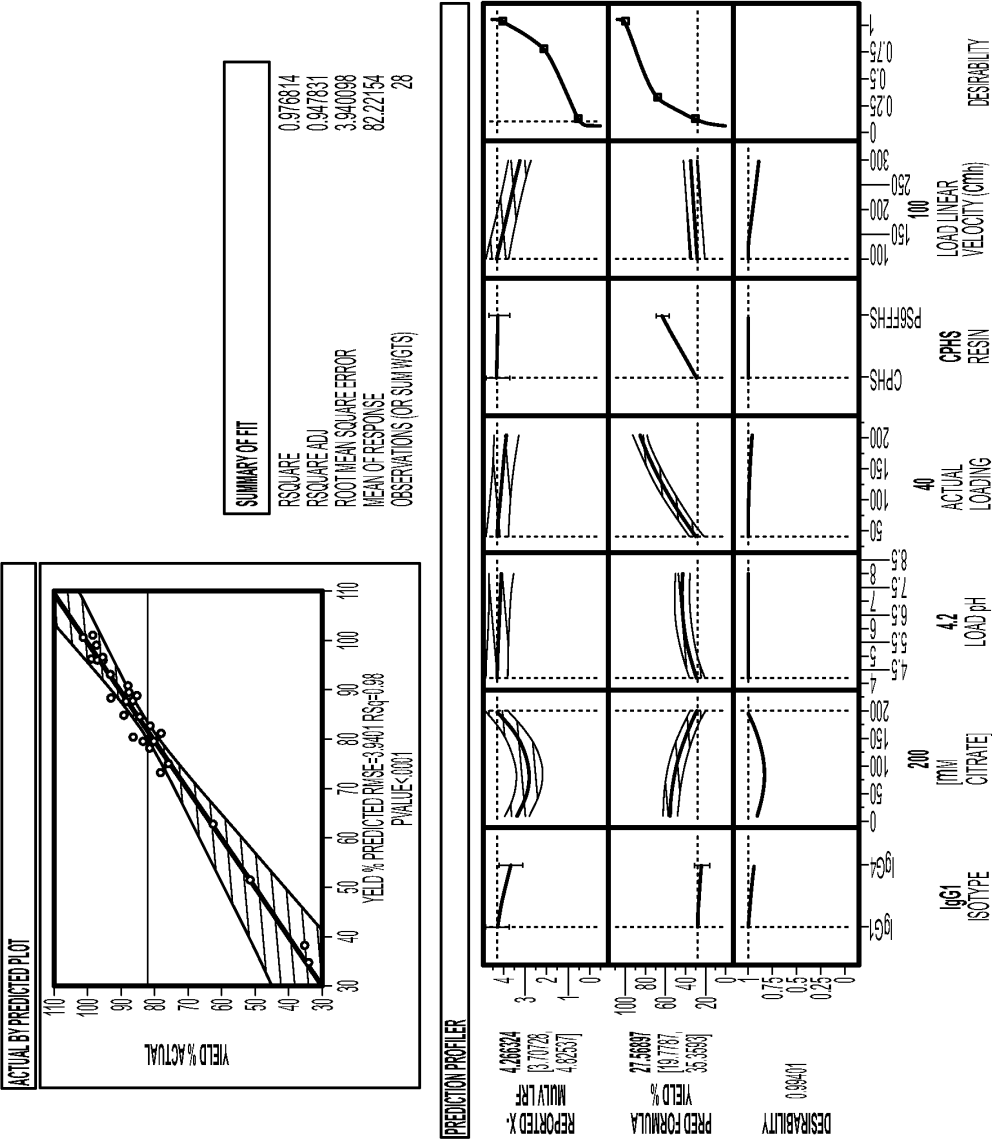


FIG. 20