

**ANEXO No. 9. Análisis del Experimento para el Caso Base
(Corriente 723).**

Análisis de la Corriente, 723 (Experimento de Screening)
02/12/2005 12:31 p.m.

Analysis Summary

File name: C:\Documents and Settings\Edward A. Moscoso\Mis documentos\Statgraphics\CB_723_1.sfx

Estimated effects for Ol y Ona 723

average	= 168,796	+/- 0,588352
A:Carga	= 19,945	+/- 1,1767
B:Vapor E530	= 14,8912	+/- 1,1767
C:P_C525	= 19,2137	+/- 1,1767
D:Nivel_V540	= 19,1212	+/- 1,1767
E:Vapor_E532	= 10,9587	+/- 1,1767
AB	= 2,30375	+/- 1,1767
AC	= -0,65875	+/- 1,1767
AD	= 3,88875	+/- 1,1767
AE	= 1,47625	+/- 1,1767
BC	= 4,2725	+/- 1,1767
BD	= 0,71	+/- 1,1767
BE	= -1,845	+/- 1,1767
CD	= 2,08	+/- 1,1767
CE	= 2,785	+/- 1,1767
DE	= 0,59	+/- 1,1767

Standard errors are based on total error with 16 d.f.

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This table shows each of the estimated effects and interactions. Also shown is the standard error of each of the effects, which measures their sampling error. To plot the estimates in decreasing order of importance, select Pareto Charts from the list of Graphical Options. To test the statistical significance of the effects, select ANOVA Table from the list of Tabular Options. You can then remove insignificant effects by pressing the alternate mouse button, selecting Analysis Options, and pressing the Exclude button.

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Analysis of Variance for Ol y Ona 723

Source	Sum of Squares	Df	Mean Square	F-Ratio	P-Value
A:Carga	3182,42	1	3182,42	287,30	0,0000
B:Vapor E530	1773,99	1	1773,99	160,15	0,0000
C:P C525	2953,35	1	2953,35	266,62	0,0000
D:Nivel V540	2924,98	1	2924,98	264,06	0,0000
E:Vapor E532	960,754	1	960,754	86,73	0,0000
AB	42,4581	1	42,4581	3,83	0,0679
AC	3,47161	1	3,47161	0,31	0,5834
AD	120,979	1	120,979	10,92	0,0045
AE	17,4345	1	17,4345	1,57	0,2277
BC	146,034	1	146,034	13,18	0,0022
BD	4,0328	1	4,0328	0,36	0,5547
BE	27,2322	1	27,2322	2,46	0,1365
CD	34,6112	1	34,6112	3,12	0,0962
CE	62,0498	1	62,0498	5,60	0,0309
DE	2,7848	1	2,7848	0,25	0,6229
Total error	177,233	16	11,077		
Total (corr.)	12433,8	31			

R-squared = 98,5746 percent
 R-squared (adjusted for d.f.) = 97,2383 percent
 Standard Error of Est. = 3,32822
 Mean absolute error = 1,96
 Durbin-Watson statistic = 2,76048 (P=0,0002)
 Lag 1 residual autocorrelation = -0,414811

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The ANOVA table partitions the variability in Ol y Ona 723 into separate pieces for each of the effects. It then tests the statistical significance of each effect by comparing the mean square against an estimate of the experimental error. In this case, 8 effects have P-values less than 0,05, indicating that they are significantly different from zero at the 95,0% confidence level.

The R-Squared statistic indicates that the model as fitted explains 98,5746% of the variability in Ol y Ona 723. The adjusted R-squared statistic, which is more suitable for comparing models with different numbers of independent variables, is 97,2383%. The standard error of the estimate shows the standard deviation of the residuals to be 3,32822. The mean absolute error (MAE) of 1,96 is the average value of the residuals. The Durbin-Watson (DW) statistic tests the residuals to determine if there is any significant correlation based on the order in which they occur in your data file. Since the P-value is less than 0.05, there is an indication of possible serial correlation. Plot the residuals versus row order to see if there is any pattern which can be seen.

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Regression coeffs. for Ol y Ona 723

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constant      = 1385,12  
A:Carga       = -0,0132645  
B:Vapor E530  = -0,124937  
C:P C525      = -169,511  
D:Nivel V540  = -19,4189  
E:Vapor E532  = 0,106403  
AB            = 0,00000131643  
AC            = -0,000188214  
AD            = 0,000158724  
AE            = 0,00000140595  
BC            = 0,01709  
BD            = 0,000405714  
BE            = -0,0000246  
CD            = 0,594286  
CE            = 0,0185667  
DE            = 0,000561905  
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This pane displays the regression equation which has been fitted to the data. The equation of the fitted model is

$$\begin{aligned} \text{Ol y Ona 723} = & 1385,12 - 0,0132645 \cdot \text{Carga} - 0,124937 \cdot \text{Vapor E530} - \\ & 169,511 \cdot \text{P C525} - 19,4189 \cdot \text{Nivel V540} + 0,106403 \cdot \text{Vapor E532} + \\ & 0,00000131643 \cdot \text{Carga} \cdot \text{Vapor E530} - 0,000188214 \cdot \text{Carga} \cdot \text{P C525} + \\ & 0,000158724 \cdot \text{Carga} \cdot \text{Nivel V540} + 0,00000140595 \cdot \text{Carga} \cdot \text{Vapor E532} + \\ & 0,01709 \cdot \text{Vapor E530} \cdot \text{P C525} + 0,000405714 \cdot \text{Vapor E530} \cdot \text{Nivel V540} - \\ & 0,0000246 \cdot \text{Vapor E530} \cdot \text{Vapor E532} + 0,594286 \cdot \text{P C525} \cdot \text{Nivel V540} + \\ & 0,0185667 \cdot \text{P C525} \cdot \text{Vapor E532} + 0,000561905 \cdot \text{Nivel V540} \cdot \text{Vapor E532} \end{aligned}$$

where the values of the variables are specified in their original units. To have STATGRAPHICS evaluate this function, select Predictions from the list of Tabular Options. To plot the function, select Response Plots from the list of Graphical Options.

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Estimation Results for Ol y Ona 723

Row	Observed Value	Fitted Value	Lower 95,0% CL for Mean	Upper 95,0% CL for Mean
1	136,84	134,533	129,543	139,522
2	149,02	147,467	142,478	152,457
3	144,02	143,983	138,993	148,972
4	158,34	161,525	156,536	166,514
5	148,7	145,267	140,278	150,257
6	152,41	156,885	151,896	161,874
7	160,68	163,263	158,273	168,252
8	182,4	179,488	174,498	184,477
9	143,93	146,385	141,396	151,374
10	168,82	167,097	162,108	172,087
11	157,94	157,255	152,266	162,244
12	181,91	182,575	177,586	187,564
13	161,68	161,28	156,291	166,269
14	178,19	180,675	175,686	185,664
15	178,87	180,695	175,706	185,684
16	209,32	204,697	199,708	209,687
17	138,34	142,485	137,496	147,474
18	158,54	158,372	153,383	163,362
19	151,92	148,245	143,256	153,234
20	168,33	168,74	163,751	173,729
21	157,06	158,79	153,801	163,779
22	176,25	173,36	168,371	178,349
23	172,1	173,095	168,106	178,084
24	192,82	192,272	187,283	197,262
25	154,36	155,517	150,528	160,507
26	181,19	179,183	174,193	184,172
27	163,75	162,697	157,708	167,687
28	189,78	190,97	185,981	195,959
29	179,33	175,983	170,993	180,972
30	196,95	198,33	193,341	203,319
31	191,66	191,707	186,718	196,697
32	216,03	218,662	213,673	223,652

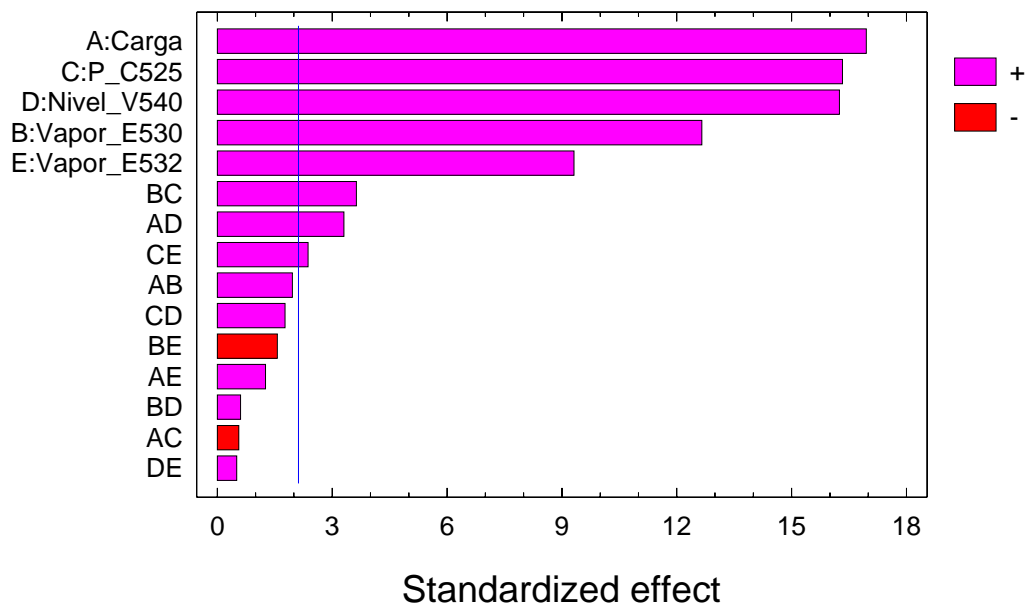
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This table contains information about values of Ol y Ona 723 generated using the fitted model. The table includes:

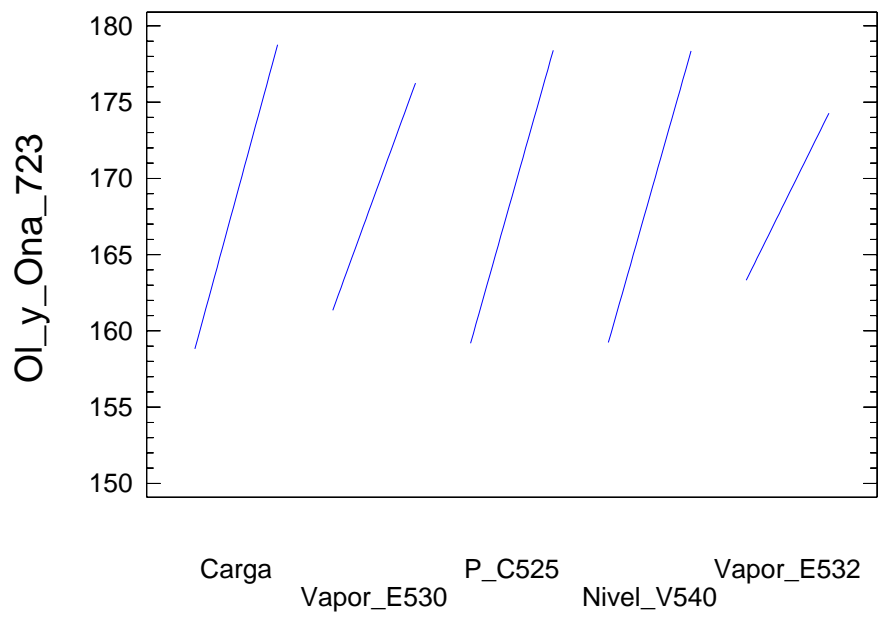
- (1) the observed value of Ol y Ona 723 (if any)
- (2) the predicted value of Ol y Ona 723 using the fitted model
- (3) 95,0% confidence limits for the mean response

Each item corresponds to the values of the experimental factors in a specific row of your data file. To generate forecasts for additional combinations of the factors, add additional rows to the bottom of your data file. In each new row, enter values for the experimental factors but leave the cell for the response empty. When you return to this pane, forecasts will be added to the table for the new rows, but the model will be unaffected.

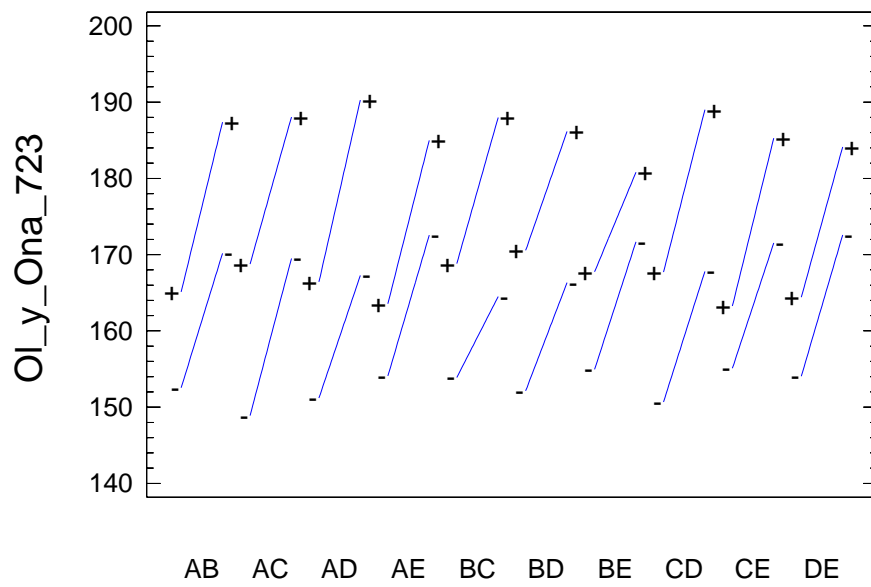
Standardized Pareto Chart for Ol_y_Ona_723



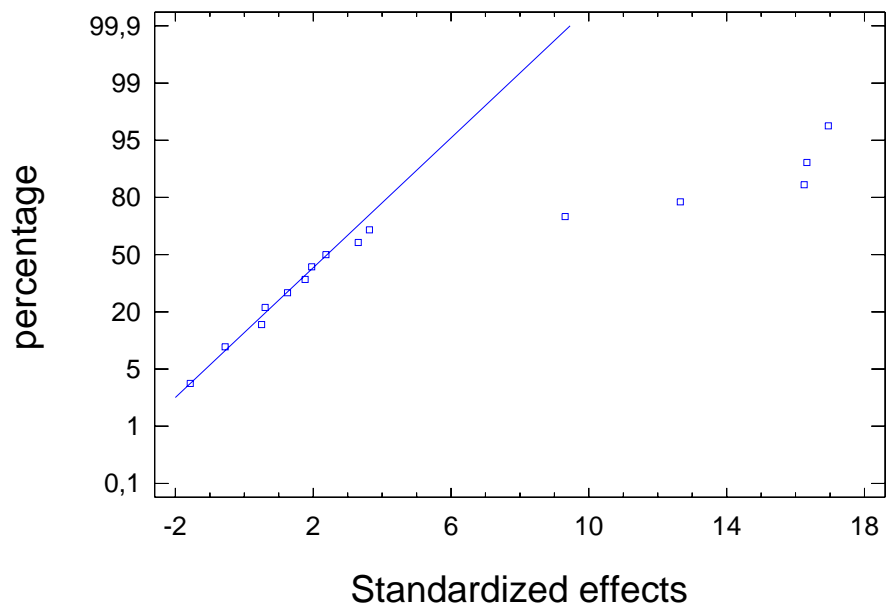
Main Effects Plot for OI_y_Ona_723

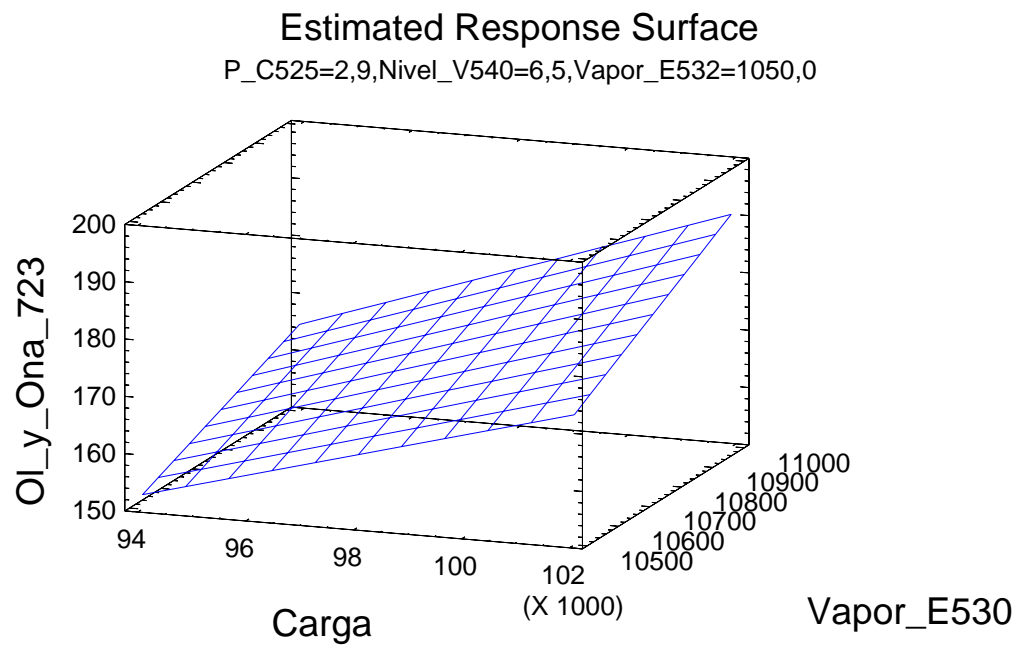


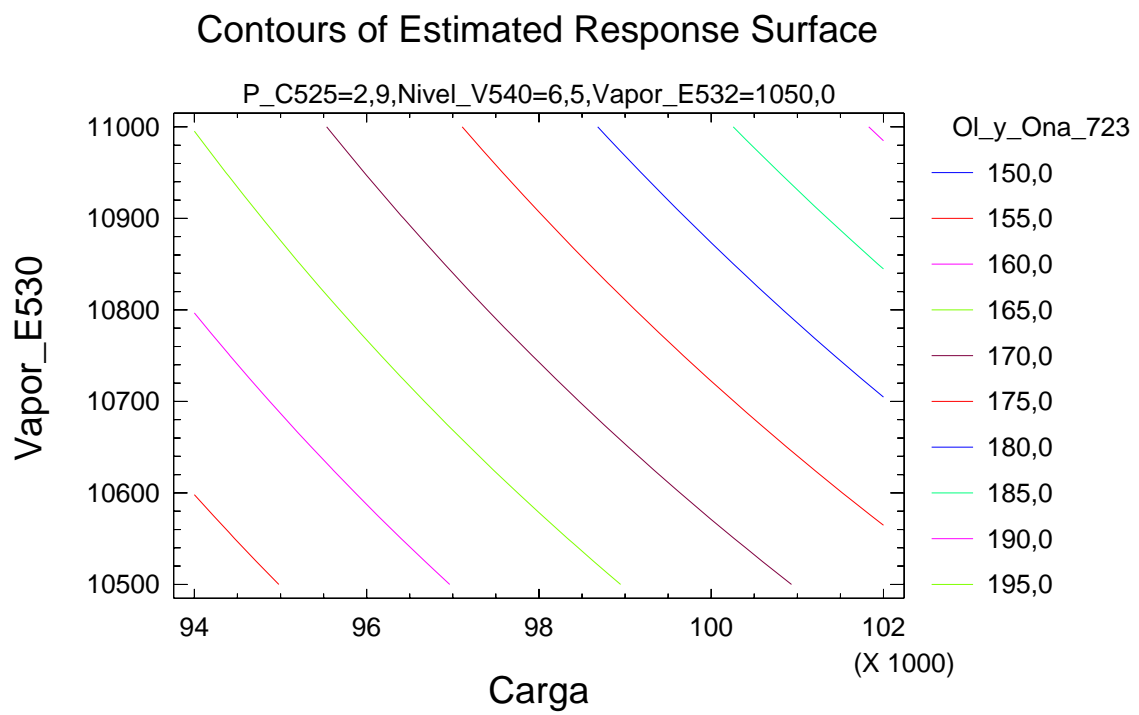
Interaction Plot for OI_y_Ona_723



Normal Probability Plot for OI_y_Ona_723







Residual Plot for Ol_y_Ona_723

