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STA 9705 FINAL PROJECT - SPRING '21

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Data Description

We have chosen a data set consisting of flavor scores for 27 varieties of peas as measured by judges. There are 6 flavor attributes: Flavour, Sweetness, Fruity Flavour, Off Flavour, Mealiness, and Hardness. Each was scored on a scale of 1-9 by the judges. The predictors are Tenderometer Values, % dry matter, % dry matter after freezing, sucrose percentage, 2 glucose measurements, and 4 color measurements.

Objective of Analysis

The objective of our analysis is to determine if there is an overall relationship among the dependent and independent variables by performing a multivariate regression and canonical correlation analysis. Afterwards, since there are 27 varieties of peas included in the study, we will perform a cluster analysis to determine if there are any natural groupings evident among the different varieties.

Methods Used

We employ three techniques in the current analysis: Multivariate Regression, Canonical Correlation Analysis, and Cluster Analysis.

1. **Multivariate Regression**

   The purpose of multivariate regression is to measure the linear relationship between multiple independent variables and multiple dependent variables. The method assumes the following:

   1. $Y \sim N_p(\boldsymbol{\mu}, \boldsymbol{\Sigma})$
   2. $E(Y) = XB$
   3. $E(\Xi) = 0$
   4. $Cov(Yi) = \Sigma$
   5. $Cov(Yi,Yj) = 0, i \neq j$

   Assumptions 1, 2, and 3 state that Y is multivariate normal and is linear in the predictors and therefore the expected value of the residuals is 0. Assumptions 4 and 5 state that while the Y variables are correlated with each other within each observation, there is no such correlation between the observations. In other words, each observation is independent of each other.

   Multivariate Multiple Regression, like Multiple linear regression, will yield highly variable parameter estimates when there is significant correlation between the predictors. While the resulting model may yield accurate predictions, when analyzing a new data set from the same data generating process, the resulting model could have drastically different parameter estimates. This lack of stability is detrimental to model interpretability and we would prefer to have a model that is not only stable but allows us to interpret it more easily. Multi-collinearity must be kept in mind with regards to the set of Y and X variables as it affects their essential dimensionality.

Another limitation pertains to non-linearity. Multivariate Regression assumes a linear relationship between the response and independent variables. If the relationships is non-linear, the regression will perform well.

Upon running the regression our primary concern is whether the overall model is significant. To determine if this is the case or not, we employ MANOVA Test Statistics and their p-values. Our null hypothesis is that $B_1 = 0$. If the p-values are less than $\alpha = .05$ we reject the null hypothesis in favor of the alternative hypothesis that there is at least 1 significant coefficient.

2. Canonical Correlation

In simple linear and multiple linear regression, we assess the model's overall fit to the data via the Coefficient of Determination – R^2. In multiple linear regression the use of R^2 underestimates the true fit. Canonical Correlation is used instead to measure the strength of the linear relationships between a set of Y and a set of X variables.

The correlations themselves are the eigenvalues of $S_{yy}^{-1}S_{yx}S_{xx}^{-1}S_{xy}$. Analysis of the Canonical Correlations begins with the appropriate null hypothesis. Testing if there is an overall relationship between a set of y's and a set of x's is equivalent to testing if $\Sigma_{yx} = 0$ (test of independence) or $B_1 = 0$ (test of overall regression). To test the null hypothesis we iteratively calculate $\Lambda_m = \prod_{i=m}^{s}(1 - r_i^2)$ for m=1: s, where s is the number of canonical correlations. Starting at 1 we proceed until we fail to reject the null hypothesis.

The primary limitation of Canonical Correlation analysis is that we are limited to using Wilks' Lambda for testing whether correlations 2 to s are significant.

3. Cluster Analysis

The purpose of Cluster Analysis is to find patterns in the data set by grouping the observations into clusters, and we aim to do it in such a way that the observations within each cluster are similar, but the clusters are dissimilar to each other. This is an unsupervised method, because the number of groups and the groups themselves are unknown prior to the analysis. The underlying assumption of the method when implemented on SAS is that the data set is already formatted in a n by p matrix, so that we can try to group n rows into g, which is unknown, groups.

There are mainly two common clustering approaches: Hierarchical method and Partitioning method. We use Hierarchical Clustering here. It is a sequential process. At first, we see each observation as its own group or cluster, and we try to find the minimum distance between two groups, and we merge them together as one cluster. At each step, we repeat the same process, an observation or an already-clustered observations is merged with another closest cluster, where the "closest" is measured in terms of the similarity of two clusters. There are also many methods that we can measure the similarity, and here we simply use the single linkage method, where the minimum distance is taken as $\min(d(y_i, y_j))$, for y_i in group A and y_j in group B.

The primary limitation of Hierarchical Clustering, which is the method employed in this analysis, is that once a decision has been made about a cluster, the decision cannot be undone so that if later down the line a better cluster could be formed with observations which have already been clustered, we cannot do so.

Analysis

1. Multivariate Regression

Our data set contains 11 independent variables. Not all of them will be significantly related to our set of response variables. To determine the most significant variables we employed stepwise selection with entry & exit thresholds set to (.15, .05)

The final model chosen by stepwise selection retains the following 6 independent variables

Independent Variable
SucrosePercent
DryMatter
Tenderometer
Skin
Colour1
Colour3

Based on the results of the stepwise selection procedure we tested the full and reduced model. We set B_d = Dry_Matter_After_Freezing, TotalGlucose1, TotalGlucose2, Colour2, Whiteness and tested the null hypothesis that $\mathbf{B_d = 0}$

The results of the analysis yielded the following MANOVA Test statistics:

Statistic	Value	P-Value
Wilks' Lambda	0.5294575	0.4746
Pillai's Trace	0.5751025	0.4459
Hotelling-Lawley Trace	0.7069937	0.4982
Roy's Greatest Root	0.3202728	0.6633

Based on the results of our analysis we cannot reject the null hypothesis and we are satisfied that the reduced model is significant. Testing the final model yielded the following MANOVA Test statistics:

Statistic	Value	P-Value
Wilks' Lambda	0.0086461	<.0001
Pillai's Trace	2.1019589	<.0001
Hotelling-Lawley Trace	30.050984	<.0001
Roy's Greatest Root	28.365981	<.0001

Our null hypothesis is that $\mathbf{B_1 = 0}$. Given that all 4 test statistics agree we reject the null hypothesis in favor of the alternative hypothesis that at least one of the coefficients is non-zero.

Eigenvalues of $E^{-1}H$

Eigenvalue	Difference	Proportion	Cumulative
28.366	27.6662	0.9439	0.9439
0.6998	0.2243	0.0233	0.9672
0.4754	0.1446	0.0158	0.983
0.3308	0.1583	0.011	0.994
0.1726	0.1662	0.0057	0.9998
0.0064		0.0002	1

Looking at the eigenvalues of $E^{-1}H$ we see that the first eigenvalue accounts of 94.39% of the total suggesting that the essential dimensionality of the y's is 1 as predicted by the x's. Again, the issue of multi-collinearity presents itself. Looking at the correlation matrix of the Y variables we see that there is a significant level of multi-collinearity among the y's indicating that the essential dimensionality is less than p.

	Flavour	Sweet	Fruity	OffFlavour	Mealiness	Hardness
Flavour	1	0.95125	0.9751	-0.95234	-0.93298	-0.9242
Sweet	0.95125	1	0.94918	-0.90145	-0.91381	-0.94519
Fruity	0.9751	0.94918	1	-0.90339	-0.96886	-0.94385
OffFlavour	-0.95234	-0.90145	-0.90339	1	0.83622	0.85445
Mealiness	-0.93298	-0.91381	-0.96886	0.83622	1	0.9268
Hardness	-0.9242	-0.94519	-0.94385	0.85445	0.9268	1

Our final coefficient estimates are given here:

Y/X	Flavour	Sweet	Fruity	OffFlavour	Mealiness	Hardness
Tenderometer	0.00857	0.00746	0.00423	-0.00166	-0.00246	0.01673
DryMatter	0.16408	0.06578	0.14534	0.19417	0.30867	0.10137
SucrosePercent	0.4187	0.6858	0.45357	-0.41759	-0.47396	-0.54743
Colour1	0.03586	0.01691	0.05861	-0.10081	-0.03377	-0.21646
Colour3	0.12661	0.02692	0.08936	-0.25582	-0.036	-0.06748
Skin	0.36918	0.08014	0.24843	0.38731	0.31901	0.03868

Residual Analysis

1. **Flavour:** Residuals are scattered about zero randomly with no discernable pattern indicating that the residuals are normally distributed. However, for SucrosePercent there is some indication that the assumption of uniform variance has been violated as we see a slight conical spread of the residuals moving left to right.
2. **Sweet:** Residuals are scattered randomly and uniformly about zero indicating our assumptions of normality and uniform variance have not been violated.
3. **Fruity**: Residuals are scattered randomly and uniformly about zero indicating our assumptions of normality and unform variance have not been violated.
4. **Off Flavour:** For Colour1, Colour3, and Skin we see that residuals are uniformly and randomly scattered about zero. However, for Tenderometer, DryMatter, and SucrosePercent, we see that there is a non-linear relationship that the model has failed to capture.
5. **Mealiness:** For Colour1, Colour3, and Skin the residuals are scattered randomly and uniformly about zero indicating our assumptions of normality and uniform variance have not been violated. However, for Tenderometer, DryMatter, and SucrosePercent there may be a slight non-linear relationship. Further, for DryMatter we see a violation of the uniform variance assumption.
6. **Hardness:** Residuals are scattered randomly and uniformly about zero indicating our assumptions of normality and uniform variance have not been violated.

We conclude that there is a significant relationship between our set of Y and X variables. To test the strength of that relationship we proceed with Canonical Correlation Analysis.

2. Canonical Correlation Analysis

To determine the strength of the overall relationship between the set of Y's and set of X's we look to the canonical correlations and their associated Wilks's Lambda test statistic.

R_i	R_i^2	Λ_k – Test Stat.	Critical Value[1]	Significant
0.982826	0.96594695	0.008646142	0.37115	TRUE
0.641632	0.41169162	0.253902097	0.4722	TRUE
0.567661	0.32223901	0.431579946	0.5845	TRUE
0.498595	0.24859697	0.63677307	0.7015	TRUE
0.383631	0.14717274	0.847445443	0.81615	FALSE
0.079439	0.00631055	0.993689445	0.9194	FALSE

Because SAS calculates approximate F-Statistics for the canonical correlations, we must look to the relevant critical values to perform our testing of each correlation. We calculate our test statistic by first squaring the correlation and calculating: $\Lambda_k = \prod_{i=k}^{s}\left(1 - r_i^2\right)$ where k refers to

[1] Critical values have been linearly interpolated

the correlation we are testing and s = min(p,q). To test whether succeeding correlations are significant we compare our statistic to $\Lambda_{\alpha=.05,p-k+1,q-k+1,n-k-q}$. If our statistic is less than the critical value, we reject the null hypothesis and move on to the next canonical correlation. In the table above we see that we fail to reject the null hypothesis at the 5th canonical correlation, and we conclude that our dependent and independent variables are significantly correlated in 4 dimensions.

Now we turn to the standardized Canonical Coefficients to determine which of the covariates contribute most to each correlation.

The CANCORR Procedure

Canonical Correlation Analysis

Standardized Canonical Coefficients for the VAR Variables						
	V1	V2	V3	V4	V5	V6
Tenderometer	-0.2455	-1.8981	-1.8172	1.6499	-1.0113	0.0280
DryMatter	-0.2840	2.0938	2.3182	0.7355	0.8816	-0.1839
SucrosePercent	0.5329	-0.0797	0.4656	2.0473	-0.2899	0.8560
Colour1	0.0552	0.2096	-0.7879	0.4457	0.9443	0.3947
Colour3	0.0598	-0.4204	-0.3577	0.1069	1.1490	-0.5982
Skin	-0.0601	0.7033	0.0714	0.4848	-0.3071	-1.1862

Standardized Canonical Coefficients for the WITH Variables						
	W1	W2	W3	W4	W5	W6
Flavour	0.0226	0.2977	3.7725	-5.7749	-0.8427	-0.8770
Sweet	0.3700	-0.0119	1.7680	2.5749	-2.0994	-1.1493
Fruity	0.0515	0.4188	0.6163	3.3946	3.1327	5.1966
OffFlavour	-0.0932	1.6856	2.3057	-1.5949	-1.3544	1.2212
Mealiness	-0.0422	1.7032	2.6088	0.6684	2.8955	1.0422
Hardness	-0.4461	-2.4992	1.4431	1.0979	-1.3560	0.9876

Based on the Standardized Coefficients we see that these are the X and Y variables that contribute most to each of the significant Canonical Correlations.

Canonical Correlation	X Variables	Y Variables
r_1	Sucrose Percent	Hardness, Sweet
r_2	Tenderometer, DryMatter	OffFlavour, Mealiness,Hardness
r_3	Tenderometer, DryMatter	Flavour, OffFlavour, Mealiness
r_4	Sucrose Percent, Tenderometer	Flavour, Fruity, Sweet

In conclusion, the overall regression model is significant, and the set of independent and dependent variables are significantly correlated in 4 dimensions. The resulting model, therefore, is a good fit and given a new set of observations on X, we will be able to accurately predict our response variables. However, the correlations among the y-variables indicates that they can be described in less than 6 dimensions due to their incredibly high correlations among each other.

3. Cluster Analysis

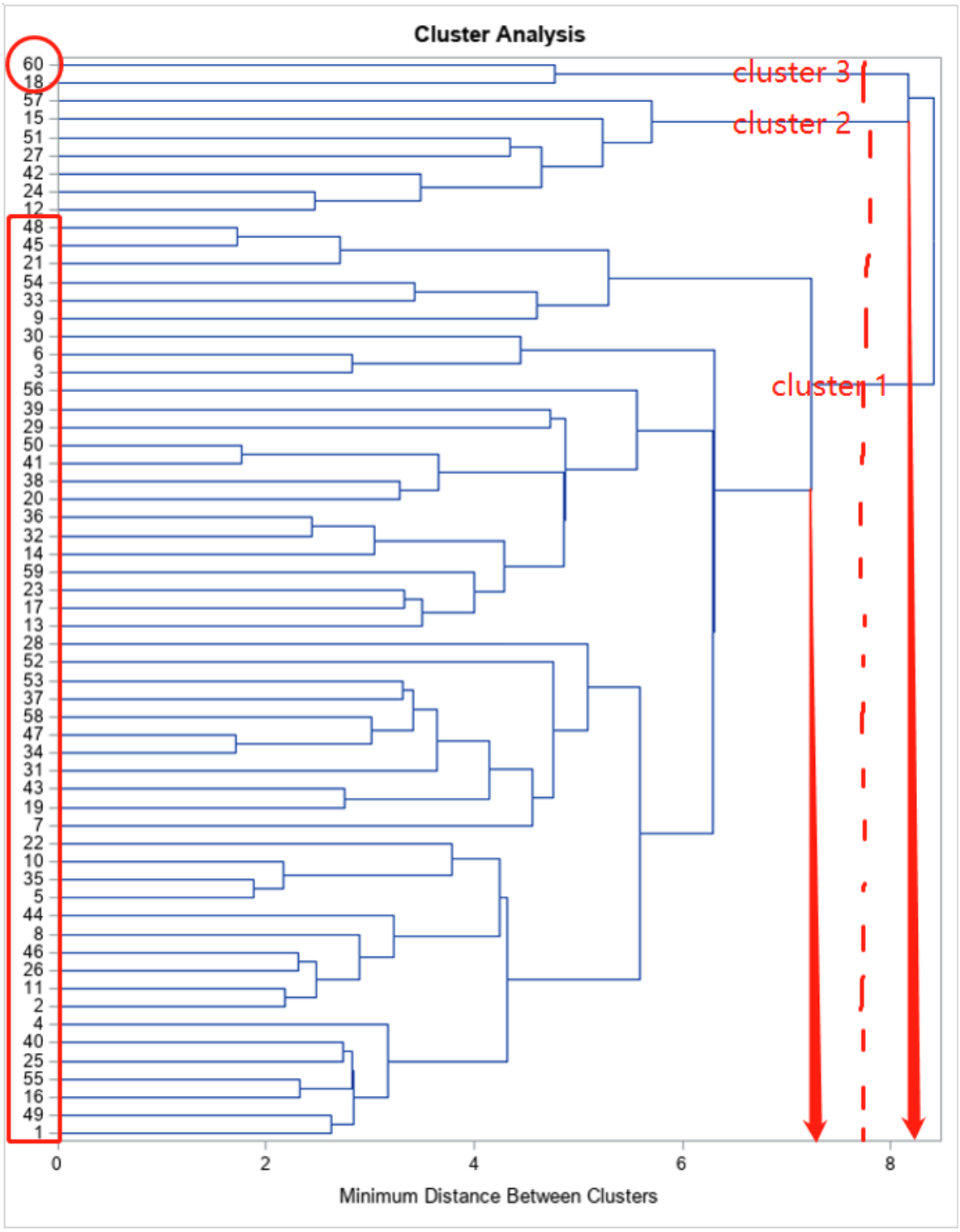
Below is the history of the clustering process, in which the last column “Min Dist” shows the single linkage distance between two groups. And since it is a sequential process, and we always combine two groups with the minimum distance, the “Min Dist” always increases as we proceed.

We could also present the clustering process in the form of dendrogram. We can see below that, in accordance with the table, pea number 45 and 48 form a cluster at first with the minimum distance among all groups. And in the end, we are left with a single cluster containing the whole data set.

Cluster History

Number of Clusters	Clusters Joined		Freq	MinDist
59	45	48	2	1.7127
58	34	47	2	1.7151
57	41	50	2	1.7603
56	5	35	2	1.8808
55	CL56	10	3	2.1708
54	2	11	2	2.1821
53	26	46	2	2.3096
52	16	55	2	2.316
51	32	36	2	2.428
50	12	24	2	2.4652
49	CL54	CL53	4	2.4773
48	1	49	2	2.6245
47	21	CL59	3	2.7128
46	25	40	2	2.7303
45	19	43	2	2.7534
44	3	6	2	2.8279
43	CL52	CL46	4	2.8296
42	CL48	CL43	6	2.8389
41	CL49	8	5	2.8896
40	CL58	58	3	3.0063
39	14	CL51	3	3.034
38	CL42	4	7	3.1613
37	CL41	44	6	3.2348
36	20	38	2	3.2685
35	37	53	2	3.2987
34	17	23	2	3.3244
33	CL40	CL35	5	3.4108

32	33	54	2	3.4288
31	CL50	42	3	3.482
30	13	CL34	3	3.4992
29	31	CL33	6	3.6386
28	CL36	CL57	4	3.6447
27	CL55	22	4	3.7763
26	CL30	59	4	3.9943
25	CL45	CL29	8	4.1381
24	CL37	CL27	10	4.2411
23	CL26	CL39	7	4.2936
22	CL38	CL24	17	4.3181
21	27	51	2	4.341
20	CL44	30	3	4.442
19	7	CL25	9	4.5642
18	9	CL32	3	4.6076
17	CL31	CL21	5	4.6562
16	29	39	2	4.7271
15	CL19	52	10	4.7505
14	18	60	2	4.7695
13	CL23	CL28	11	4.8555
12	CL13	CL16	13	4.8703
11	CL15	28	11	5.0805
10	CL17	15	6	5.2377
9	CL18	CL47	6	5.2978
8	CL12	56	14	5.5625
7	CL22	CL11	28	5.5944
6	CL10	57	7	5.717
5	CL7	CL8	42	6.2866
4	CL5	CL20	45	6.3048
3	CL4	CL9	51	7.2367
2	CL6	CL14	9	8.1661
1	CL3	CL2	60	8.4148


Cluster Analysis
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cluster 2
cluster 1
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Minimum Distance Between Clusters

We have two methods available for determining the number of clusters to keep. The first is the dendrogram approach whereby we cut the dendrogram at the greatest distance between clusters. In this case, the greatest distance occurs between 3 and 4 clusters.

The second method involves the mean and standard deviation of all the distances between clusters given in the cluster history whereby we compare the distance to $\bar{\alpha} + k * s_e$ and we keep the number of clusters which satisfies the inequality $\alpha_j > \bar{\alpha} + k * s_e$. Using the Millegan-Cooper value of 1.25 for K we would end up with 5 clusters.

In the present analysis we will employ the first method which leaves us with 3 clusters. The first cluster is the largest cluster within the red box; the second cluster is composed of the uncircled observations; the third cluster only contains peas 60 and 18.

Based on the clustering, we conclude that most of the peas have similar enough patterns that they can be grouped together, with observation 60 and 18 being special enough that they can form a group individually.

Therefore, even though there are 27 varieties of pea, most peas are quite alike suggesting that the variety plays little to no role with regards to the variables under consideration in this analysis.

References

Data Source: https://openmv.net/info/peas

Textbook: Rencher A. (2002) Methods of Multivariate Analysis 2nd Ed. (John Wiley & Sons Inc)

```
/* CHANGE THE WORKING DIRECTORY */
data _null_;
      rc=dlgcdir("Z:\OneDrive - Smart City Real Estate\Personal\Baruch\S4\STA 9705 -
      Multivariate\Project");
      put rc=;
run;

PROC IMPORT DATAFILE = "Peas.csv" DBMS = CSV OUT = PEAS REPLACE;
GETNAMES = YES;
RUN;

/**** Perform Best Subset Selection ****/
ods pdf file ="9705 Peas Subset Selection.pdf";
proc reg data = work.peas;
    model Flavour Sweet Fruity OffFlavour Mealiness Hardness = Tenderometer DryMatter
    Dry_matter_after_freezing SucrosePercent TotalGlucose1 TotalGlucose2 Whiteness
    Colour1 Colour2 Colour3 Skin / selection=stepwise slentry=.15 slstay=.05;
    title "Stepwise Subset Selection";
run;
quit;
ods pdf close;

/**** based on above check the full model versus the reduced model ****/
ods pdf file ="9705 Peas Coefficient Subset Test.pdf";
proc reg data = work.peas;
    model Flavour Sweet Fruity OffFlavour Mealiness Hardness = Tenderometer DryMatter
    Dry_matter_after_freezing SucrosePercent TotalGlucose1 TotalGlucose2 Whiteness
    Colour1 Colour2 Colour3 Skin;
    overall: mtest /print canprint mstat=exact;
    partial1: mtest Colour2, TotalGlucose1, TotalGlucose2, Dry_matter_after_freezing,
    Whiteness /print canprint mstat=exact;
    TITLE "Coefficient Subset Test";
run;
quit;
ods pdf close;

/**** running the model with the subset of variables chosen above ****/
ods pdf file = "9705 Reduced Model.pdf";
proc reg data =work.peas;
    MODEL Flavour Sweet Fruity OffFlavour Mealiness Hardness = Tenderometer DryMatter
    SucrosePercent Colour1 Colour3 Skin;
    OVERALL: MTEST /PRINT CANPRINT MSTAT=EXACT;
    TITLE "Reduced Model";
RUN;
quit;
ods pdf close;

/**** Check the Correlation among the y variables" ****/
ods pdf file = "9705 Y's Correlation.pdf";
proc corr data = work.peas plots=matrix;
    var Flavour Sweet Fruity OffFlavour Mealiness Hardness;
    run;
quit;
ods pdf close;

/**** Run the Canonical Correlation ****/
ods pdf file="9705 Canonical Correlation.pdf";
proc cancorr ALL;
    with Flavour Sweet Fruity OffFlavour Mealiness Hardness;
    var Tenderometer DryMatter SucrosePercent Colour1 Colour3 Skin;
run;
quit;
ods pdf close;

/**** Perform Cluster Analysis ****/
ods pdf file="9705 Project - Cluster Analysis.pdf";
proc cluster data = PEAS OUTTREE = PEASTREE1 METHOD = SINGLE NONORM;
    VAR Flavour Sweet Fruity OffFlavour Mealiness Hardness Tenderometer DryMatter
    Dry_matter_after_freezing SucrosePercent TotalGlucose1 TotalGlucose2 Whiteness
```

```
        Colour1 Colour2 Colour3 Skin;
62      ID Obs;
63      title "cluster peas 2";
64  run;
65  quit;
66  ods pdf close;
```

The REG Procedure
Model: MODEL1
Dependent Variable: Flavour

Number of Observations Read	60
Number of Observations Used	60

Stepwise Selection: Step 1

Variable SucrosePercent Entered: R-Square = 0.8469 and C(p) = 58.8840

Analysis of Variance					
Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	1	70.05549	70.05549	320.83	<.0001
Error	58	12.66463	0.21836		
Corrected Total	59	82.72012			

Variable	Parameter Estimate	Standard Error	Type II SS	F Value	Pr > F
Intercept	1.19958	0.23817	5.53941	25.37	<.0001
SucrosePercent	0.96572	0.05392	70.05549	320.83	<.0001

Bounds on condition number: 1, 1

Stepwise Selection: Step 2

Variable Tenderometer Entered: R-Square = 0.8849 and C(p) = 32.4054

Analysis of Variance					
Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	2	73.19492	36.59746	219.00	<.0001
Error	57	9.52519	0.16711		
Corrected Total	59	82.72012			

Variable	Parameter Estimate	Standard Error	Type II SS	F Value	Pr > F
Intercept	4.77726	0.85131	5.26236	31.49	<.0001
Tenderometer	-0.01492	0.00344	3.13944	18.79	<.0001
SucrosePercent	0.60048	0.09657	6.46141	38.67	<.0001

Bounds on condition number: 4.1919, 16.768

The REG Procedure
Model: MODEL1
Dependent Variable: Flavour

Stepwise Selection: Step 3

Variable Colour3 Entered: R-Square = 0.8979 and C(p) = 24.5864

Analysis of Variance					
Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	3	74.27736	24.75912	164.22	<.0001
Error	56	8.44276	0.15076		
Corrected Total	59	82.72012			

Variable	Parameter Estimate	Standard Error	Type II SS	F Value	Pr > F
Intercept	4.65673	0.80986	4.98474	33.06	<.0001
Tenderometer	-0.01688	0.00335	3.82731	25.39	<.0001
SucrosePercent	0.49575	0.09970	3.72724	24.72	<.0001
Colour3	0.15611	0.05826	1.08243	7.18	0.0097

Bounds on condition number: 4.9531, 31.885

Stepwise Selection: Step 4

Variable DryMatter Entered: R-Square = 0.9058 and C(p) = 20.7228

Analysis of Variance					
Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	4	74.92375	18.73094	132.14	<.0001
Error	55	7.79637	0.14175		
Corrected Total	59	82.72012			

Variable	Parameter Estimate	Standard Error	Type II SS	F Value	Pr > F
Intercept	5.68408	0.92093	5.39998	38.09	<.0001
Tenderometer	-0.00882	0.00498	0.44391	3.13	0.0823
DryMatter	-0.10271	0.04810	0.64639	4.56	0.0372
SucrosePercent	0.44102	0.10002	2.75603	19.44	<.0001
Colour3	0.17861	0.05747	1.36936	9.66	0.0030

Bounds on condition number: 10.351, 105.77

The REG Procedure
Model: MODEL1
Dependent Variable: Flavour

Stepwise Selection: Step 5

Variable Tenderometer Removed: R-Square = 0.9004 and C(p) = 22.7496

Analysis of Variance					
Source	**DF**	**Sum of Squares**	**Mean Square**	**F Value**	**Pr > F**
Model	3	74.47984	24.82661	168.72	<.0001
Error	56	8.24028	0.14715		
Corrected Total	59	82.72012			

Variable	Parameter Estimate	Standard Error	Type II SS	F Value	Pr > F
Intercept	5.48439	0.93123	5.10386	34.69	<.0001
DryMatter	-0.16724	0.03196	4.02979	27.39	<.0001
SucrosePercent	0.50359	0.09532	4.10682	27.91	<.0001
Colour3	0.17851	0.05855	1.36776	9.30	0.0035

Bounds on condition number: 4.6386, 29.955

Stepwise Selection: Step 6

Variable Skin Entered: R-Square = 0.9177 and C(p) = 11.7684

Analysis of Variance					
Source	**DF**	**Sum of Squares**	**Mean Square**	**F Value**	**Pr > F**
Model	4	75.91086	18.97772	153.29	<.0001
Error	55	6.80925	0.12380		
Corrected Total	59	82.72012			

Variable	Parameter Estimate	Standard Error	Type II SS	F Value	Pr > F
Intercept	7.86122	1.10380	6.27971	50.72	<.0001
DryMatter	-0.22682	0.03415	5.46080	44.11	<.0001
SucrosePercent	0.48426	0.08762	3.78164	30.55	<.0001
Colour3	0.14114	0.05482	0.82071	6.63	0.0128
Skin	-0.38755	0.11399	1.43103	11.56	0.0013

Bounds on condition number: 5.469, 54.515

The REG Procedure
Model: MODEL1
Dependent Variable: Flavour

Stepwise Selection: Step 7

Variable Tenderometer Entered: R-Square = 0.9223 and C(p) = 10.2714

Analysis of Variance					
Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	5	76.29637	15.25927	128.27	<.0001
Error	54	6.42375	0.11896		
Corrected Total	59	82.72012			

Variable	Parameter Estimate	Standard Error	Type II SS	F Value	Pr > F
Intercept	8.00014	1.08472	6.47070	54.39	<.0001
Tenderometer	-0.00822	0.00457	0.38550	3.24	0.0774
DryMatter	-0.16546	0.04778	1.42673	11.99	0.0011
SucrosePercent	0.42629	0.09173	2.56932	21.60	<.0001
Colour3	0.14198	0.05374	0.83046	6.98	0.0108
Skin	-0.37984	0.11182	1.37262	11.54	0.0013

Bounds on condition number: 11.139, 151.62

Stepwise Selection: Step 8

Variable Tenderometer Removed: R-Square = 0.9177 and C(p) = 11.7684

Analysis of Variance					
Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	4	75.91086	18.97772	153.29	<.0001
Error	55	6.80925	0.12380		
Corrected Total	59	82.72012			

Variable	Parameter Estimate	Standard Error	Type II SS	F Value	Pr > F
Intercept	7.86122	1.10380	6.27971	50.72	<.0001
DryMatter	-0.22682	0.03415	5.46080	44.11	<.0001
SucrosePercent	0.48426	0.08762	3.78164	30.55	<.0001
Colour3	0.14114	0.05482	0.82071	6.63	0.0128
Skin	-0.38755	0.11399	1.43103	11.56	0.0013

The REG Procedure
Model: MODEL1
Dependent Variable: Flavour

Stepwise Selection: Step 8

Bounds on condition number: 5.469, 54.515

All variables left in the model are significant at the 0.0500 level.

The stepwise method terminated because the next variable to be entered was just removed.

Summary of Stepwise Selection

Step	Variable Entered	Variable Removed	Number Vars In	Partial R-Square	Model R-Square	C(p)	F Value	Pr > F
1	SucrosePercent		1	0.8469	0.8469	58.8840	320.83	<.0001
2	Tenderometer		2	0.0380	0.8849	32.4054	18.79	<.0001
3	Colour3		3	0.0131	0.8979	24.5864	7.18	0.0097
4	DryMatter		4	0.0078	0.9058	20.7228	4.56	0.0372
5		Tenderometer	3	0.0054	0.9004	22.7496	3.13	0.0823
6	Skin		4	0.0173	0.9177	11.7684	11.56	0.0013
7	Tenderometer		5	0.0047	0.9223	10.2714	3.24	0.0774
8		Tenderometer	4	0.0047	0.9177	11.7684	3.24	0.0774

The REG Procedure
Model: MODEL1
Dependent Variable: Sweet

Number of Observations Read	60
Number of Observations Used	60

Stepwise Selection: Step 1

Variable SucrosePercent Entered: R-Square = 0.9203 and C(p) = 23.1371

Analysis of Variance					
Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	1	77.28218	77.28218	670.11	<.0001
Error	58	6.68903	0.11533		
Corrected Total	59	83.97120			

Variable	Parameter Estimate	Standard Error	Type II SS	F Value	Pr > F
Intercept	1.08494	0.17309	4.53130	39.29	<.0001
SucrosePercent	1.01431	0.03918	77.28218	670.11	<.0001

Bounds on condition number: 1, 1

Stepwise Selection: Step 2

Variable Tenderometer Entered: R-Square = 0.9412 and C(p) = 4.3873

Analysis of Variance					
Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	2	79.03604	39.51802	456.42	<.0001
Error	57	4.93516	0.08658		
Corrected Total	59	83.97120			

Variable	Parameter Estimate	Standard Error	Type II SS	F Value	Pr > F
Intercept	3.75902	0.61278	3.25816	37.63	<.0001
Tenderometer	-0.01115	0.00248	1.75387	20.26	<.0001
SucrosePercent	0.74131	0.06951	9.84775	113.74	<.0001

Bounds on condition number: 4.1919, 16.768

The REG Procedure
Model: MODEL1
Dependent Variable: Sweet

Stepwise Selection: Step 3

Variable TotalGlucose2 Entered: R-Square = 0.9437 and C(p) = 3.9353

Analysis of Variance					
Source	**DF**	**Sum of Squares**	**Mean Square**	**F Value**	**Pr > F**
Model	3	79.24330	26.41443	312.87	<.0001
Error	56	4.72791	0.08443		
Corrected Total	59	83.97120			

Variable	Parameter Estimate	Standard Error	Type II SS	F Value	Pr > F
Intercept	3.41874	0.64290	2.38743	28.28	<.0001
Tenderometer	-0.01360	0.00290	1.85201	21.94	<.0001
SucrosePercent	0.78426	0.07391	9.50598	112.59	<.0001
TotalGlucose2	0.11749	0.07499	0.20725	2.45	0.1228

Bounds on condition number: 5.9082, 48.067

Stepwise Selection: Step 4

Variable TotalGlucose2 Removed: R-Square = 0.9412 and C(p) = 4.3873

Analysis of Variance					
Source	**DF**	**Sum of Squares**	**Mean Square**	**F Value**	**Pr > F**
Model	2	79.03604	39.51802	456.42	<.0001
Error	57	4.93516	0.08658		
Corrected Total	59	83.97120			

Variable	Parameter Estimate	Standard Error	Type II SS	F Value	Pr > F
Intercept	3.75902	0.61278	3.25816	37.63	<.0001
Tenderometer	-0.01115	0.00248	1.75387	20.26	<.0001
SucrosePercent	0.74131	0.06951	9.84775	113.74	<.0001

Bounds on condition number: 4.1919, 16.768

All variables left in the model are significant at the 0.0500 level.

The stepwise method terminated because the next variable to be entered was just removed.

The REG Procedure
Model: MODEL1
Dependent Variable: Sweet

Summary of Stepwise Selection								
Step	**Variable Entered**	**Variable Removed**	**Number Vars In**	**Partial R-Square**	**Model R-Square**	**C(p)**	**F Value**	**Pr > F**
1	SucrosePercent		1	0.9203	0.9203	23.1371	670.11	<.0001
2	Tenderometer		2	0.0209	0.9412	4.3873	20.26	<.0001
3	TotalGlucose2		3	0.0025	0.9437	3.9353	2.45	0.1228
4		TotalGlucose2	2	0.0025	0.9412	4.3873	2.45	0.1228

The REG Procedure
Model: MODEL1
Dependent Variable: Fruity

Number of Observations Read	60
Number of Observations Used	60

Stepwise Selection: Step 1

Variable SucrosePercent Entered: R-Square = 0.8598 and C(p) = 32.4334

Analysis of Variance					
Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	1	55.20073	55.20073	355.80	<.0001
Error	58	8.99848	0.15515		
Corrected Total	59	64.19921			

Variable	Parameter Estimate	Standard Error	Type II SS	F Value	Pr > F
Intercept	-0.11635	0.20075	0.05212	0.34	0.5644
SucrosePercent	0.85724	0.04545	55.20073	355.80	<.0001

Bounds on condition number: 1, 1

Stepwise Selection: Step 2

Variable DryMatter Entered: R-Square = 0.9007 and C(p) = 8.6701

Analysis of Variance					
Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	2	57.82225	28.91113	258.42	<.0001
Error	57	6.37695	0.11188		
Corrected Total	59	64.19921			

Variable	Parameter Estimate	Standard Error	Type II SS	F Value	Pr > F
Intercept	3.72169	0.81099	2.35606	21.06	<.0001
DryMatter	-0.12940	0.02673	2.62153	23.43	<.0001
SucrosePercent	0.54986	0.07431	6.12598	54.76	<.0001

Bounds on condition number: 3.7074, 14.829

The REG Procedure
Model: MODEL1
Dependent Variable: Fruity

Stepwise Selection: Step 3

Variable Skin Entered: R-Square = 0.9113 and C(p) = 3.9687

Analysis of Variance					
Source	**DF**	**Sum of Squares**	**Mean Square**	**F Value**	**Pr > F**
Model	3	58.50415	19.50138	191.76	<.0001
Error	56	5.69505	0.10170		
Corrected Total	59	64.19921			

Variable	Parameter Estimate	Standard Error	Type II SS	F Value	Pr > F
Intercept	5.34898	0.99639	2.93084	28.82	<.0001
DryMatter	-0.17359	0.03067	3.25729	32.03	<.0001
SucrosePercent	0.51835	0.07188	5.28814	52.00	<.0001
Skin	-0.26209	0.10122	0.68190	6.71	0.0122

Bounds on condition number: 5.3699, 33.689

All variables left in the model are significant at the 0.0500 level.

No other variable met the 0.1500 significance level for entry into the model.

Summary of Stepwise Selection								
Step	**Variable Entered**	**Variable Removed**	**Number Vars In**	**Partial R-Square**	**Model R-Square**	**C(p)**	**F Value**	**Pr > F**
1	SucrosePercent		1	0.8598	0.8598	32.4334	355.80	<.0001
2	DryMatter		2	0.0408	0.9007	8.6701	23.43	<.0001
3	Skin		3	0.0106	0.9113	3.9687	6.71	0.0122

The REG Procedure
Model: MODEL1
Dependent Variable: OffFlavour

Number of Observations Read	60
Number of Observations Used	60

Stepwise Selection: Step 1

Variable SucrosePercent Entered: R-Square = 0.7696 and C(p) = 35.1145

Analysis of Variance					
Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	1	49.17108	49.17108	193.69	<.0001
Error	58	14.72404	0.25386		
Corrected Total	59	63.89512			

Variable	Parameter Estimate	Standard Error	Type II SS	F Value	Pr > F
Intercept	6.34492	0.25680	154.97454	610.47	<.0001
SucrosePercent	-0.80907	0.05813	49.17108	193.69	<.0001

Bounds on condition number: 1, 1

Stepwise Selection: Step 2

Variable Colour3 Entered: R-Square = 0.7931 and C(p) = 27.8065

Analysis of Variance					
Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	2	50.67525	25.33762	109.25	<.0001
Error	57	13.21987	0.23193		
Corrected Total	59	63.89512			

Variable	Parameter Estimate	Standard Error	Type II SS	F Value	Pr > F
Intercept	7.02463	0.36261	87.04061	375.29	<.0001
SucrosePercent	-0.74383	0.06119	34.27518	147.78	<.0001
Colour3	-0.17957	0.07051	1.50417	6.49	0.0136

Bounds on condition number: 1.2126, 4.8502

The REG Procedure
Model: MODEL1
Dependent Variable: OffFlavour

Stepwise Selection: Step 3

Variable DryMatter Entered: R-Square = 0.8315 and C(p) = 14.6280

Analysis of Variance					
Source	**DF**	**Sum of Squares**	**Mean Square**	**F Value**	**Pr > F**
Model	3	53.12808	17.70936	92.11	<.0001
Error	56	10.76703	0.19227		
Corrected Total	59	63.89512			

Variable	Parameter Estimate	Standard Error	Type II SS	F Value	Pr > F
Intercept	3.41011	1.06447	1.97324	10.26	0.0022
DryMatter	0.13047	0.03653	2.45284	12.76	0.0007
SucrosePercent	-0.40935	0.10896	2.71360	14.11	0.0004
Colour3	-0.24709	0.06693	2.62062	13.63	0.0005

Bounds on condition number: 4.6386, 29.955

Stepwise Selection: Step 4

Variable Skin Entered: R-Square = 0.8505 and C(p) = 9.1259

Analysis of Variance					
Source	**DF**	**Sum of Squares**	**Mean Square**	**F Value**	**Pr > F**
Model	4	54.34041	13.58510	78.20	<.0001
Error	55	9.55470	0.17372		
Corrected Total	59	63.89512			

Variable	Parameter Estimate	Standard Error	Type II SS	F Value	Pr > F
Intercept	1.22243	1.30752	0.15185	0.87	0.3539
DryMatter	0.18532	0.04046	3.64520	20.98	<.0001
SucrosePercent	-0.39156	0.10379	2.47242	14.23	0.0004
Colour3	-0.21269	0.06494	1.86380	10.73	0.0018
Skin	0.35671	0.13503	1.21233	6.98	0.0107

Bounds on condition number: 5.469, 54.515

The REG Procedure
Model: MODEL1
Dependent Variable: OffFlavour

Stepwise Selection: Step 5

Variable Whiteness Entered: R-Square = 0.8603 and C(p) = 7.2172

Analysis of Variance					
Source	**DF**	**Sum of Squares**	**Mean Square**	**F Value**	**Pr > F**
Model	5	54.97205	10.99441	66.54	<.0001
Error	54	8.92307	0.16524		
Corrected Total	59	63.89512			

Variable	Parameter Estimate	Standard Error	Type II SS	F Value	Pr > F
Intercept	2.99340	1.56417	0.60517	3.66	0.0610
DryMatter	0.16557	0.04073	2.73055	16.52	0.0002
SucrosePercent	-0.45030	0.10559	3.00514	18.19	<.0001
Whiteness	-0.21128	0.10806	0.63164	3.82	0.0558
Colour3	-0.24900	0.06600	2.35215	14.23	0.0004
Skin	0.36462	0.13176	1.26546	7.66	0.0077

Bounds on condition number: 5.8275, 79.252

Stepwise Selection: Step 6

Variable Whiteness Removed: R-Square = 0.8505 and C(p) = 9.1259

Analysis of Variance					
Source	**DF**	**Sum of Squares**	**Mean Square**	**F Value**	**Pr > F**
Model	4	54.34041	13.58510	78.20	<.0001
Error	55	9.55470	0.17372		
Corrected Total	59	63.89512			

Variable	Parameter Estimate	Standard Error	Type II SS	F Value	Pr > F
Intercept	1.22243	1.30752	0.15185	0.87	0.3539
DryMatter	0.18532	0.04046	3.64520	20.98	<.0001
SucrosePercent	-0.39156	0.10379	2.47242	14.23	0.0004
Colour3	-0.21269	0.06494	1.86380	10.73	0.0018
Skin	0.35671	0.13503	1.21233	6.98	0.0107

The REG Procedure
Model: MODEL1
Dependent Variable: OffFlavour

Stepwise Selection: Step 6

Bounds on condition number: 5.469, 54.515

All variables left in the model are significant at the 0.0500 level.

The stepwise method terminated because the next variable to be entered was just removed.

Summary of Stepwise Selection								
Step	Variable Entered	Variable Removed	Number Vars In	Partial R-Square	Model R-Square	C(p)	F Value	Pr > F
1	SucrosePercent		1	0.7696	0.7696	35.1145	193.69	<.0001
2	Colour3		2	0.0235	0.7931	27.8065	6.49	0.0136
3	DryMatter		3	0.0384	0.8315	14.6280	12.76	0.0007
4	Skin		4	0.0190	0.8505	9.1259	6.98	0.0107
5	Whiteness		5	0.0099	0.8603	7.2172	3.82	0.0558
6		Whiteness	4	0.0099	0.8505	9.1259	3.82	0.0558

The REG Procedure
Model: MODEL1
Dependent Variable: Mealiness

Number of Observations Read	60
Number of Observations Used	60

Stepwise Selection: Step 1

Variable DryMatter Entered: R-Square = 0.8211 and C(p) = 17.6241

Analysis of Variance					
Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	1	88.95453	88.95453	266.26	<.0001
Error	58	19.37707	0.33409		
Corrected Total	59	108.33159			

Variable	Parameter Estimate	Standard Error	Type II SS	F Value	Pr > F
Intercept	-3.24431	0.47396	15.65354	46.85	<.0001
DryMatter	0.39146	0.02399	88.95453	266.26	<.0001

Bounds on condition number: 1, 1

Stepwise Selection: Step 2

Variable SucrosePercent Entered: R-Square = 0.8687 and C(p) = 0.0246

Analysis of Variance					
Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	2	94.11292	47.05646	188.64	<.0001
Error	57	14.21867	0.24945		
Corrected Total	59	108.33159			

Variable	Parameter Estimate	Standard Error	Type II SS	F Value	Pr > F
Intercept	1.93806	1.21099	0.63891	2.56	0.1150
DryMatter	0.23636	0.03991	8.74680	35.06	<.0001
SucrosePercent	-0.50457	0.11096	5.15839	20.68	<.0001

Bounds on condition number: 3.7074, 14.829

The REG Procedure
Model: MODEL1
Dependent Variable: Mealiness

Stepwise Selection: Step 3

Variable Skin Entered: R-Square = 0.8779 and C(p) = -1.7427

Analysis of Variance					
Source	**DF**	**Sum of Squares**	**Mean Square**	**F Value**	**Pr > F**
Model	3	95.10441	31.70147	134.21	<.0001
Error	56	13.22718	0.23620		
Corrected Total	59	108.33159			

Variable	Parameter Estimate	Standard Error	Type II SS	F Value	Pr > F
Intercept	-0.02418	1.51850	0.00005987	0.00	0.9874
DryMatter	0.28965	0.04674	9.06874	38.39	<.0001
SucrosePercent	-0.46658	0.10955	4.28451	18.14	<.0001
Skin	0.31604	0.15425	0.99150	4.20	0.0452

Bounds on condition number: 5.3699, 33.689

All variables left in the model are significant at the 0.0500 level.

No other variable met the 0.1500 significance level for entry into the model.

Summary of Stepwise Selection								
Step	**Variable Entered**	**Variable Removed**	**Number Vars In**	**Partial R-Square**	**Model R-Square**	**C(p)**	**F Value**	**Pr > F**
1	DryMatter		1	0.8211	0.8211	17.6241	266.26	<.0001
2	SucrosePercent		2	0.0476	0.8687	0.0246	20.68	<.0001
3	Skin		3	0.0092	0.8779	-1.7427	4.20	0.0452

The REG Procedure
Model: MODEL1
Dependent Variable: Hardness

Number of Observations Read	60
Number of Observations Used	60

Stepwise Selection: Step 1

Variable Tenderometer Entered: R-Square = 0.8959 and C(p) = 42.9963

Analysis of Variance					
Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	1	110.49426	110.49426	499.40	<.0001
Error	58	12.83268	0.22125		
Corrected Total	59	123.32694			

Variable	Parameter Estimate	Standard Error	Type II SS	F Value	Pr > F
Intercept	-1.08791	0.26847	3.63308	16.42	0.0002
Tenderometer	0.04323	0.00193	110.49426	499.40	<.0001

Bounds on condition number: 1, 1

Stepwise Selection: Step 2

Variable SucrosePercent Entered: R-Square = 0.9352 and C(p) = 7.6822

Analysis of Variance					
Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	2	115.33121	57.66561	411.09	<.0001
Error	57	7.99573	0.14028		
Corrected Total	59	123.32694			

Variable	Parameter Estimate	Standard Error	Type II SS	F Value	Pr > F
Intercept	3.31681	0.77997	2.53666	18.08	<.0001
Tenderometer	0.02707	0.00315	10.33613	73.68	<.0001
SucrosePercent	-0.51954	0.08848	4.83695	34.48	<.0001

Bounds on condition number: 4.1919, 16.768

The REG Procedure
Model: MODEL1
Dependent Variable: Hardness

Stepwise Selection: Step 3

Variable Colour1 Entered: R-Square = 0.9419 and C(p) = 3.2418

Analysis of Variance					
Source	**DF**	**Sum of Squares**	**Mean Square**	**F Value**	**Pr > F**
Model	3	116.16607	38.72202	302.82	<.0001
Error	56	7.16088	0.12787		
Corrected Total	59	123.32694			

Variable	Parameter Estimate	Standard Error	Type II SS	F Value	Pr > F
Intercept	5.04059	1.00484	3.21773	25.16	<.0001
Tenderometer	0.02425	0.00321	7.31659	57.22	<.0001
SucrosePercent	-0.61227	0.09194	5.67098	44.35	<.0001
Colour1	-0.17635	0.06902	0.83485	6.53	0.0134

Bounds on condition number: 4.9655, 32.712

Stepwise Selection: Step 4

Variable DryMatter Entered: R-Square = 0.9459 and C(p) = 1.4567

Analysis of Variance					
Source	**DF**	**Sum of Squares**	**Mean Square**	**F Value**	**Pr > F**
Model	4	116.65673	29.16418	240.48	<.0001
Error	55	6.67021	0.12128		
Corrected Total	59	123.32694			

Variable	Parameter Estimate	Standard Error	Type II SS	F Value	Pr > F
Intercept	3.97372	1.11308	1.54568	12.75	0.0007
Tenderometer	0.01732	0.00465	1.68102	13.86	0.0005
DryMatter	0.08865	0.04407	0.49066	4.05	0.0492
SucrosePercent	-0.56918	0.09206	4.63550	38.22	<.0001
Colour1	-0.15946	0.06774	0.67207	5.54	0.0222

Bounds on condition number: 10.55, 105.2

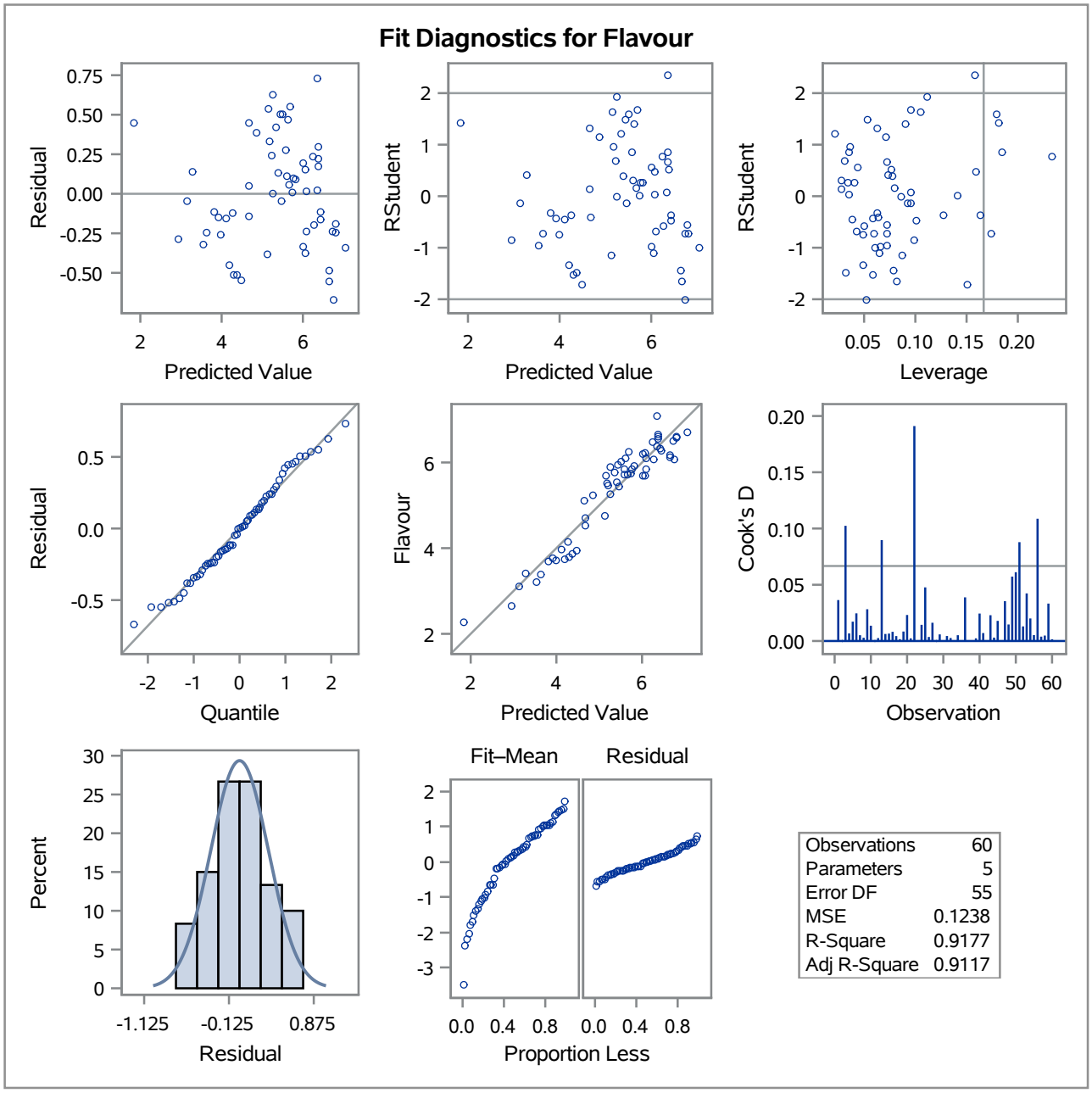
All variables left in the model are significant at the 0.0500 level.

No other variable met the 0.1500 significance level for entry into the model.

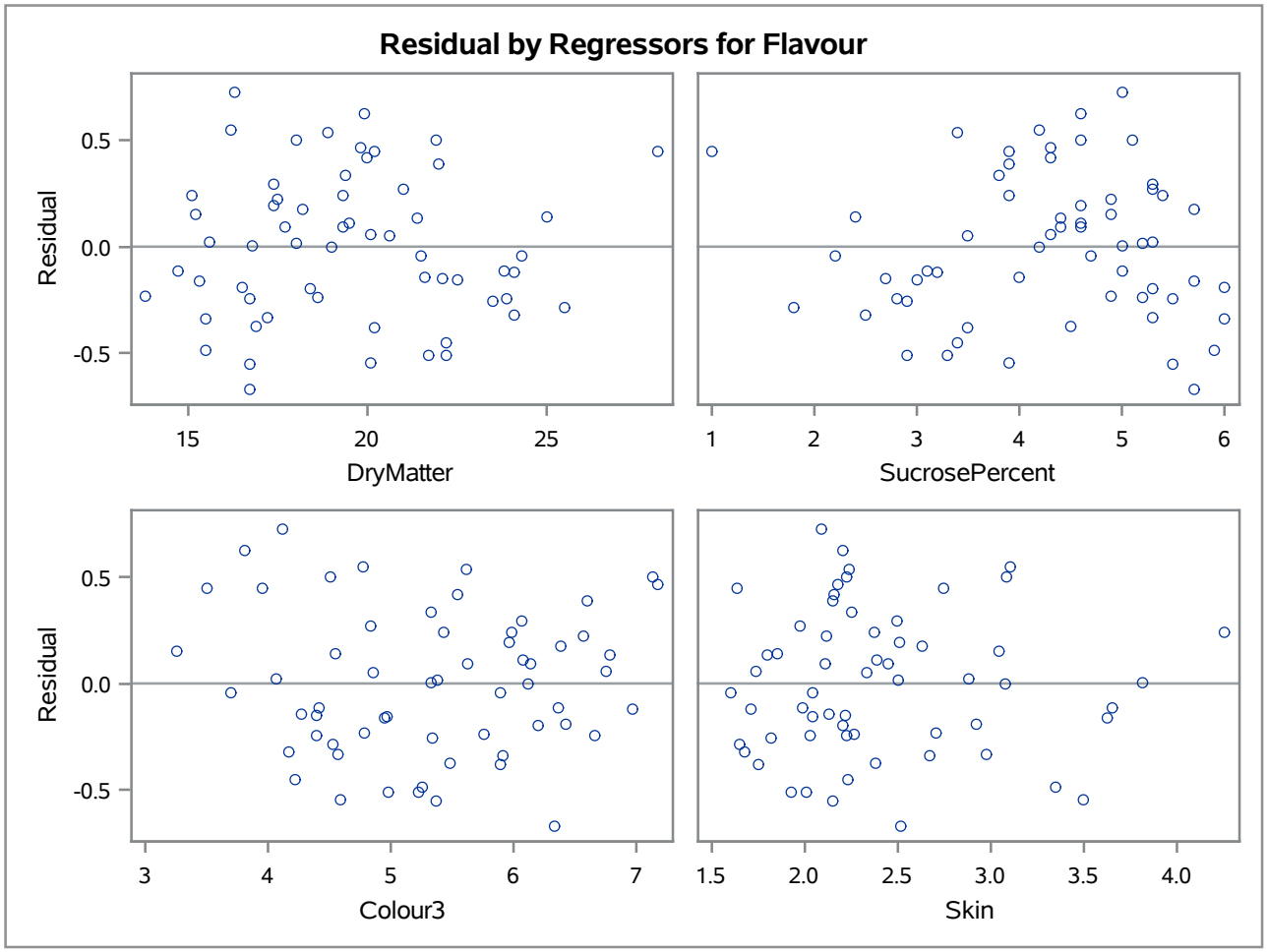
The REG Procedure
Model: MODEL1
Dependent Variable: Hardness

Summary of Stepwise Selection								
Step	Variable Entered	Variable Removed	Number Vars In	Partial R-Square	Model R-Square	C(p)	F Value	Pr > F
1	Tenderometer		1	0.8959	0.8959	42.9963	499.40	<.0001
2	SucrosePercent		2	0.0392	0.9352	7.6822	34.48	<.0001
3	Colour1		3	0.0068	0.9419	3.2418	6.53	0.0134
4	DryMatter		4	0.0040	0.9459	1.4567	4.05	0.0492

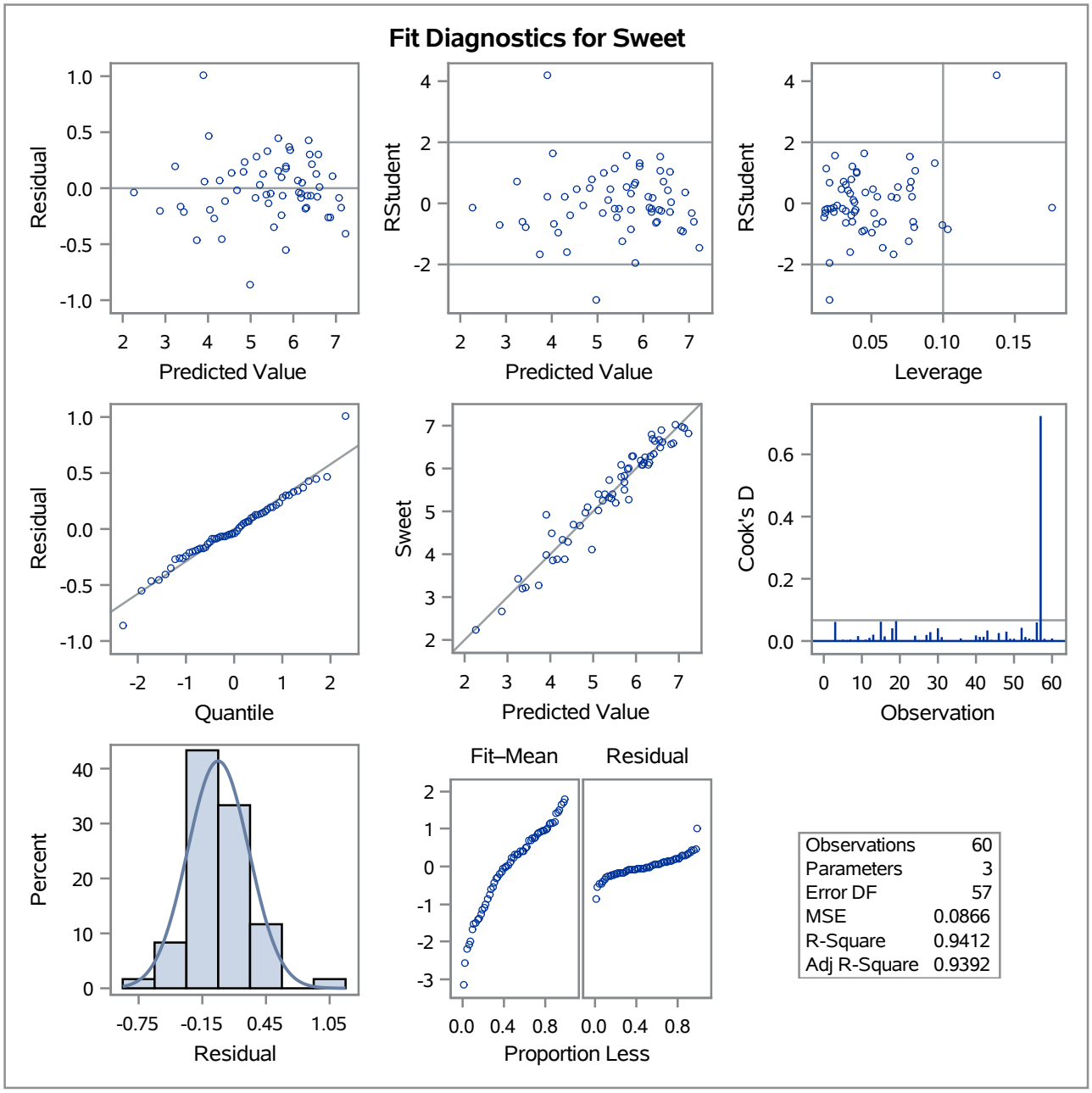
The REG Procedure
Model: MODEL1
Dependent Variable: Flavour



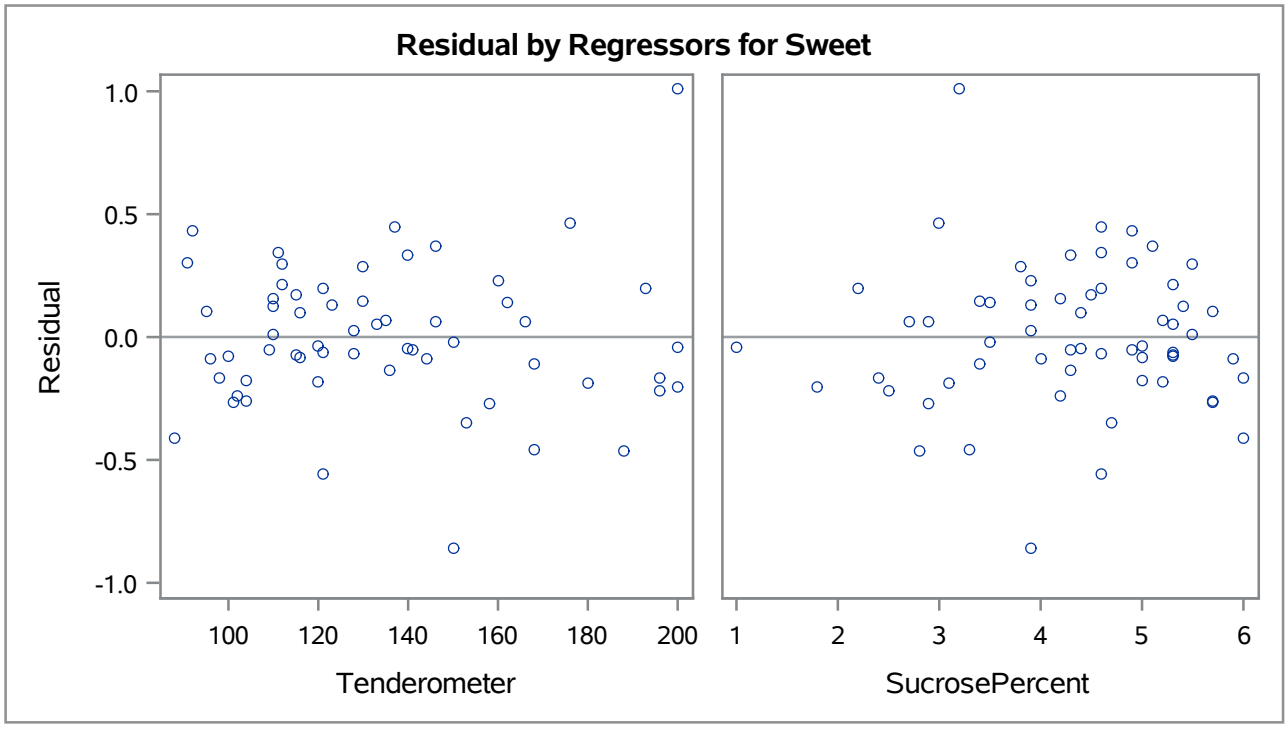
The REG Procedure
Model: MODEL1
Dependent Variable: Flavour



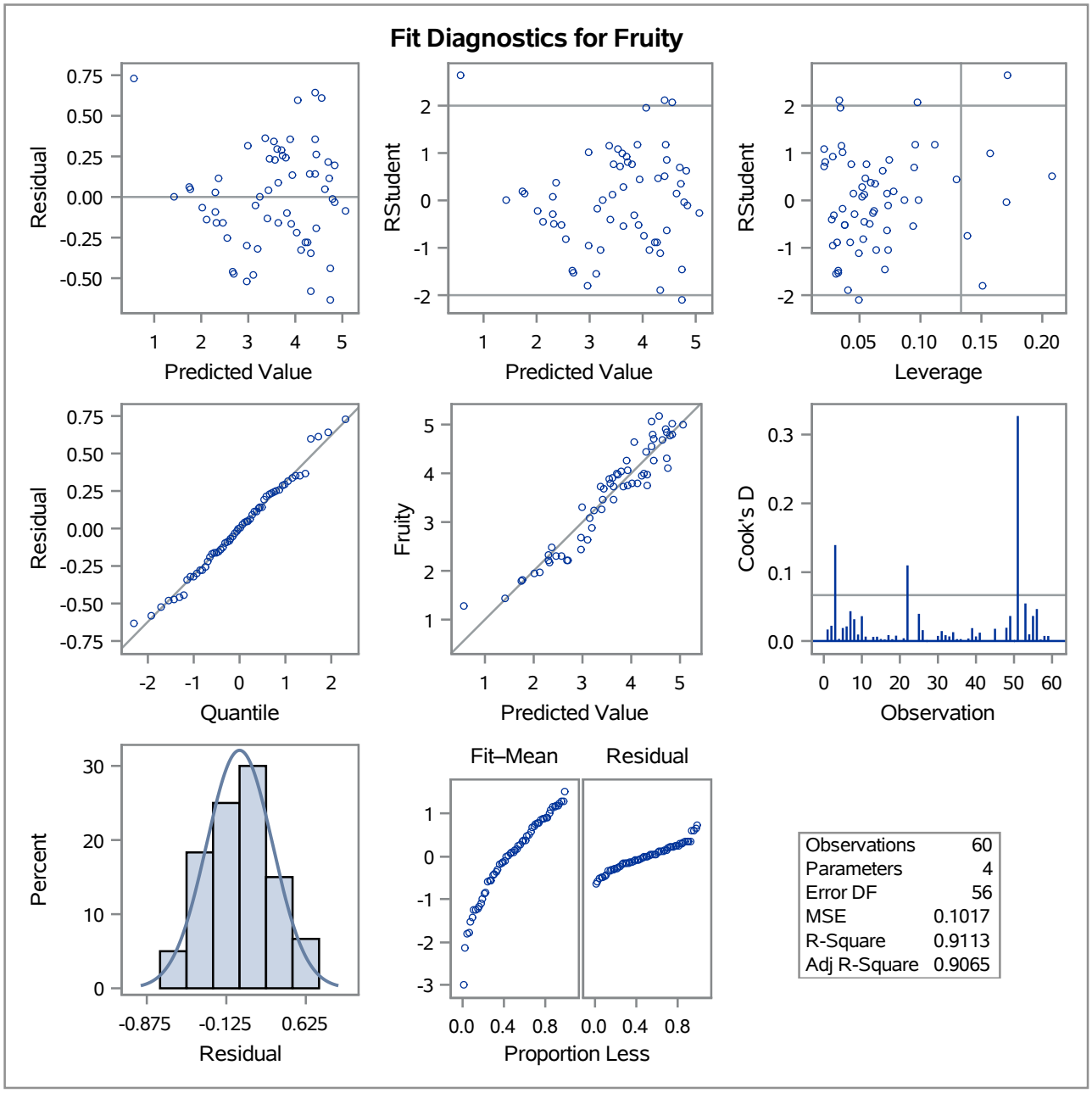
The REG Procedure
Model: MODEL1
Dependent Variable: Sweet



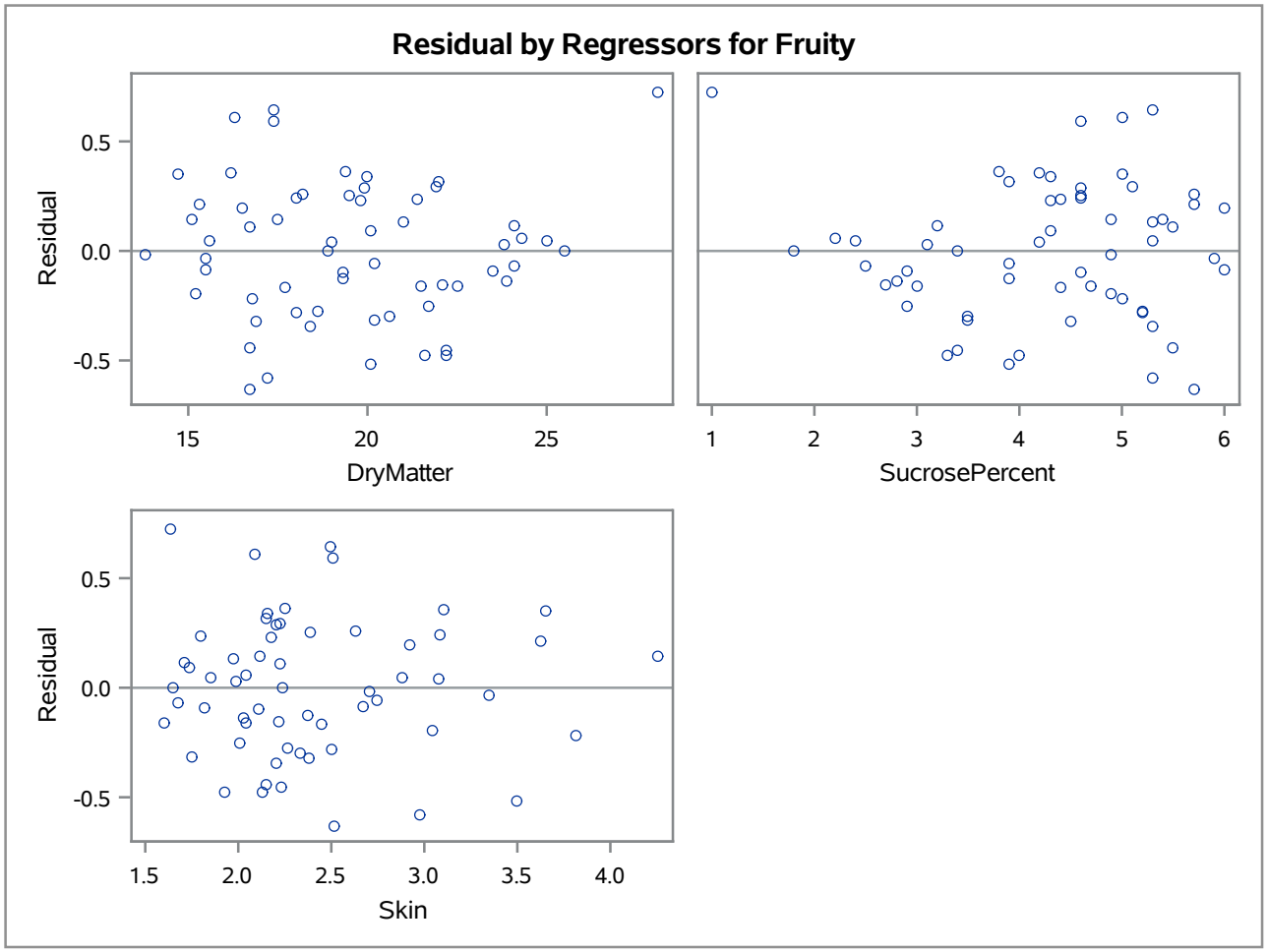
The REG Procedure
Model: MODEL1
Dependent Variable: Sweet



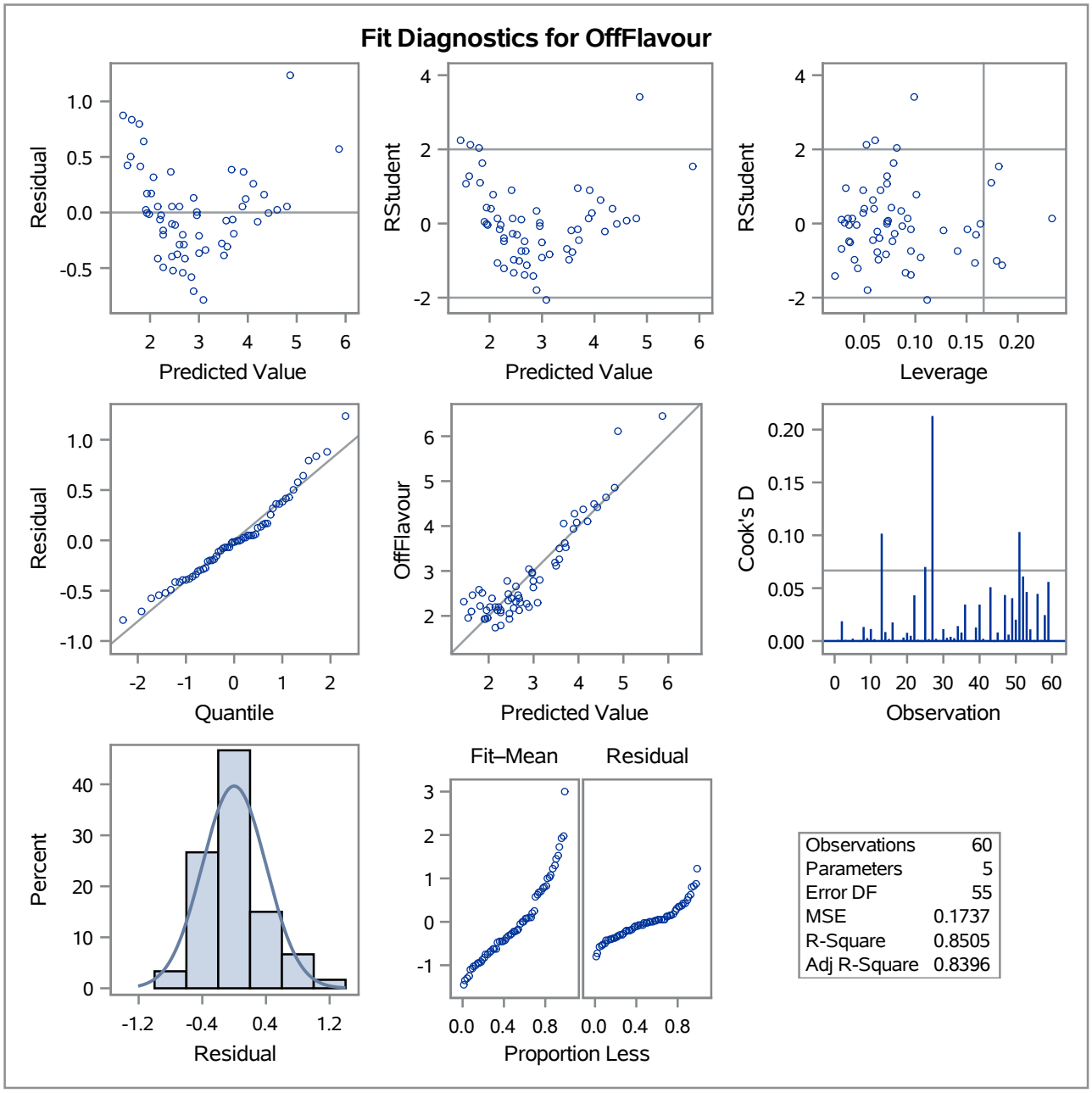
The REG Procedure
Model: MODEL1
Dependent Variable: Fruity



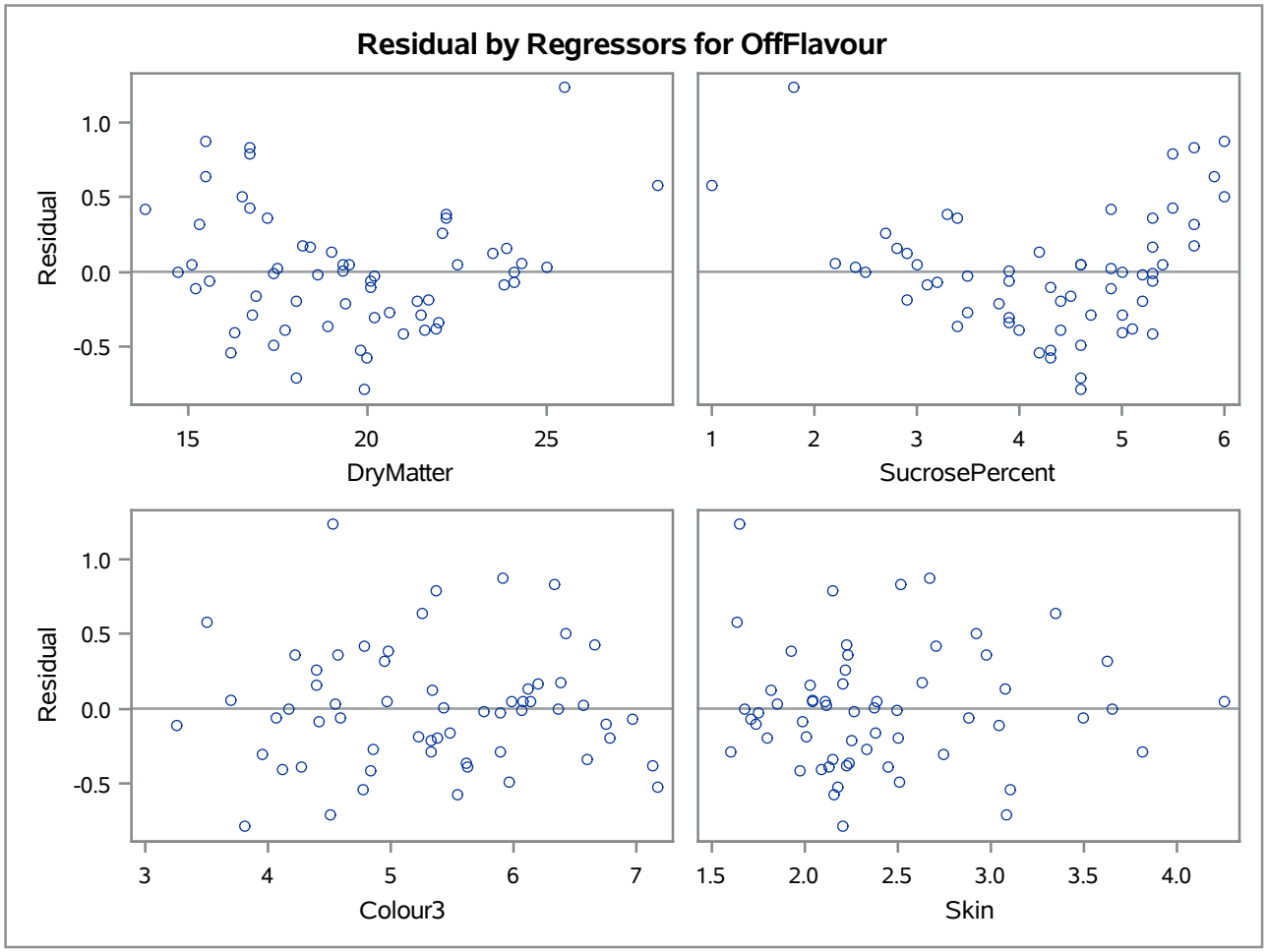
The REG Procedure
Model: MODEL1
Dependent Variable: Fruity



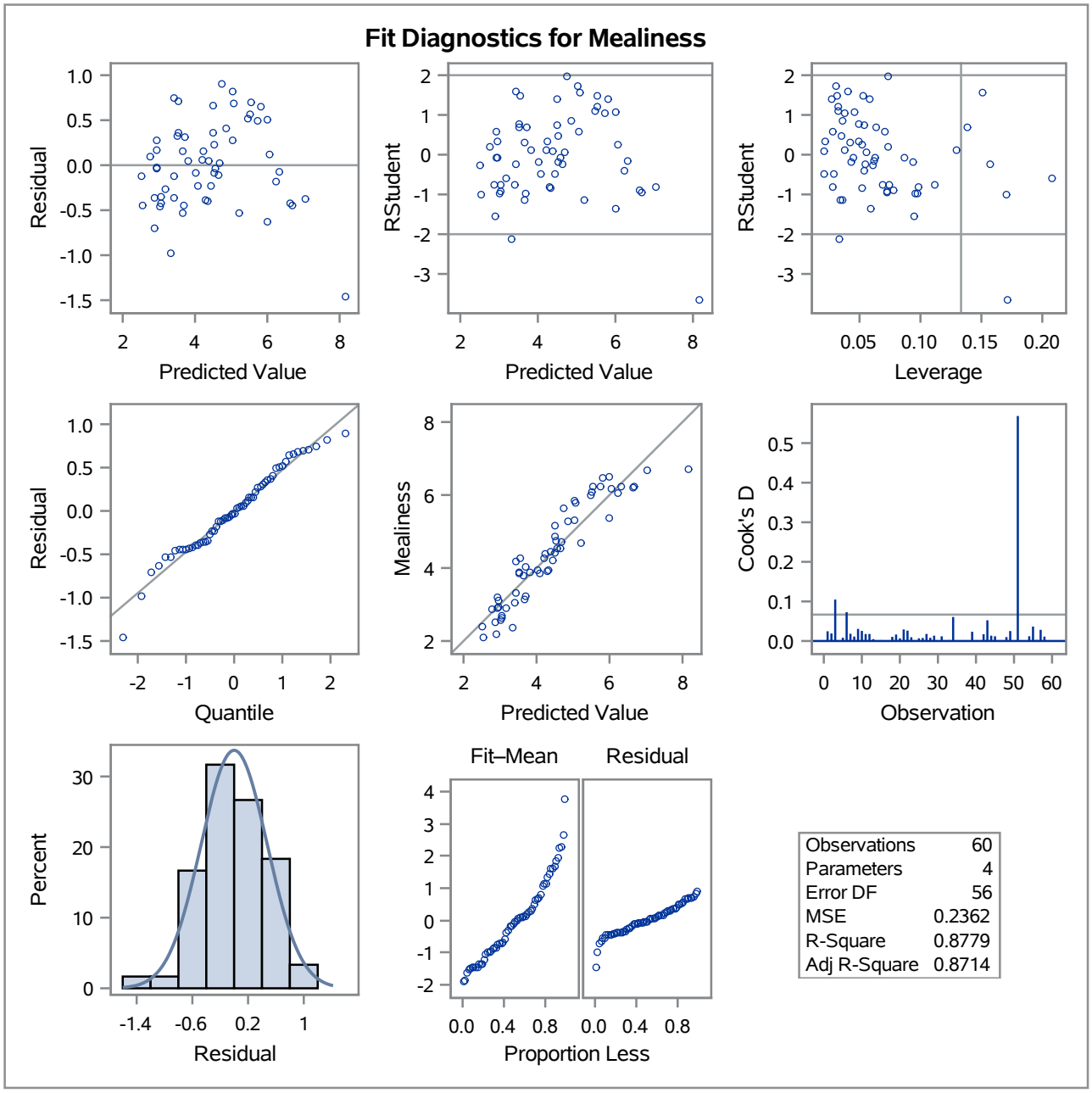
The REG Procedure
Model: MODEL1
Dependent Variable: OffFlavour



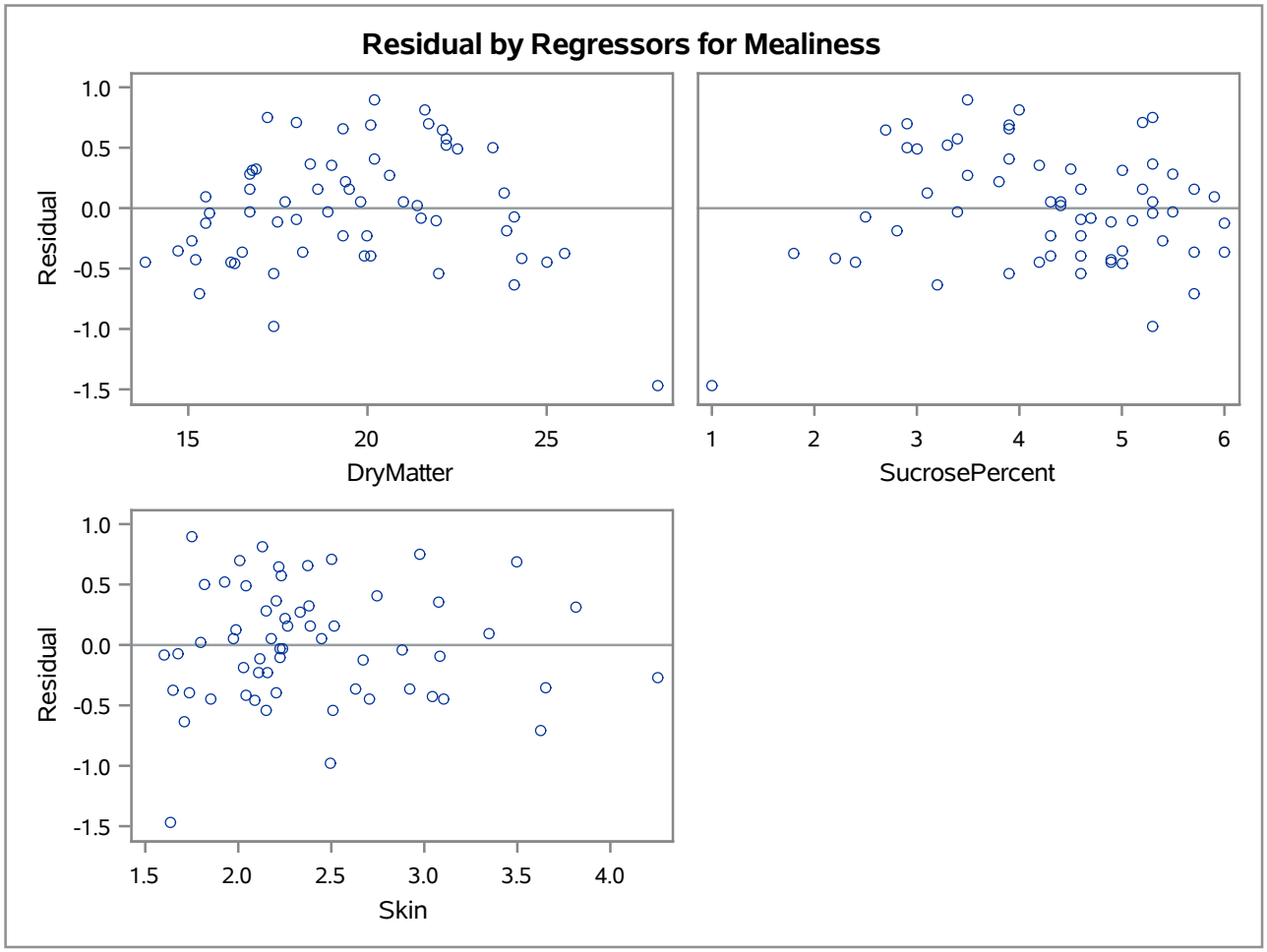
The REG Procedure
Model: MODEL1
Dependent Variable: OffFlavour



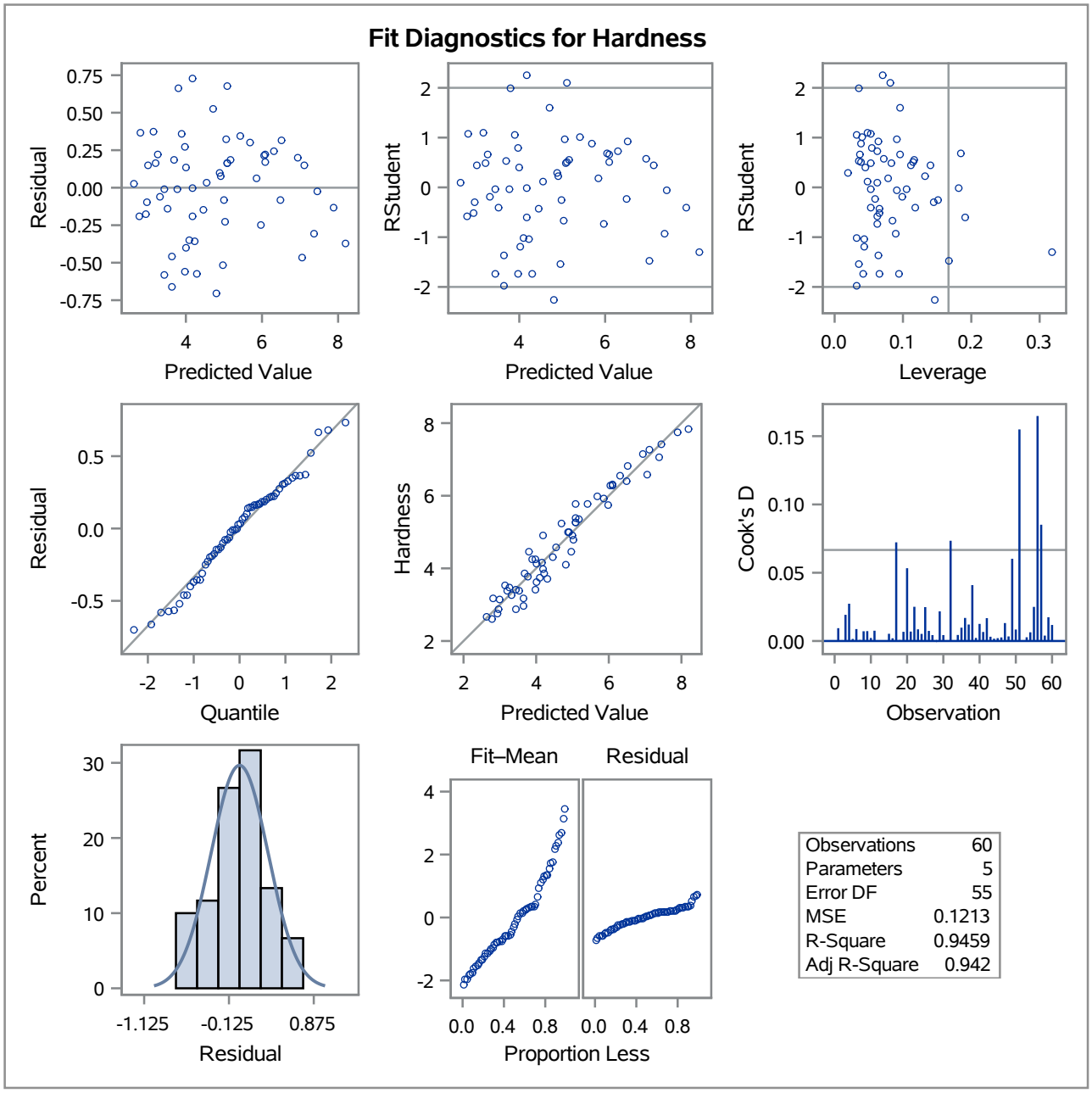
The REG Procedure
Model: MODEL1
Dependent Variable: Mealiness



The REG Procedure
Model: MODEL1
Dependent Variable: Mealiness



The REG Procedure
Model: MODEL1
Dependent Variable: Hardness



The REG Procedure
Model: MODEL1
Dependent Variable: Hardness

The REG Procedure
Model: MODEL1
Dependent Variable: Flavour

Number of Observations Read	60
Number of Observations Used	60

Analysis of Variance

Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	11	77.42867	7.03897	63.85	<.0001
Error	48	5.29144	0.11024		
Corrected Total	59	82.72012			

Root MSE	0.33202	**R-Square**	0.9360
Dependent Mean	5.32642	**Adj R-Sq**	0.9214
Coeff Var	6.23349		

Parameter Estimates

Variable	DF	Parameter Estimate	Standard Error	t Value	Pr > |t|
Intercept	1	3.27614	3.04999	1.07	0.2881
Tenderometer	1	-0.00744	0.00489	-1.52	0.1346
DryMatter	1	-0.10881	0.07545	-1.44	0.1558
Dry_matter_after_freezing	1	-0.03945	0.09828	-0.40	0.6899
SucrosePercent	1	0.41229	0.10486	3.93	0.0003
TotalGlucose1	1	-0.20352	0.13879	-1.47	0.1491
TotalGlucose2	1	0.17498	0.15838	1.10	0.2747
Whiteness	1	0.60091	0.21676	2.77	0.0079
Colour1	1	-0.18294	0.16484	-1.11	0.2726
Colour2	1	0.53120	0.30466	1.74	0.0876
Colour3	1	0.03122	0.07090	0.44	0.6617
Skin	1	-0.23310	0.12015	-1.94	0.0583

The REG Procedure
Model: MODEL1
Dependent Variable: Sweet

Number of Observations Read	60
Number of Observations Used	60

Analysis of Variance

Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	11	79.91403	7.26491	85.95	<.0001
Error	48	4.05718	0.08452		
Corrected Total	59	83.97120			

Root MSE	0.29073	**R-Square**	0.9517
Dependent Mean	5.41942	**Adj R-Sq**	0.9406
Coeff Var	5.36462		

Parameter Estimates

Variable	DF	Parameter Estimate	Standard Error	t Value	Pr > |t|
Intercept	1	0.96323	2.67069	0.36	0.7199
Tenderometer	1	-0.00910	0.00428	-2.12	0.0388
DryMatter	1	-0.08128	0.06607	-1.23	0.2246
Dry_matter_after_freezing	1	-0.00909	0.08606	-0.11	0.9163
SucrosePercent	1	0.69171	0.09182	7.53	<.0001
TotalGlucose1	1	0.01622	0.12153	0.13	0.8944
TotalGlucose2	1	0.13089	0.13868	0.94	0.3500
Whiteness	1	0.21859	0.18980	1.15	0.2552
Colour1	1	0.09090	0.14434	0.63	0.5318
Colour2	1	0.46937	0.26677	1.76	0.0849
Colour3	1	-0.02578	0.06208	-0.42	0.6799
Skin	1	-0.06489	0.10521	-0.62	0.5403

The REG Procedure
Model: MODEL1
Dependent Variable: Fruity

Number of Observations Read	60
Number of Observations Used	60

Analysis of Variance

Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	11	59.31500	5.39227	52.99	<.0001
Error	48	4.88420	0.10175		
Corrected Total	59	64.19921			

Root MSE	0.31899	**R-Square**	0.9239
Dependent Mean	3.54692	**Adj R-Sq**	0.9065
Coeff Var	8.99343		

Parameter Estimates

Variable	DF	Parameter Estimate	Standard Error	t Value	Pr > |t|
Intercept	1	3.98066	2.93027	1.36	0.1807
Tenderometer	1	-0.00296	0.00470	-0.63	0.5322
DryMatter	1	-0.08260	0.07249	-1.14	0.2602
Dry_matter_after_freezing	1	-0.07447	0.09442	-0.79	0.4342
SucrosePercent	1	0.47862	0.10074	4.75	<.0001
TotalGlucose1	1	-0.15920	0.13334	-1.19	0.2384
TotalGlucose2	1	0.17420	0.15216	1.14	0.2580
Whiteness	1	0.29232	0.20825	1.40	0.1668
Colour1	1	-0.11229	0.15837	-0.71	0.4818
Colour2	1	0.10747	0.29270	0.37	0.7151
Colour3	1	0.04130	0.06812	0.61	0.5472
Skin	1	-0.17680	0.11544	-1.53	0.1322

The REG Procedure
Model: MODEL1
Dependent Variable: OffFlavour

Number of Observations Read	60
Number of Observations Used	60

Analysis of Variance

Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	11	56.13835	5.10349	31.58	<.0001
Error	48	7.75677	0.16160		
Corrected Total	59	63.89512			

Root MSE	0.40199	**R-Square**	0.8786
Dependent Mean	2.88750	**Adj R-Sq**	0.8508
Coeff Var	13.92188		

Parameter Estimates

Variable	DF	Parameter Estimate	Standard Error	t Value	Pr > |t|
Intercept	1	7.16157	3.69277	1.94	0.0583
Tenderometer	1	-0.00175	0.00592	-0.29	0.7693
DryMatter	1	0.15070	0.09135	1.65	0.1055
Dry_matter_after_freezing	1	0.05466	0.11899	0.46	0.6481
SucrosePercent	1	-0.47013	0.12696	-3.70	0.0005
TotalGlucose1	1	0.18116	0.16804	1.08	0.2864
TotalGlucose2	1	-0.30192	0.19176	-1.57	0.1219
Whiteness	1	-0.63931	0.26244	-2.44	0.0186
Colour1	1	0.07834	0.19958	0.39	0.6964
Colour2	1	-0.53651	0.36886	-1.45	0.1523
Colour3	1	-0.13992	0.08584	-1.63	0.1097
Skin	1	0.26543	0.14548	1.82	0.0743

The REG Procedure
Model: MODEL1
Dependent Variable: Mealiness

Number of Observations Read	60
Number of Observations Used	60

Analysis of Variance					
Source	**DF**	**Sum of Squares**	**Mean Square**	**F Value**	**Pr > F**
Model	11	95.69852	8.69987	33.06	<.0001
Error	48	12.63307	0.26319		
Corrected Total	59	108.33159			

Root MSE	0.51302	**R-Square**	0.8834
Dependent Mean	4.39317	**Adj R-Sq**	0.8567
Coeff Var	11.67767		

Parameter Estimates					
Variable	**DF**	**Parameter Estimate**	**Standard Error**	**t Value**	**Pr > |t|**
Intercept	1	-2.07100	4.71266	-0.44	0.6623
Tenderometer	1	-0.00278	0.00755	-0.37	0.7143
DryMatter	1	0.23789	0.11658	2.04	0.0468
Dry_matter_after_freezing	1	0.08604	0.15186	0.57	0.5736
SucrosePercent	1	-0.50124	0.16202	-3.09	0.0033
TotalGlucose1	1	0.26192	0.21445	1.22	0.2279
TotalGlucose2	1	-0.29171	0.24472	-1.19	0.2391
Whiteness	1	0.00367	0.33492	0.01	0.9913
Colour1	1	0.12540	0.25471	0.49	0.6247
Colour2	1	0.22993	0.47073	0.49	0.6275
Colour3	1	-0.03155	0.10955	-0.29	0.7746
Skin	1	0.27973	0.18566	1.51	0.1384

The REG Procedure
Model: MODEL1
Dependent Variable: Hardness

Number of Observations Read	60
Number of Observations Used	60

Analysis of Variance

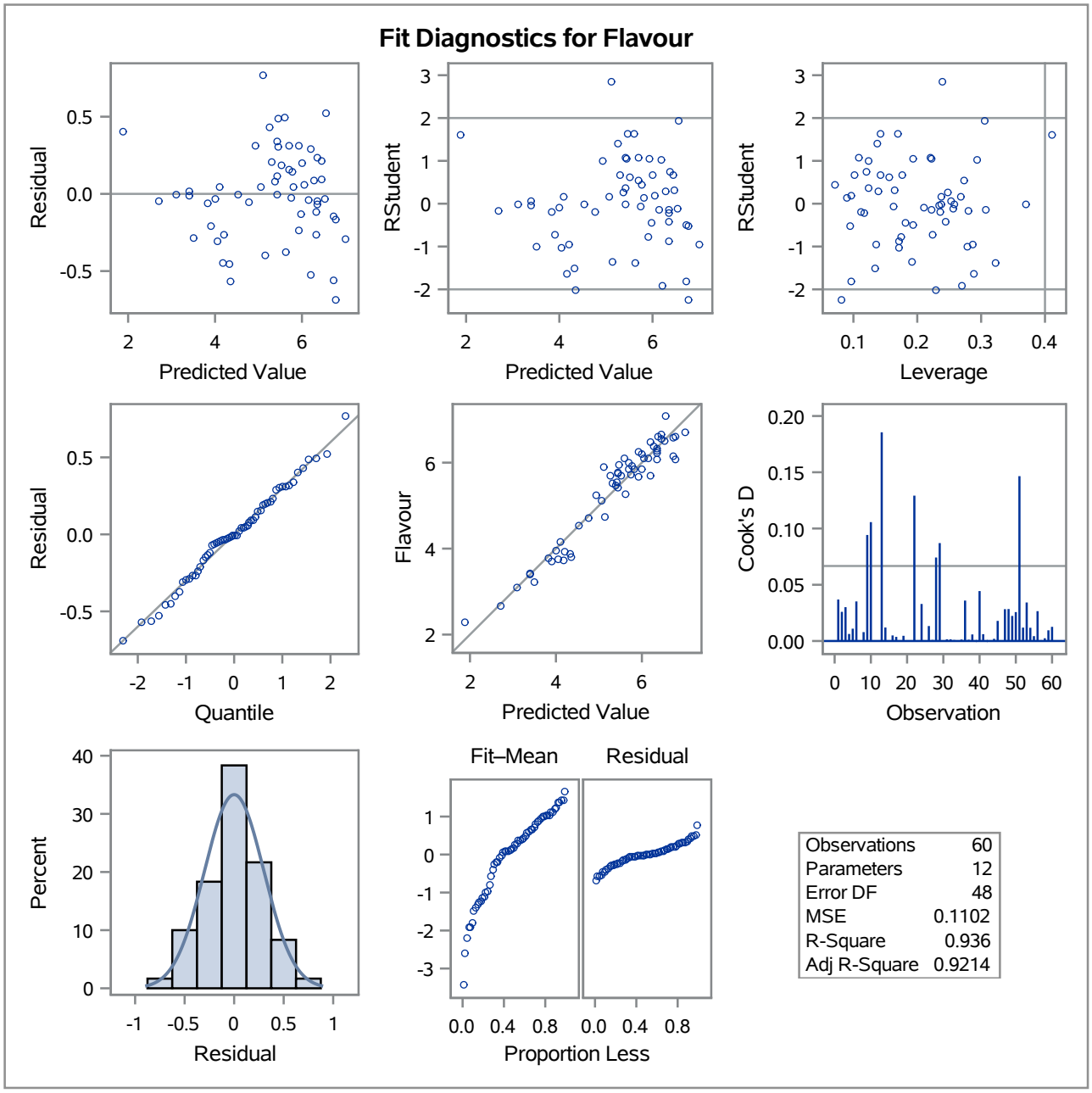
Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	11	117.10481	10.64589	82.13	<.0001
Error	48	6.22213	0.12963		
Corrected Total	59	123.32694			

Root MSE	0.36004	**R-Square**	0.9495
Dependent Mean	4.75625	**Adj R-Sq**	0.9380
Coeff Var	7.56980		

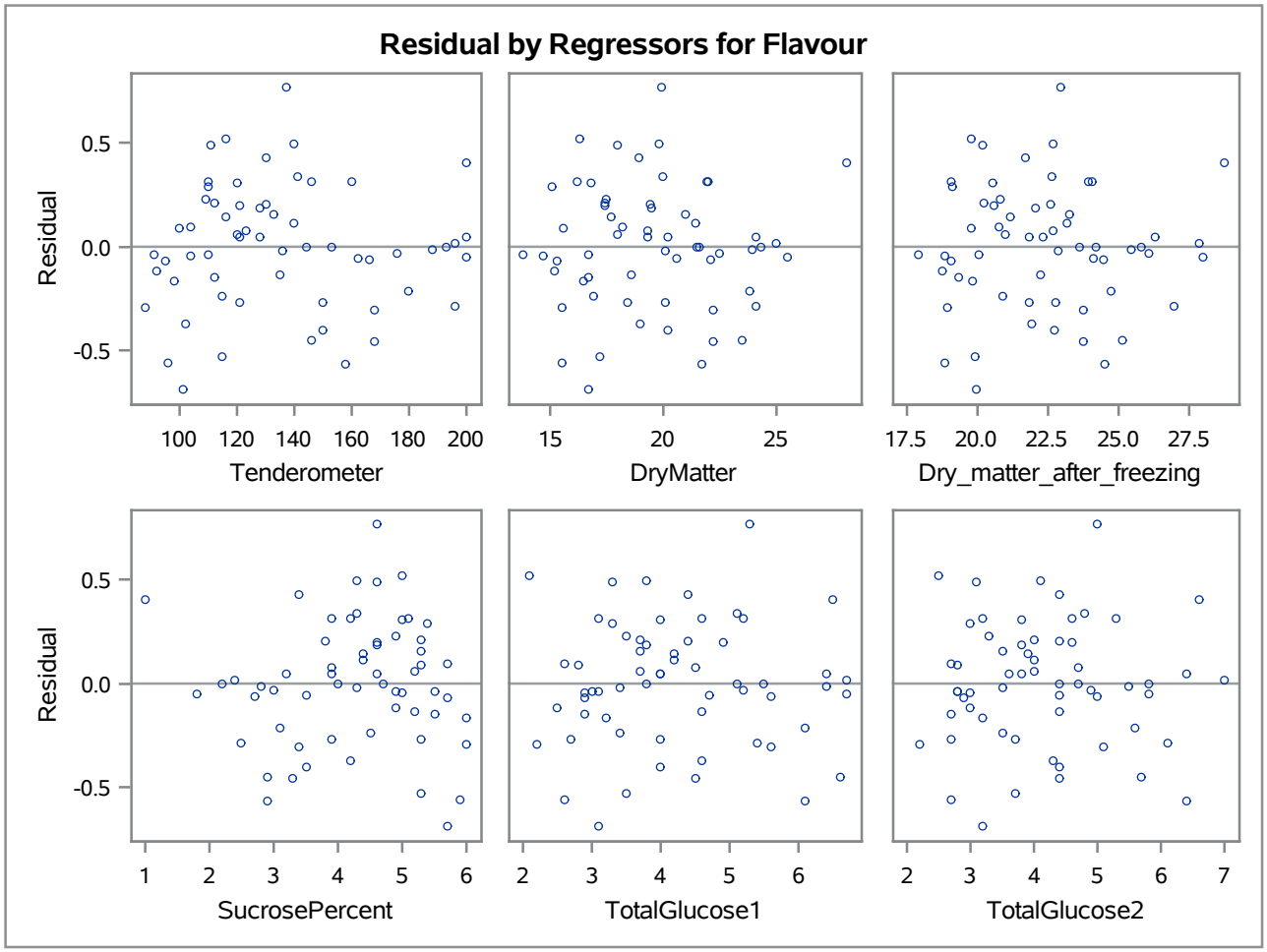
Parameter Estimates

Variable	DF	Parameter Estimate	Standard Error	t Value	Pr > |t|
Intercept	1	1.76936	3.30736	0.53	0.5951
Tenderometer	1	0.01767	0.00530	3.33	0.0017
DryMatter	1	0.07091	0.08182	0.87	0.3904
Dry_matter_after_freezing	1	0.05316	0.10657	0.50	0.6202
SucrosePercent	1	-0.53041	0.11371	-4.66	<.0001
TotalGlucose1	1	0.13182	0.15050	0.88	0.3855
TotalGlucose2	1	-0.17258	0.17175	-1.00	0.3200
Whiteness	1	0.26524	0.23505	1.13	0.2647
Colour1	1	-0.28069	0.17875	-1.57	0.1229
Colour2	1	0.19706	0.33036	0.60	0.5536
Colour3	1	-0.10204	0.07688	-1.33	0.1907
Skin	1	0.06665	0.13029	0.51	0.6113

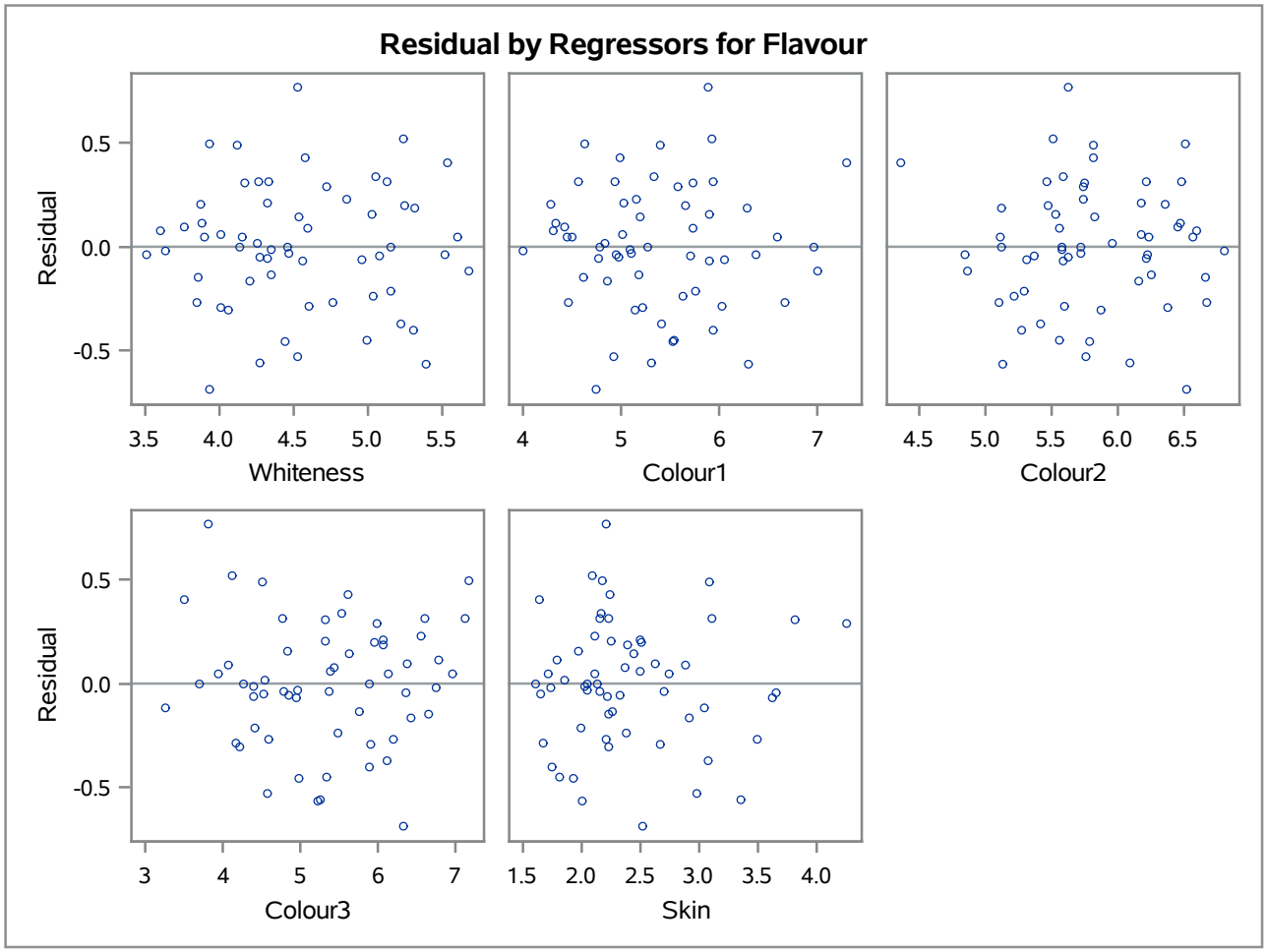
The REG Procedure
Model: MODEL1
Dependent Variable: Flavour



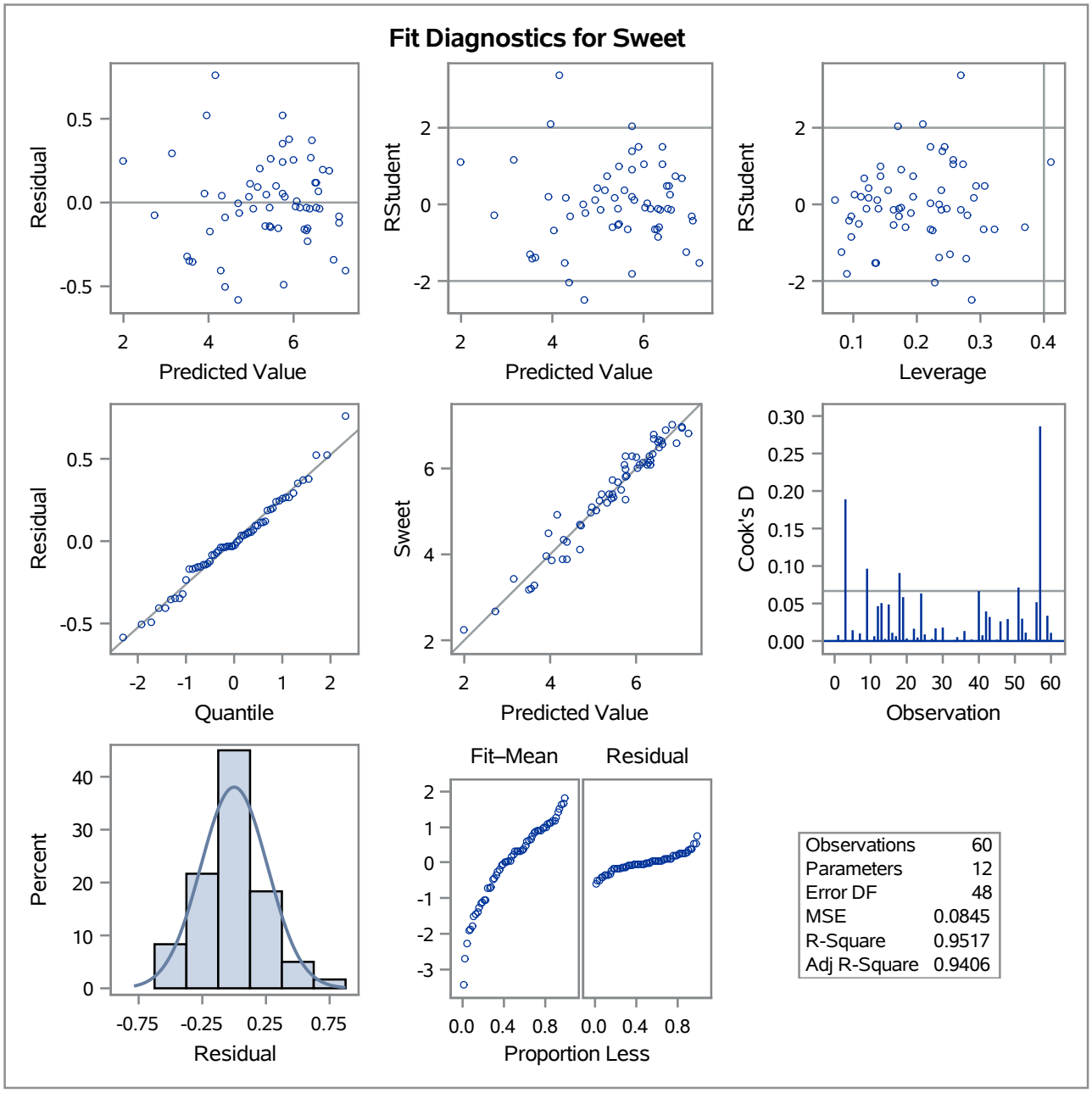
The REG Procedure
Model: MODEL1
Dependent Variable: Flavour



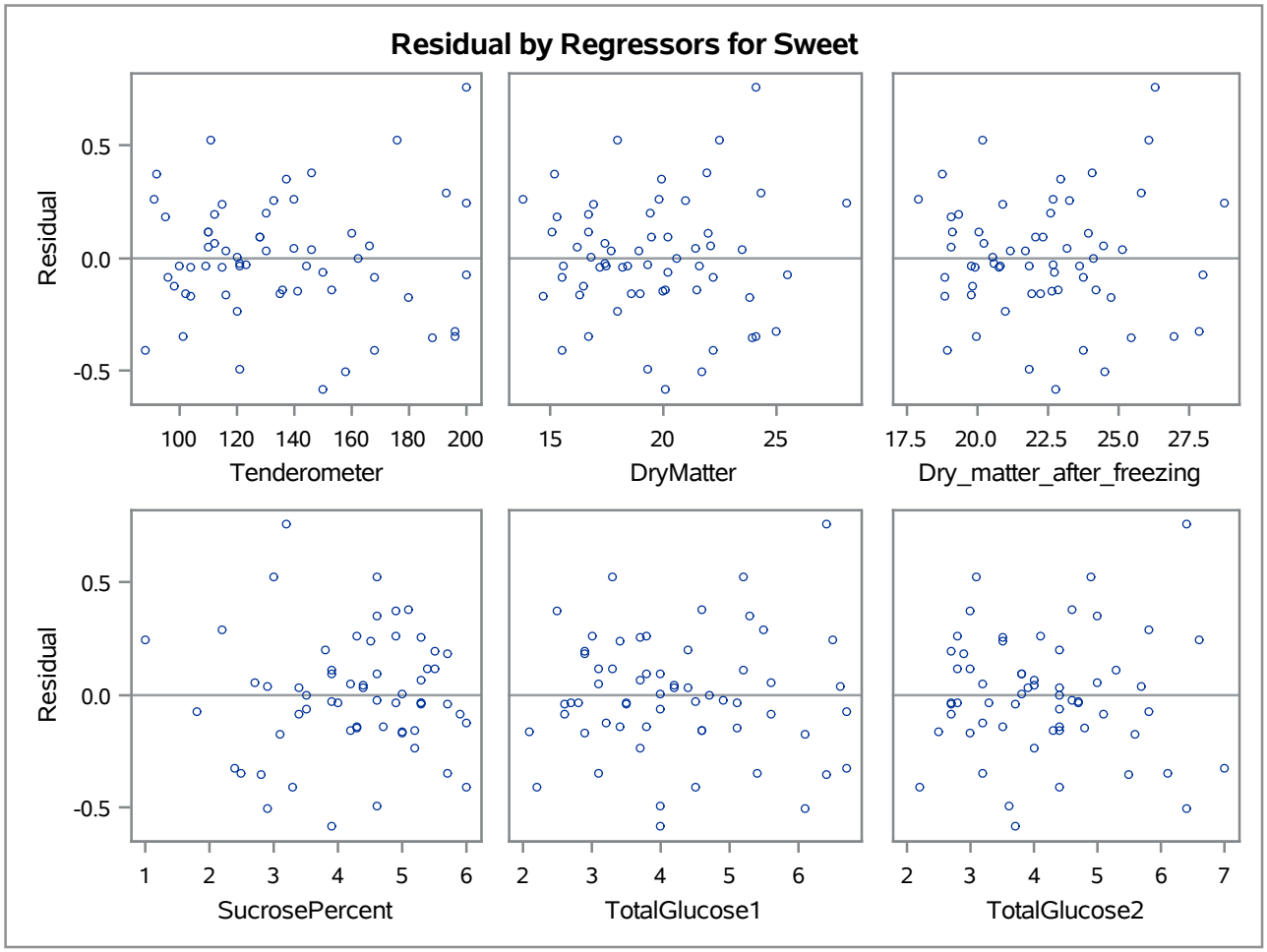
The REG Procedure
Model: MODEL1
Dependent Variable: Flavour



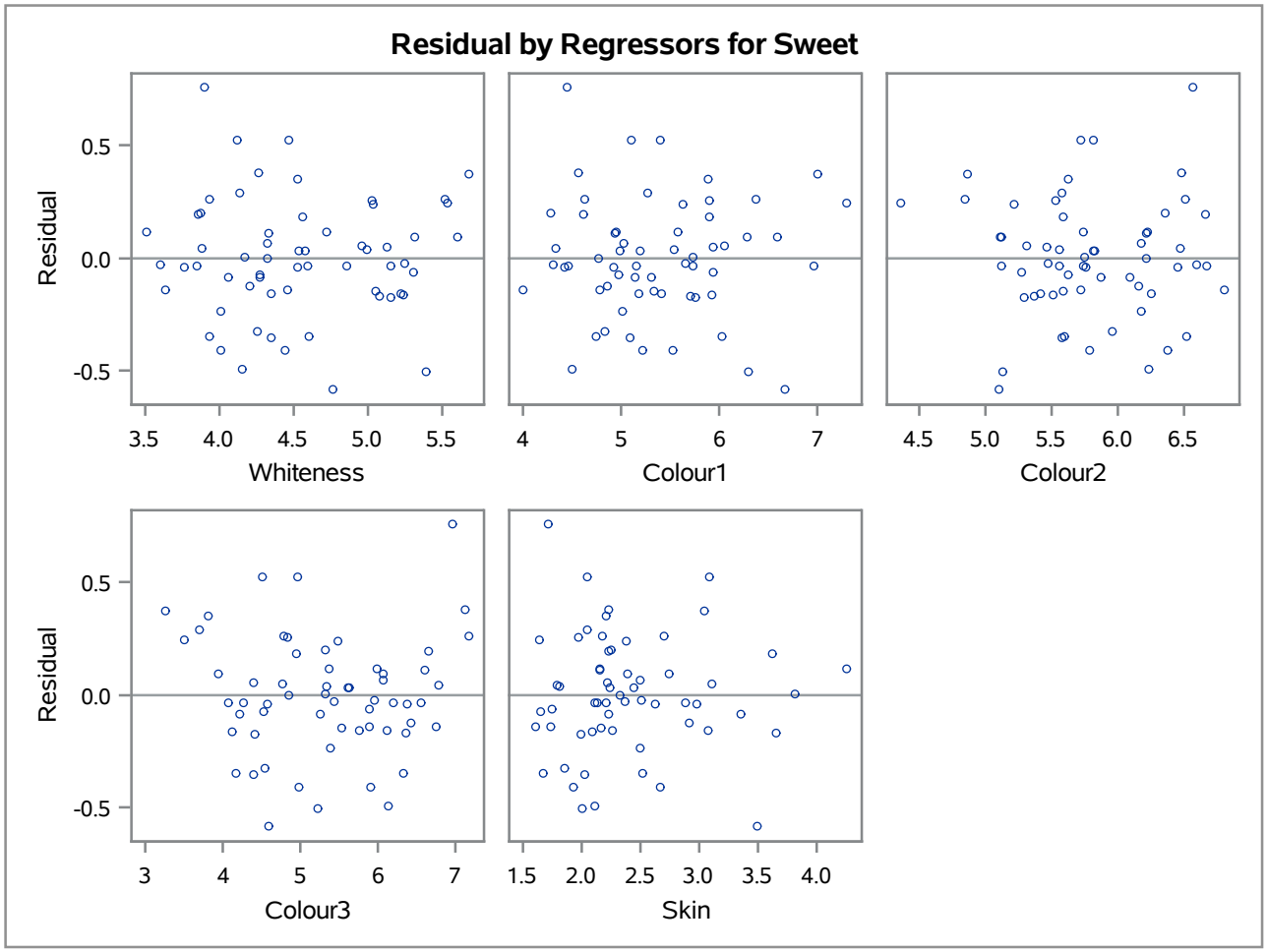
The REG Procedure
Model: MODEL1
Dependent Variable: Sweet



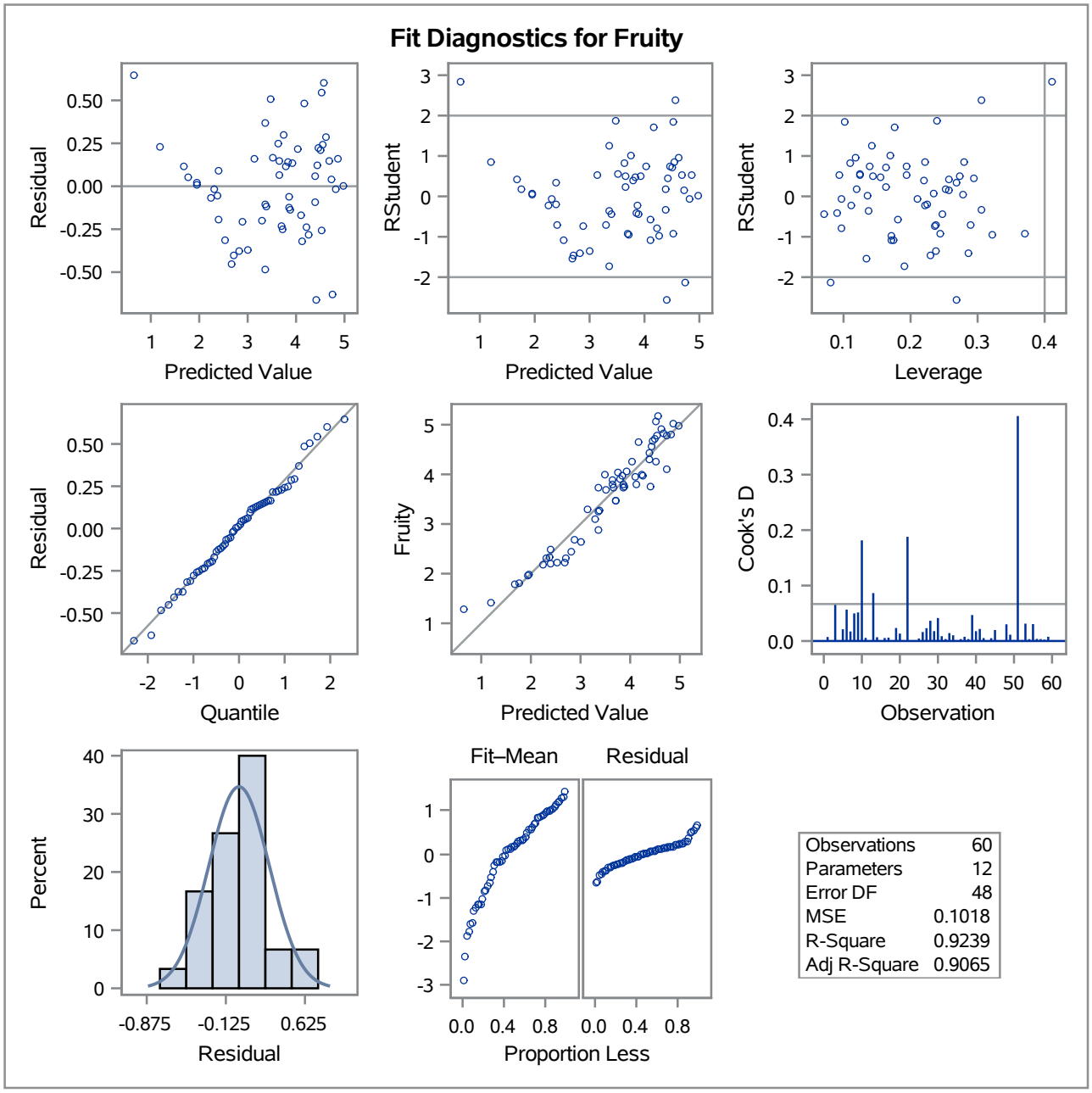
The REG Procedure
Model: MODEL1
Dependent Variable: Sweet



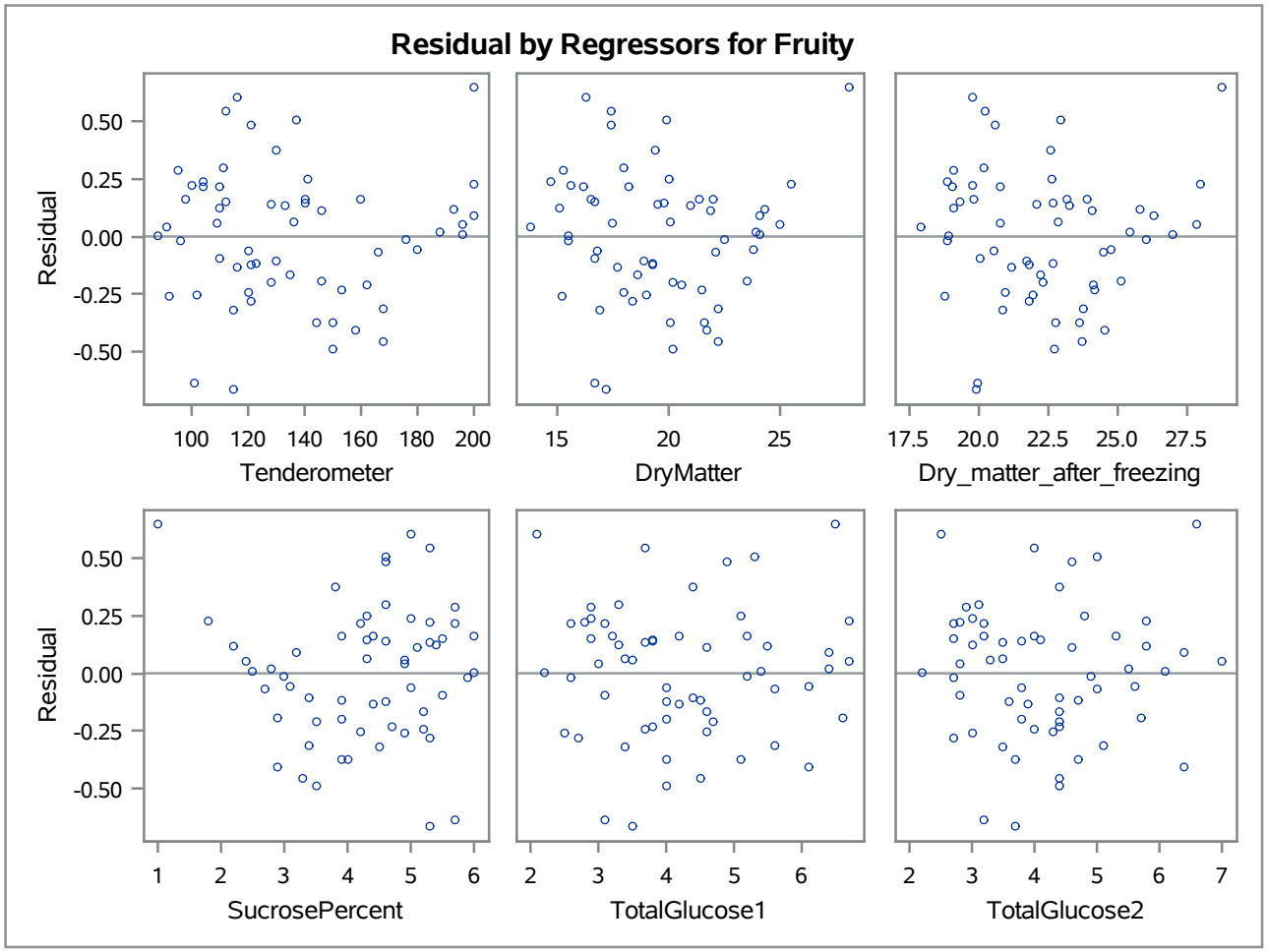
The REG Procedure
Model: MODEL1
Dependent Variable: Sweet



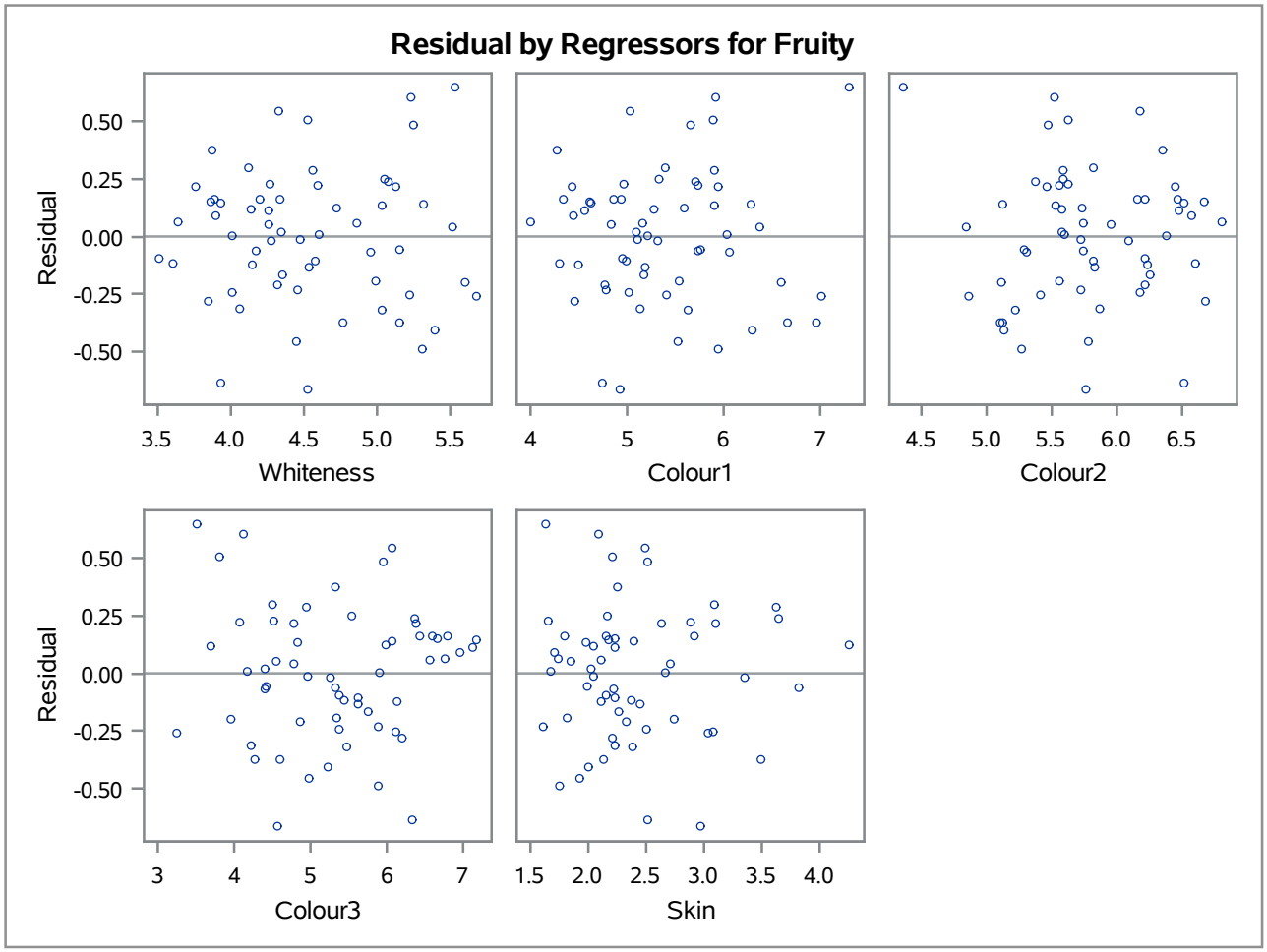
The REG Procedure
Model: MODEL1
Dependent Variable: Fruity



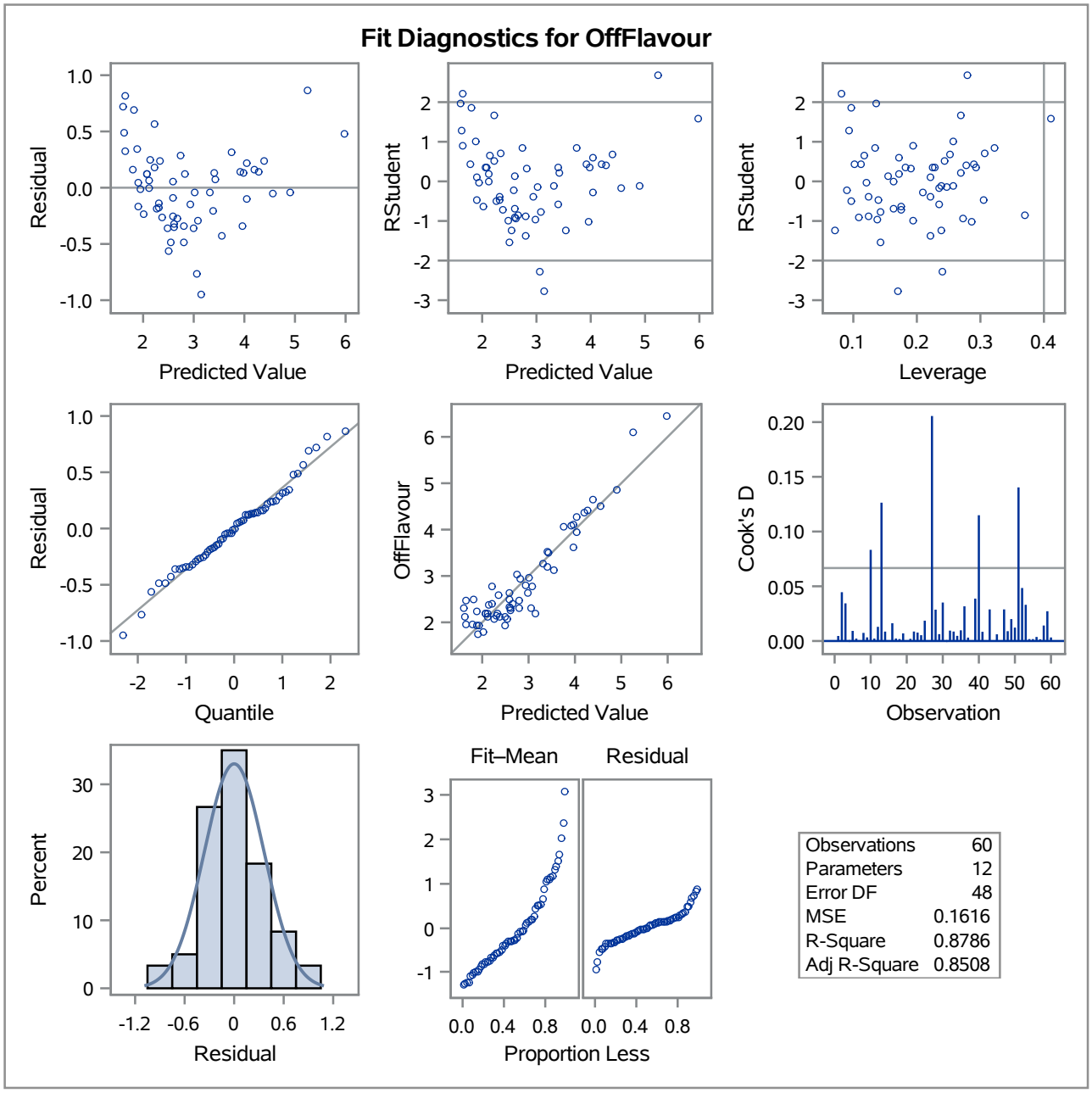
The REG Procedure
Model: MODEL1
Dependent Variable: Fruity



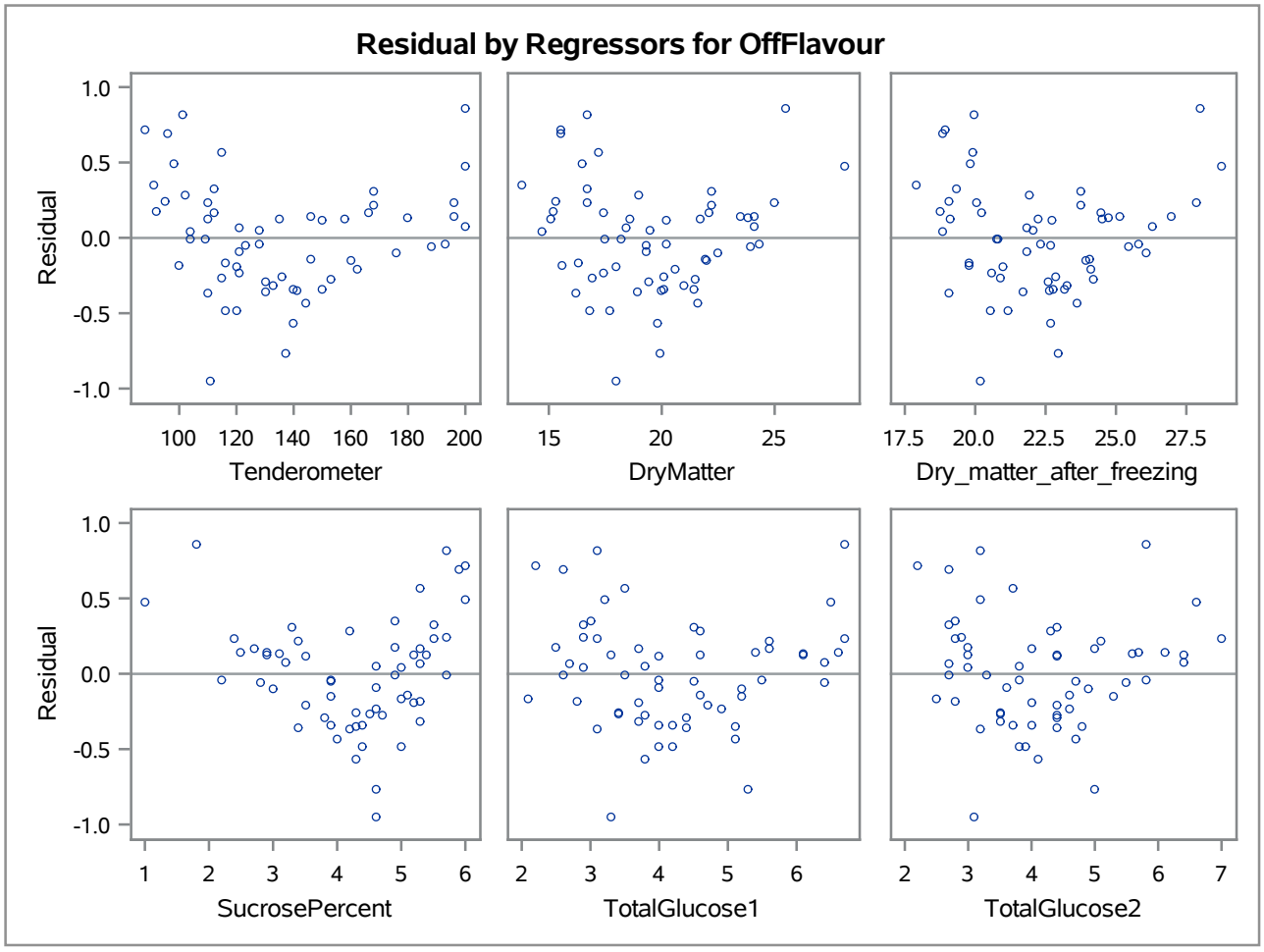
The REG Procedure
Model: MODEL1
Dependent Variable: Fruity



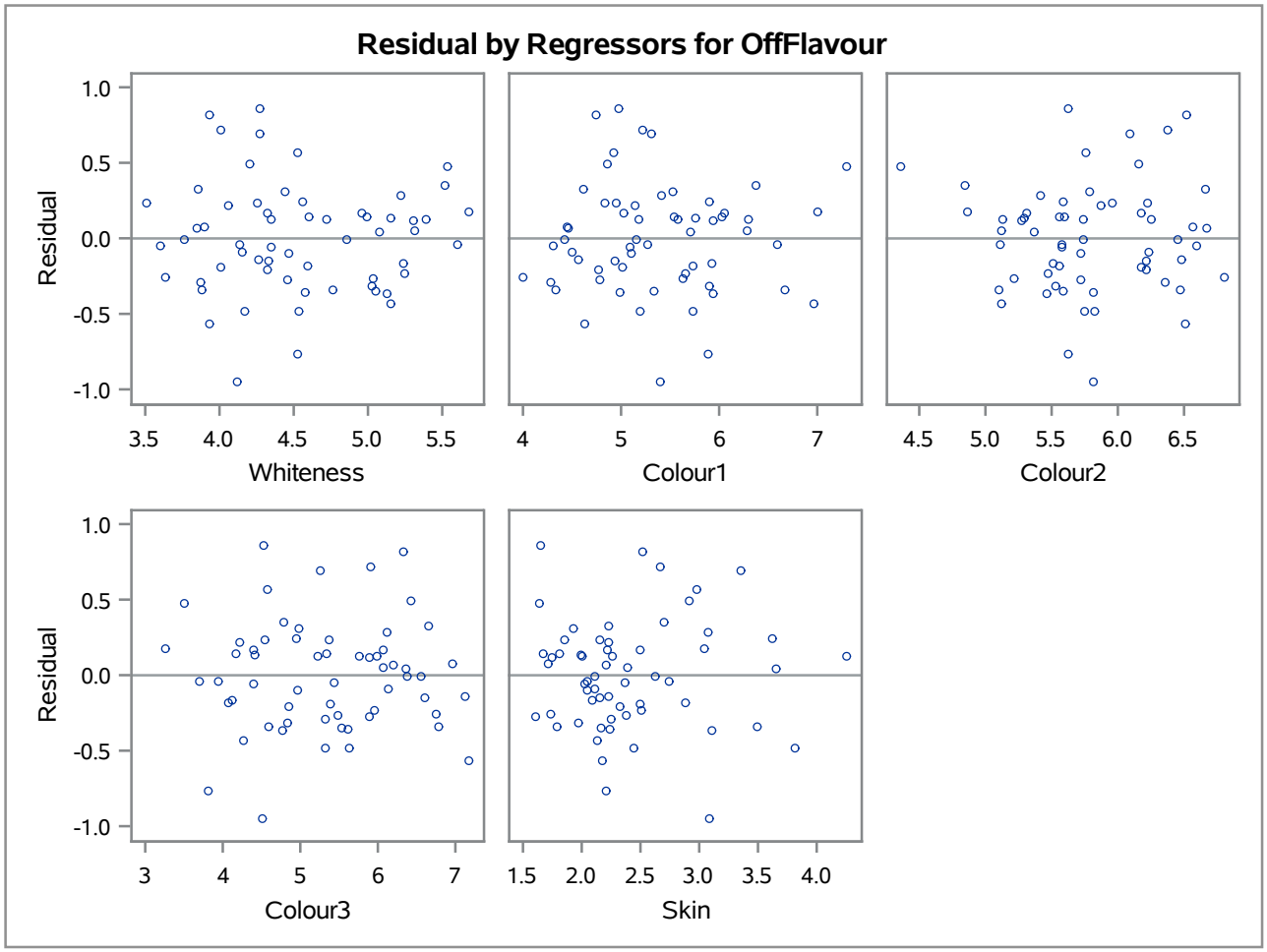
The REG Procedure
Model: MODEL1
Dependent Variable: OffFlavour



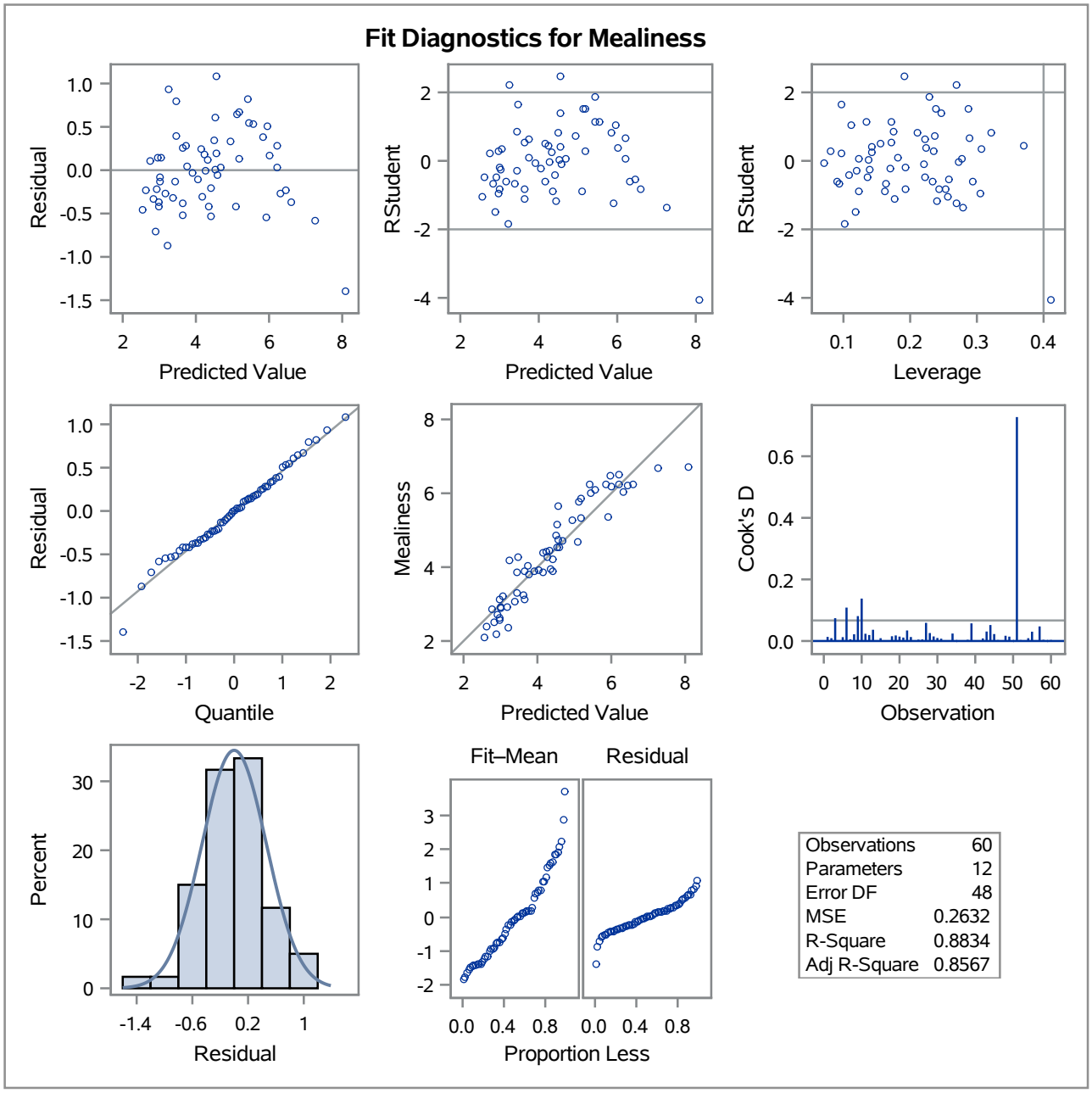
The REG Procedure
Model: MODEL1
Dependent Variable: OffFlavour



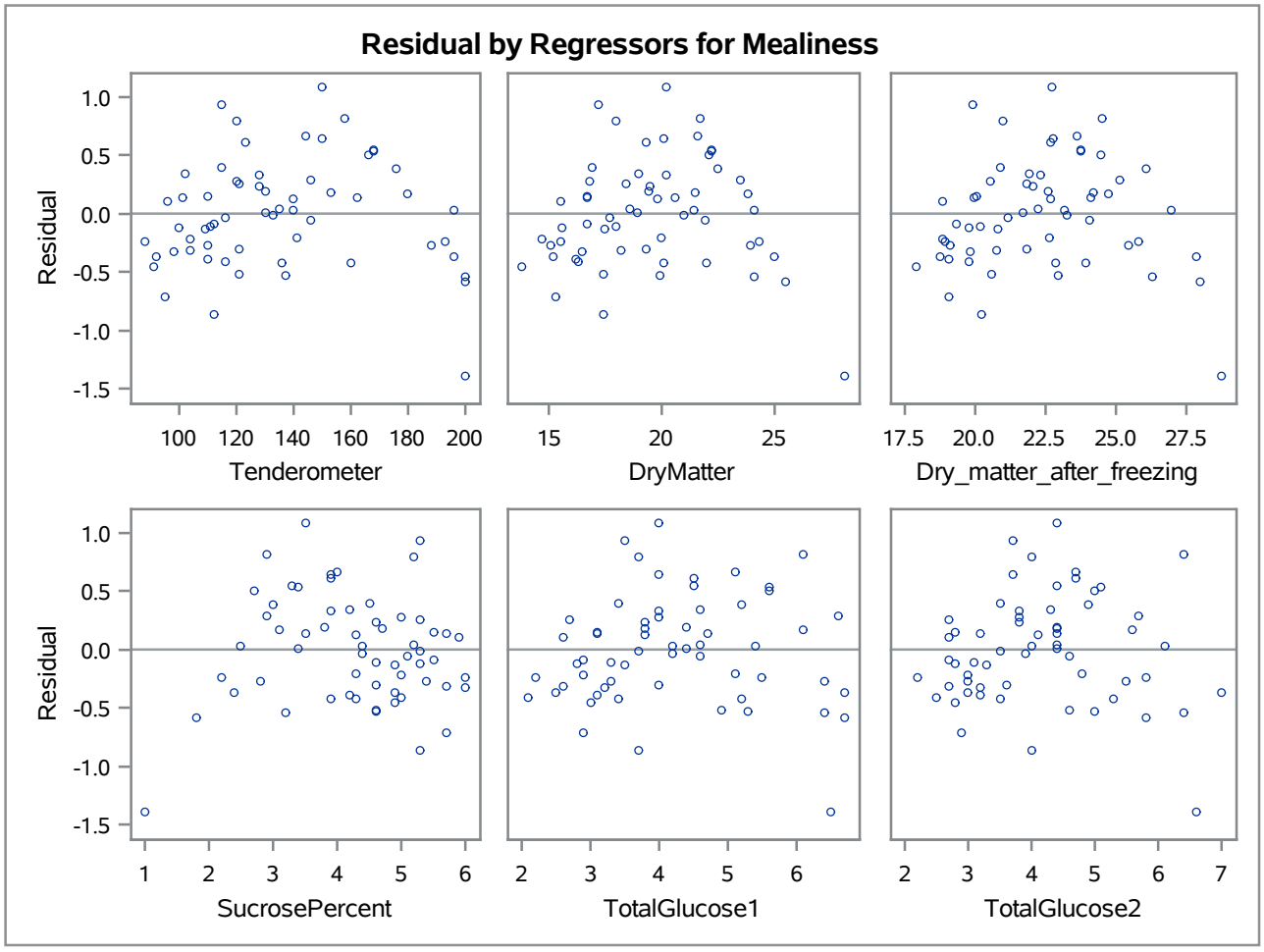
The REG Procedure
Model: MODEL1
Dependent Variable: OffFlavour



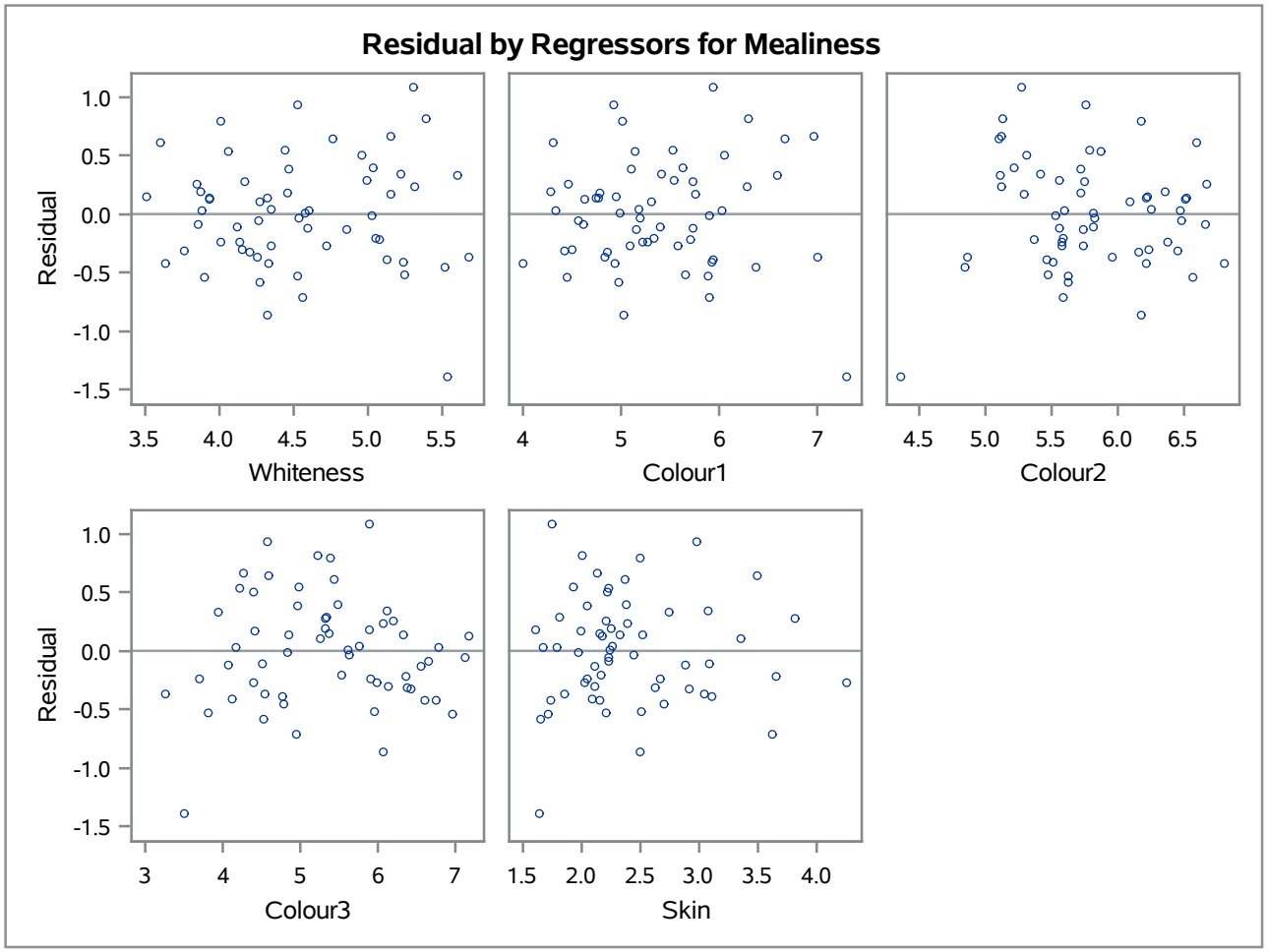
The REG Procedure
Model: MODEL1
Dependent Variable: Mealiness



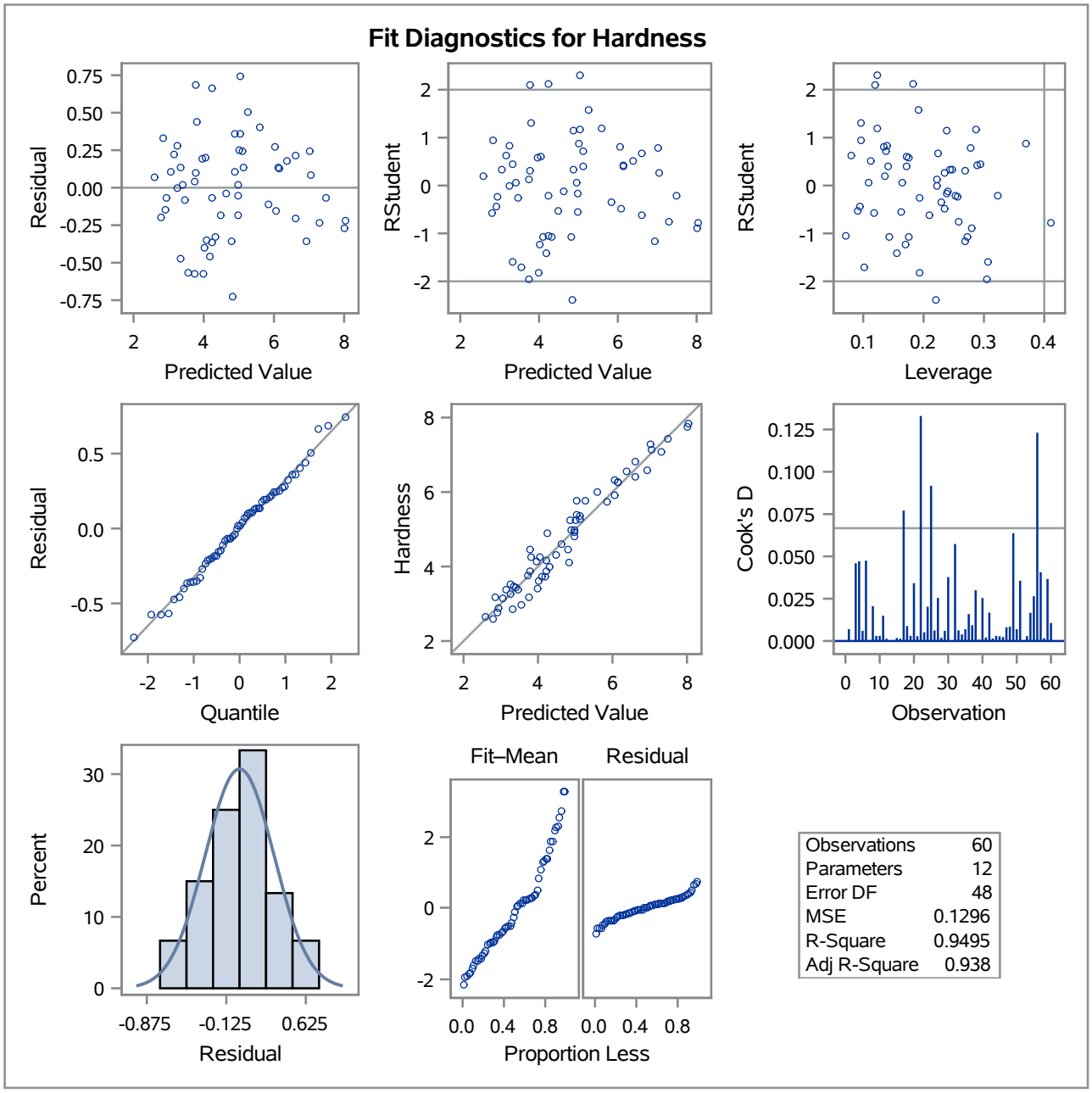
The REG Procedure
Model: MODEL1
Dependent Variable: Mealiness



The REG Procedure
Model: MODEL1
Dependent Variable: Mealiness

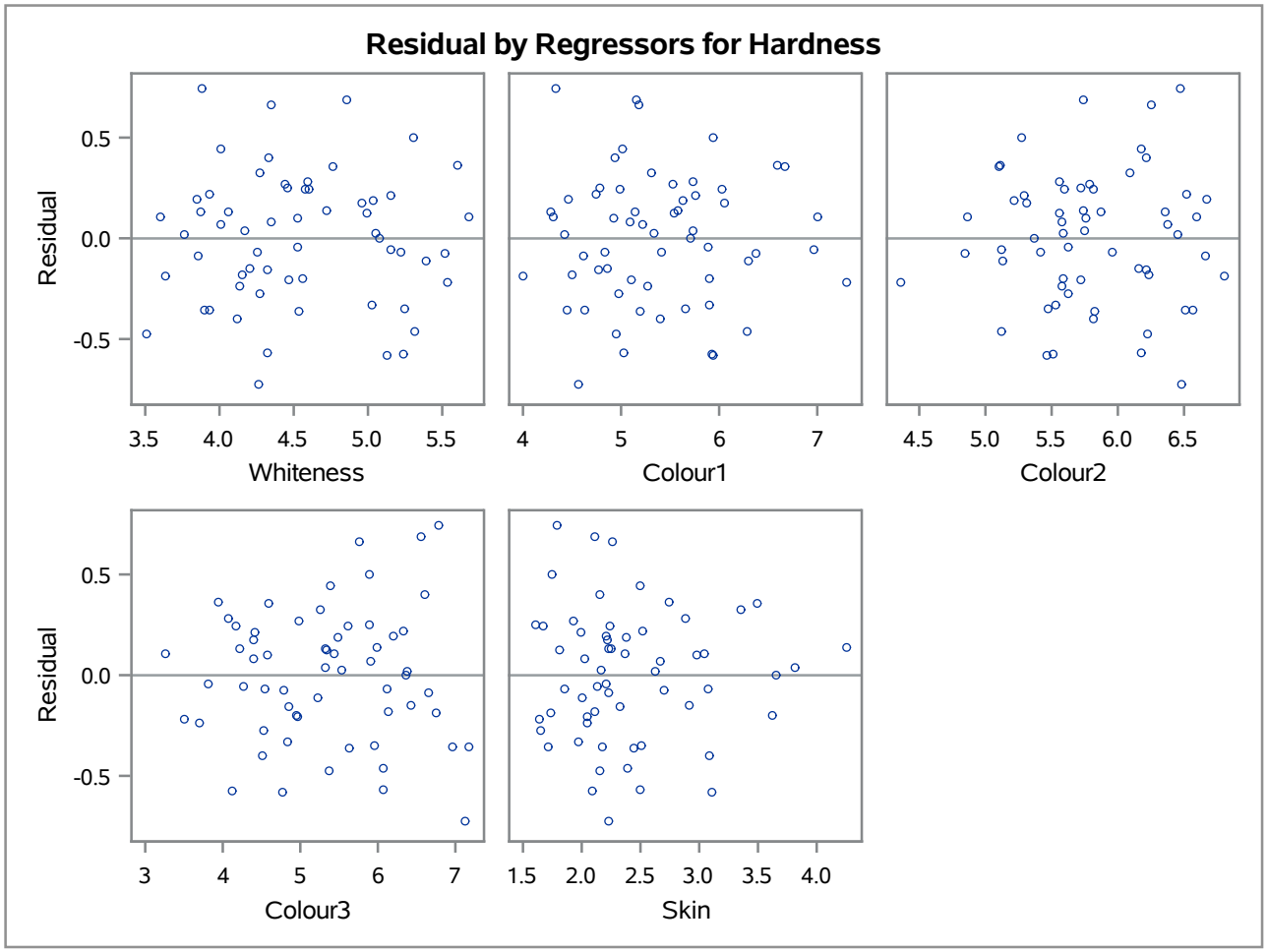


The REG Procedure
Model: MODEL1
Dependent Variable: Hardness



The REG Procedure
Model: MODEL1
Dependent Variable: Hardness

The REG Procedure
Model: MODEL1
Dependent Variable: Hardness



The REG Procedure
Model: MODEL1
Multivariate Test: overall

Error Matrix (E)					
5.2914449603	2.1100510177	3.6850128959	-4.189254597	-4.074306199	-2.028968119
2.1100510177	4.0571768917	1.6349317251	-1.531605215	-1.985451749	-1.751198656
3.6850128959	1.6349317251	4.8842044965	-1.342365523	-6.152888215	-2.440034133
-4.189254597	-1.531605215	-1.342365523	7.7567689767	-0.695883586	0.7662178935
-4.074306199	-1.985451749	-6.152888215	-0.695883586	12.633072351	3.5725800749
-2.028968119	-1.751198656	-2.440034133	0.7662178935	3.5725800749	6.2221346281

Hypothesis Matrix (H)					
77.42867251	77.170102656	67.373905945	-65.04643347	-84.24476722	-91.31757559
77.170102656	79.914026518	68.056410332	-64.49837819	-85.17073166	-94.43518633
67.373905945	68.056410332	59.315001343	-56.51684554	-74.64530006	-81.54443936
-65.04643347	-64.49837819	-56.51684554	56.138349073	70.267277223	75.083070829
-84.24476722	-85.17073166	-74.64530006	70.267277223	95.698520192	103.55318247
-91.31757559	-94.43518633	-81.54443936	75.083070829	103.55318247	117.10480753

	Canonical Correlation	Adjusted Canonical Correlation	Approximate Standard Error	Squared Canonical Correlation	Eigenvalues of Inv(E)*H = CanRsq/(1-CanRsq)			
					Eigenvalue	Difference	Proportion	Cumulative
1	0.984194	0.980359	0.004083	0.968639	30.8864	29.7970	0.9231	0.9231
2	0.722076	0.618252	0.062309	0.521394	1.0894	0.3856	0.0326	0.9557
3	0.642713	0.535851	0.076410	0.413081	0.7038	0.1771	0.0210	0.9767
4	0.587354	.	0.085276	0.344985	0.5267	0.3183	0.0157	0.9925
5	0.415286	0.335717	0.107736	0.172463	0.2084	0.1653	0.0062	0.9987
6	0.203332	0.041808	0.124806	0.041344	0.0431		0.0013	1.0000

	Test of H0: The canonical correlations in the current row and all that follow are zero				
	Likelihood Ratio	Approximate F Value	Num DF	Den DF	Pr > F
1	0.00457775	6.20	66	235.54	<.0001
2	0.14596820	2.14	50	204.04	0.0001
3	0.30498616	1.76	36	170.37	0.0089
4	0.51963884	1.41	24	134.02	0.1117
5	0.79332372	0.82	14	94	0.6416
6	0.95865610	0.35	6	48	0.9093

The REG Procedure
Model: MODEL1
Multivariate Test: overall

Multivariate Statistics		
S=6 M=2 N=20.5		
Statistic	**Value**	**P-Value**
Wilks' Lambda	0.00457775	<.0001
Pillai's Trace	2.46190493	<.0001
Hotelling-Lawley Trace	33.45786372	<.0001
Roy's Greatest Root	30.88643656	<.0001

The REG Procedure
Model: MODEL1
Multivariate Test: partial1

Error Matrix (E)					
5.2914449603	2.1100510177	3.6850128959	-4.189254597	-4.074306199	-2.028968119
2.1100510177	4.0571768917	1.6349317251	-1.531605215	-1.985451749	-1.751198656
3.6850128959	1.6349317251	4.8842044965	-1.342365523	-6.152888215	-2.440034133
-4.189254597	-1.531605215	-1.342365523	7.7567689767	-0.695883586	0.7662178935
-4.074306199	-1.985451749	-6.152888215	-0.695883586	12.633072351	3.5725800749
-2.028968119	-1.751198656	-2.440034133	0.7662178935	3.5725800749	6.2221346281

Hypothesis Matrix (H)					
1.1109280255	0.3817356537	0.6346562207	-1.214621715	-0.334381381	0.1931270903
0.3817356537	0.5937959817	0.1644596621	-0.698997686	0.0256907336	0.0647439487
0.6346562207	0.1644596621	0.4546996803	-0.748945855	-0.356854415	0.0398305093
-1.214621715	-0.698997686	-0.748945855	1.6265009659	0.4073551491	-0.198058102
-0.334381381	0.0256907336	-0.356854415	0.4073551491	0.5297984777	0.2165309783
0.1931270903	0.0647439487	0.0398305093	-0.198058102	0.2165309783	0.3020553044

	Canonical Correlation	Adjusted Canonical Correlation	Approximate Standard Error	Squared Canonical Correlation	Eigenvalues of Inv(E)*H = CanRsq/(1-CanRsq)			
					Eigenvalue	Difference	Proportion	Cumulative
1	0.492525	0.280521	0.104040	0.242581	0.3203	0.1018	0.4530	0.4530
2	0.423431	.	0.112733	0.179294	0.2185	0.0958	0.3090	0.7620
3	0.330568	0.275521	0.122350	0.109275	0.1227	0.0819	0.1735	0.9355
4	0.198062	0.130595	0.131972	0.039228	0.0408	0.0361	0.0578	0.9933
5	0.068734	-.010108	0.136712	0.004724	0.0047		0.0067	1.0000

	Test of H0: The canonical correlations in the current row and all that follow are zero				
	Likelihood Ratio	Approximate F Value	Num DF	Den DF	Pr > F
1	0.52945754	1.00	30	174	0.4746
2	0.69902836	0.84	20	146.88	0.6654
3	0.85174023	0.62	12	119.35	0.8201
4	0.95623248	0.35	6	92	0.9100
5	0.99527557	0.11	2	47	0.8947

The REG Procedure
Model: MODEL1
Multivariate Test: partial1

Multivariate Statistics		
S=5 M=0 N=20.5		
Statistic	**Value**	**P-Value**
Wilks' Lambda	0.52945754	0.4746
Pillai's Trace	0.57510249	0.4459
Hotelling-Lawley Trace	0.70699368	0.4982
Roy's Greatest Root	0.32027275	0.6633

The REG Procedure
Model: MODEL1
Dependent Variable: Flavour

Number of Observations Read	60
Number of Observations Used	60

Analysis of Variance

Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	6	76.31774	12.71962	105.30	<.0001
Error	53	6.40237	0.12080		
Corrected Total	59	82.72012			

Root MSE	0.34756	**R-Square**	0.9226
Dependent Mean	5.32642	**Adj R-Sq**	0.9138
Coeff Var	6.52525		

Parameter Estimates

Variable	DF	Parameter Estimate	Standard Error	t Value	Pr > |t|
Intercept	1	8.30218	1.30780	6.35	<.0001
Tenderometer	1	-0.00857	0.00468	-1.83	0.0724
DryMatter	1	-0.16408	0.04826	-3.40	0.0013
SucrosePercent	1	0.41870	0.09418	4.45	<.0001
Colour1	1	-0.03586	0.08525	-0.42	0.6757
Colour3	1	0.12661	0.06532	1.94	0.0579
Skin	1	-0.36918	0.11550	-3.20	0.0023

The REG Procedure
Model: MODEL1
Dependent Variable: Sweet

Number of Observations Read	60
Number of Observations Used	60

Analysis of Variance

Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	6	79.32023	13.22004	150.65	<.0001
Error	53	4.65097	0.08775		
Corrected Total	59	83.97120			

Root MSE	0.29623	**R-Square**	0.9446
Dependent Mean	5.41942	**Adj R-Sq**	0.9383
Coeff Var	5.46615		

Parameter Estimates

Variable	DF	Parameter Estimate	Standard Error	t Value	Pr > |t|
Intercept	1	4.92061	1.11466	4.41	<.0001
Tenderometer	1	-0.00746	0.00399	-1.87	0.0668
DryMatter	1	-0.06578	0.04113	-1.60	0.1157
SucrosePercent	1	0.68580	0.08027	8.54	<.0001
Colour1	1	-0.01691	0.07266	-0.23	0.8169
Colour3	1	0.02692	0.05567	0.48	0.6307
Skin	1	-0.08014	0.09844	-0.81	0.4192

The REG Procedure
Model: MODEL1
Dependent Variable: Fruity

Number of Observations Read	60
Number of Observations Used	60

Analysis of Variance

Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	6	58.86030	9.81005	97.39	<.0001
Error	53	5.33890	0.10073		
Corrected Total	59	64.19921			

Root MSE	0.31739	**R-Square**	0.9168
Dependent Mean	3.54692	**Adj R-Sq**	0.9074
Coeff Var	8.94823		

Parameter Estimates

Variable	DF	Parameter Estimate	Standard Error	t Value	Pr > |t|
Intercept	1	4.82169	1.19426	4.04	0.0002
Tenderometer	1	-0.00423	0.00427	-0.99	0.3269
DryMatter	1	-0.14534	0.04407	-3.30	0.0017
SucrosePercent	1	0.45357	0.08600	5.27	<.0001
Colour1	1	0.05861	0.07785	0.75	0.4549
Colour3	1	0.08936	0.05965	1.50	0.1400
Skin	1	-0.24843	0.10547	-2.36	0.0222

The REG Procedure
Model: MODEL1
Dependent Variable: OffFlavour

Number of Observations Read	60
Number of Observations Used	60

Analysis of Variance

Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	6	54.51185	9.08531	51.32	<.0001
Error	53	9.38327	0.17704		
Corrected Total	59	63.89512			

Root MSE	0.42076	**R-Square**	0.8531
Dependent Mean	2.88750	**Adj R-Sq**	0.8365
Coeff Var	14.57193		

Parameter Estimates

Variable	DF	Parameter Estimate	Standard Error	t Value	Pr > |t|
Intercept	1	2.08269	1.58325	1.32	0.1940
Tenderometer	1	-0.00166	0.00566	-0.29	0.7710
DryMatter	1	0.19417	0.05842	3.32	0.0016
SucrosePercent	1	-0.41759	0.11401	-3.66	0.0006
Colour1	1	-0.10081	0.10321	-0.98	0.3331
Colour3	1	-0.25582	0.07908	-3.24	0.0021
Skin	1	0.38731	0.13982	2.77	0.0077

The REG Procedure
Model: MODEL1
Dependent Variable: Mealiness

Number of Observations Read	60
Number of Observations Used	60

Analysis of Variance

Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	6	95.16872	15.86145	63.87	<.0001
Error	53	13.16287	0.24836		
Corrected Total	59	108.33159			

Root MSE	0.49835	**R-Square**	0.8785
Dependent Mean	4.39317	**Adj R-Sq**	0.8647
Coeff Var	11.34383		

Parameter Estimates

Variable	DF	Parameter Estimate	Standard Error	t Value	Pr > |t|
Intercept	1	0.33538	1.87520	0.18	0.8587
Tenderometer	1	-0.00246	0.00671	-0.37	0.7151
DryMatter	1	0.30867	0.06920	4.46	<.0001
SucrosePercent	1	-0.47396	0.13504	-3.51	0.0009
Colour1	1	-0.03377	0.12224	-0.28	0.7834
Colour3	1	-0.03600	0.09366	-0.38	0.7022
Skin	1	0.31901	0.16561	1.93	0.0594

The REG Procedure
Model: MODEL1
Dependent Variable: Hardness

Number of Observations Read	60
Number of Observations Used	60

Analysis of Variance

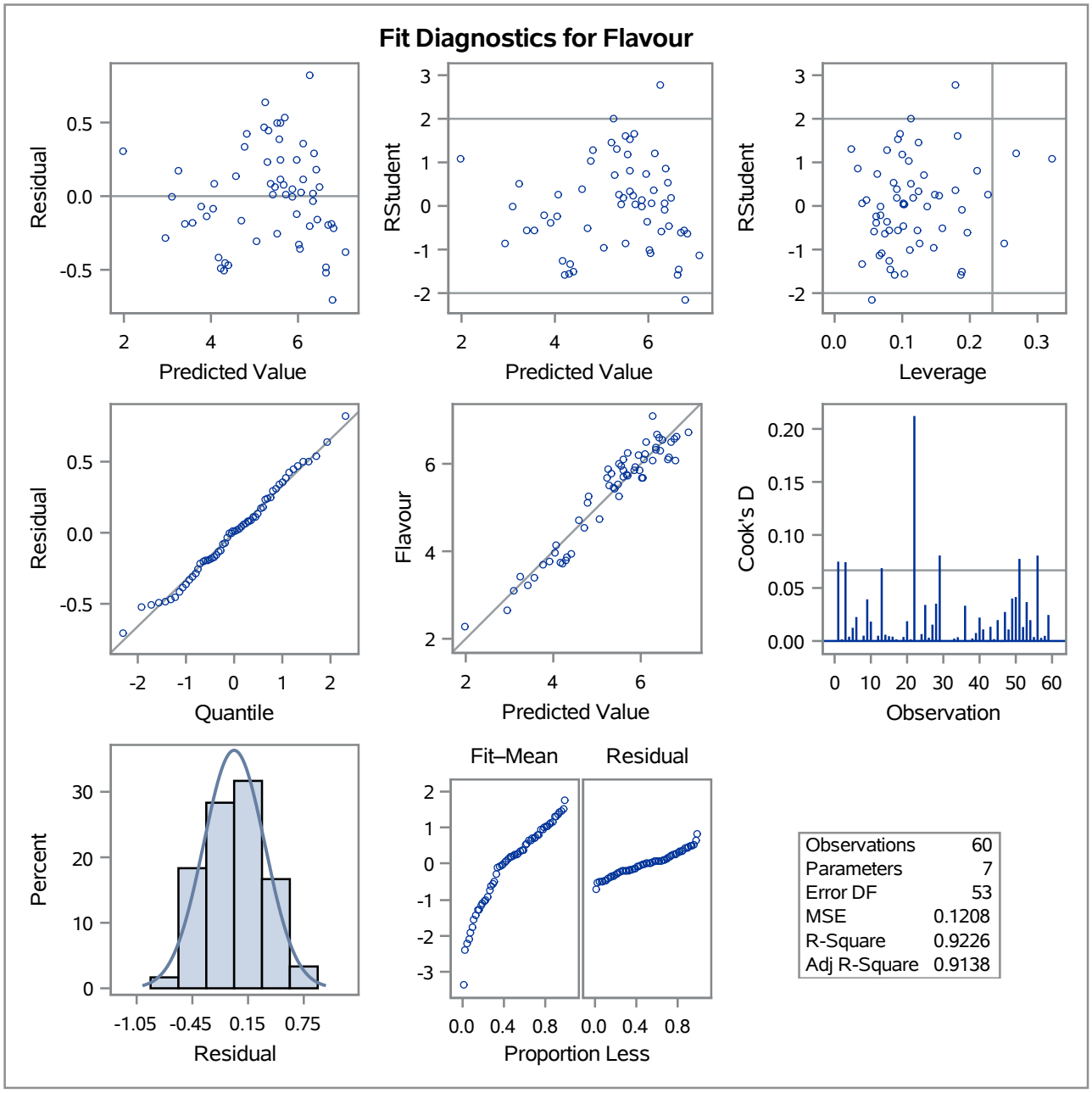
Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	6	116.80275	19.46713	158.14	<.0001
Error	53	6.52419	0.12310		
Corrected Total	59	123.32694			

Root MSE	0.35085	**R-Square**	0.9471
Dependent Mean	4.75625	**Adj R-Sq**	0.9411
Coeff Var	7.37668		

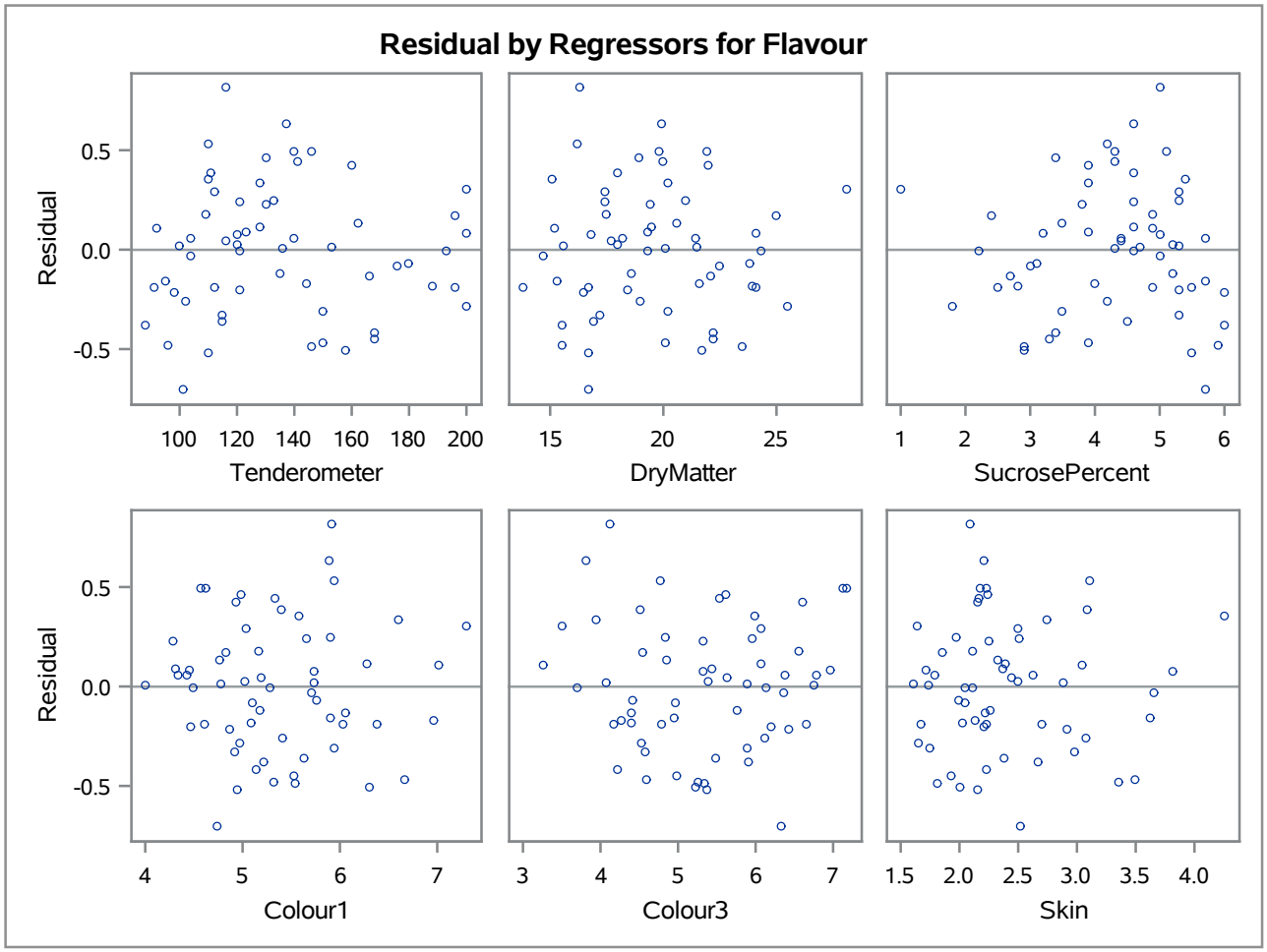
Parameter Estimates

Variable	DF	Parameter Estimate	Standard Error	t Value	Pr > |t|
Intercept	1	4.28571	1.32018	3.25	0.0020
Tenderometer	1	0.01673	0.00472	3.54	0.0008
DryMatter	1	0.10137	0.04872	2.08	0.0423
SucrosePercent	1	-0.54743	0.09507	-5.76	<.0001
Colour1	1	-0.21646	0.08606	-2.52	0.0150
Colour3	1	-0.06748	0.06594	-1.02	0.3107
Skin	1	0.03868	0.11659	0.33	0.7414

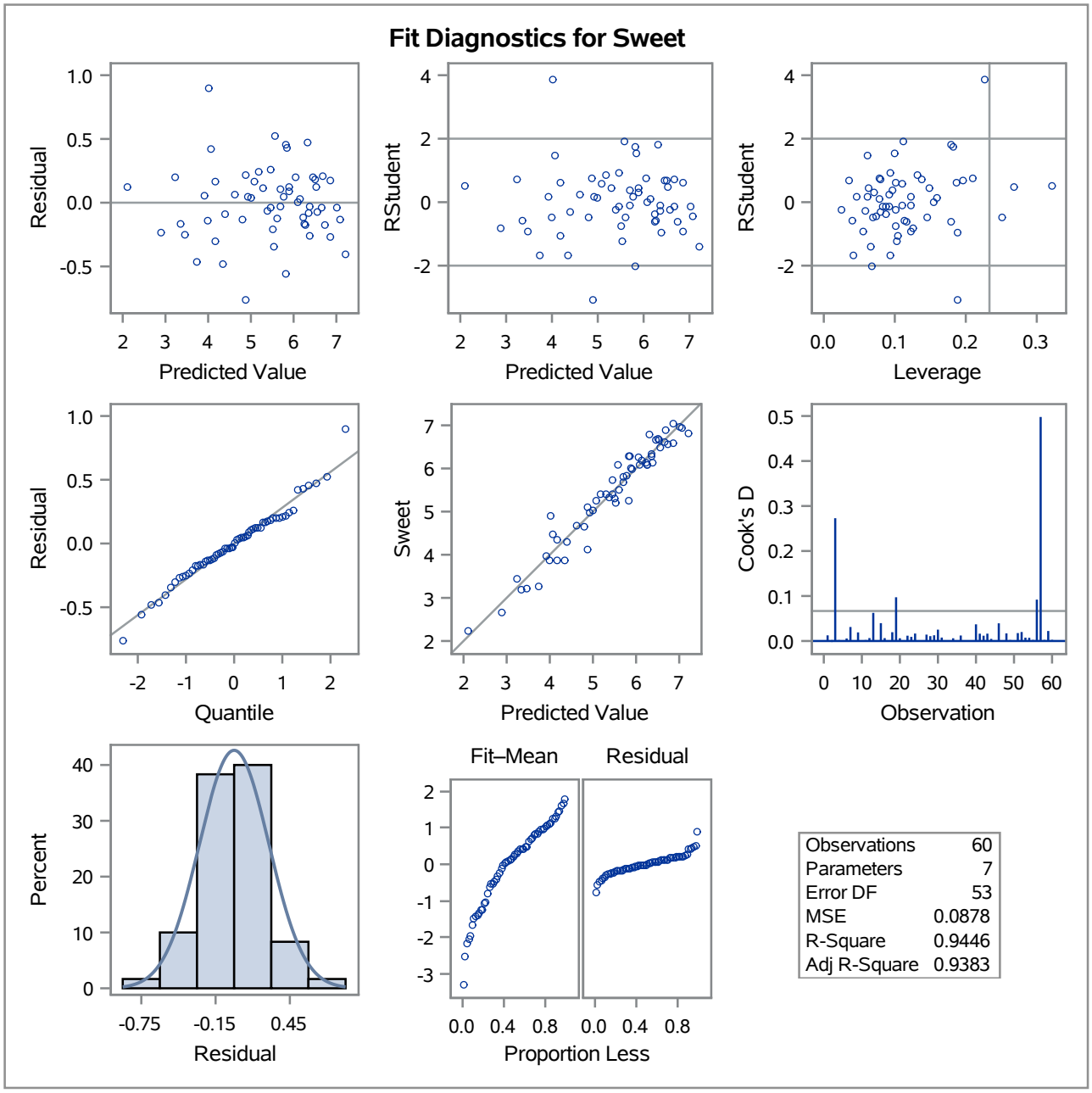
The REG Procedure
Model: MODEL1
Dependent Variable: Flavour



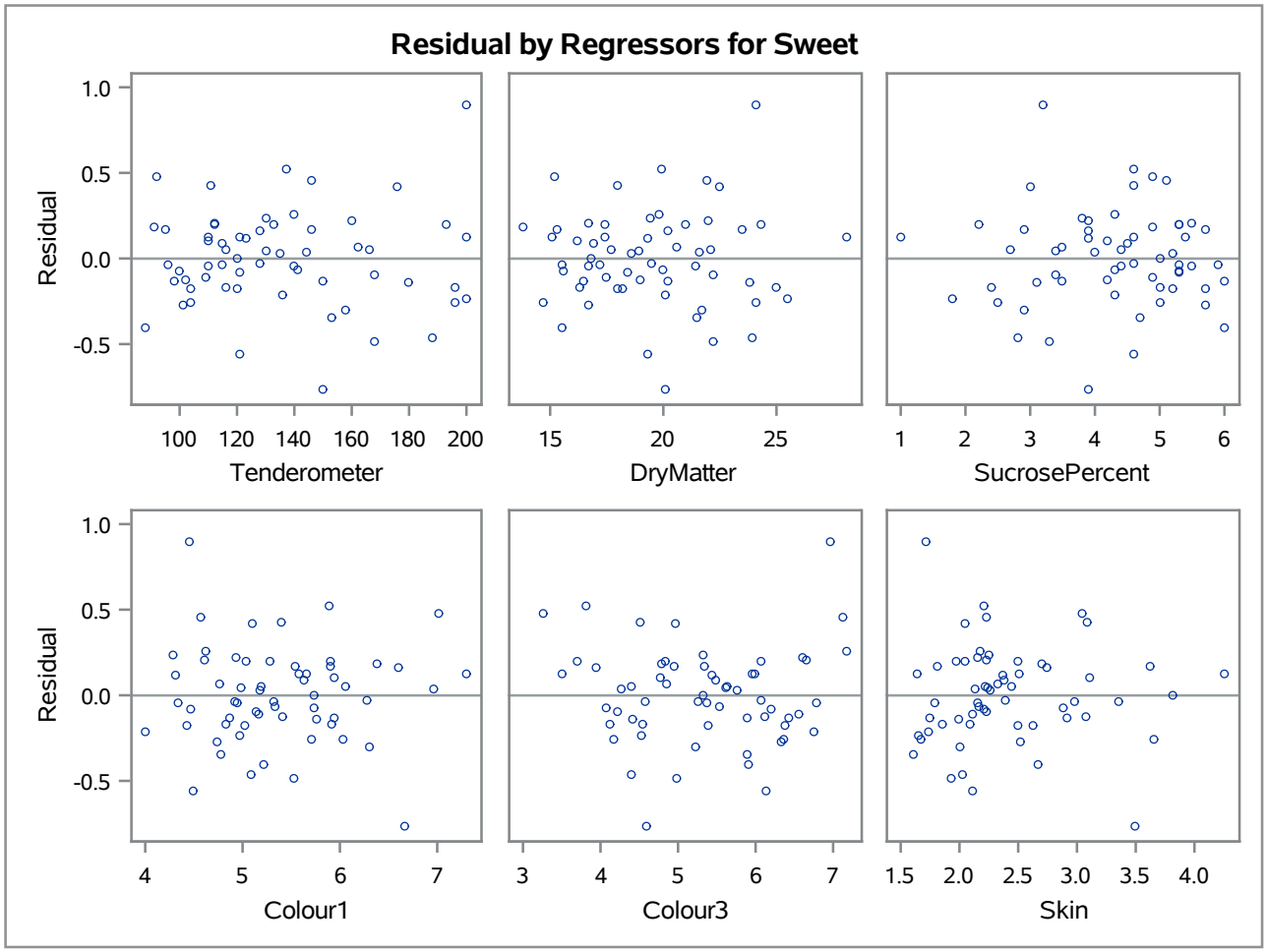
The REG Procedure
Model: MODEL1
Dependent Variable: Flavour



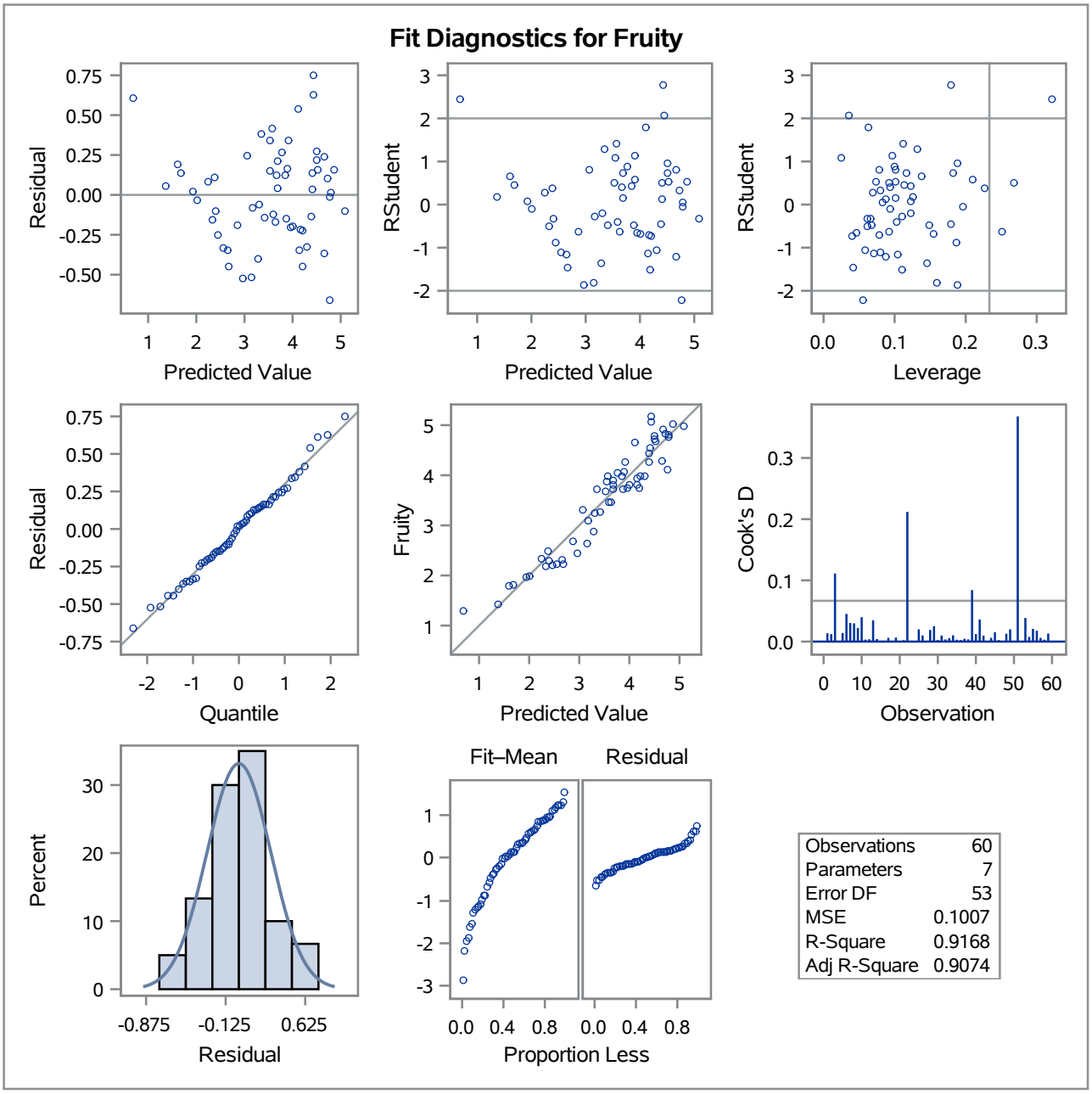
The REG Procedure
Model: MODEL1
Dependent Variable: Sweet



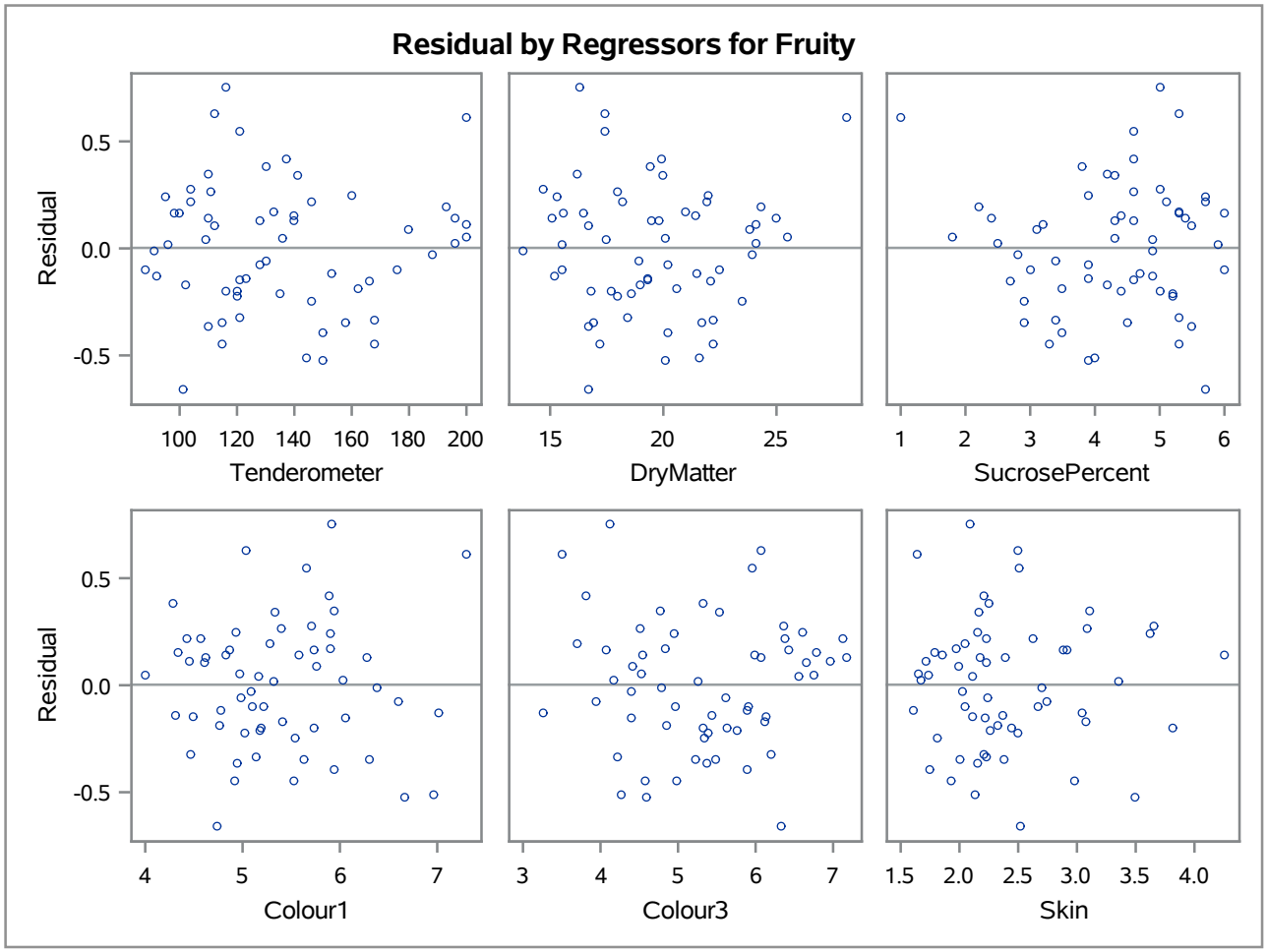
The REG Procedure
Model: MODEL1
Dependent Variable: Sweet



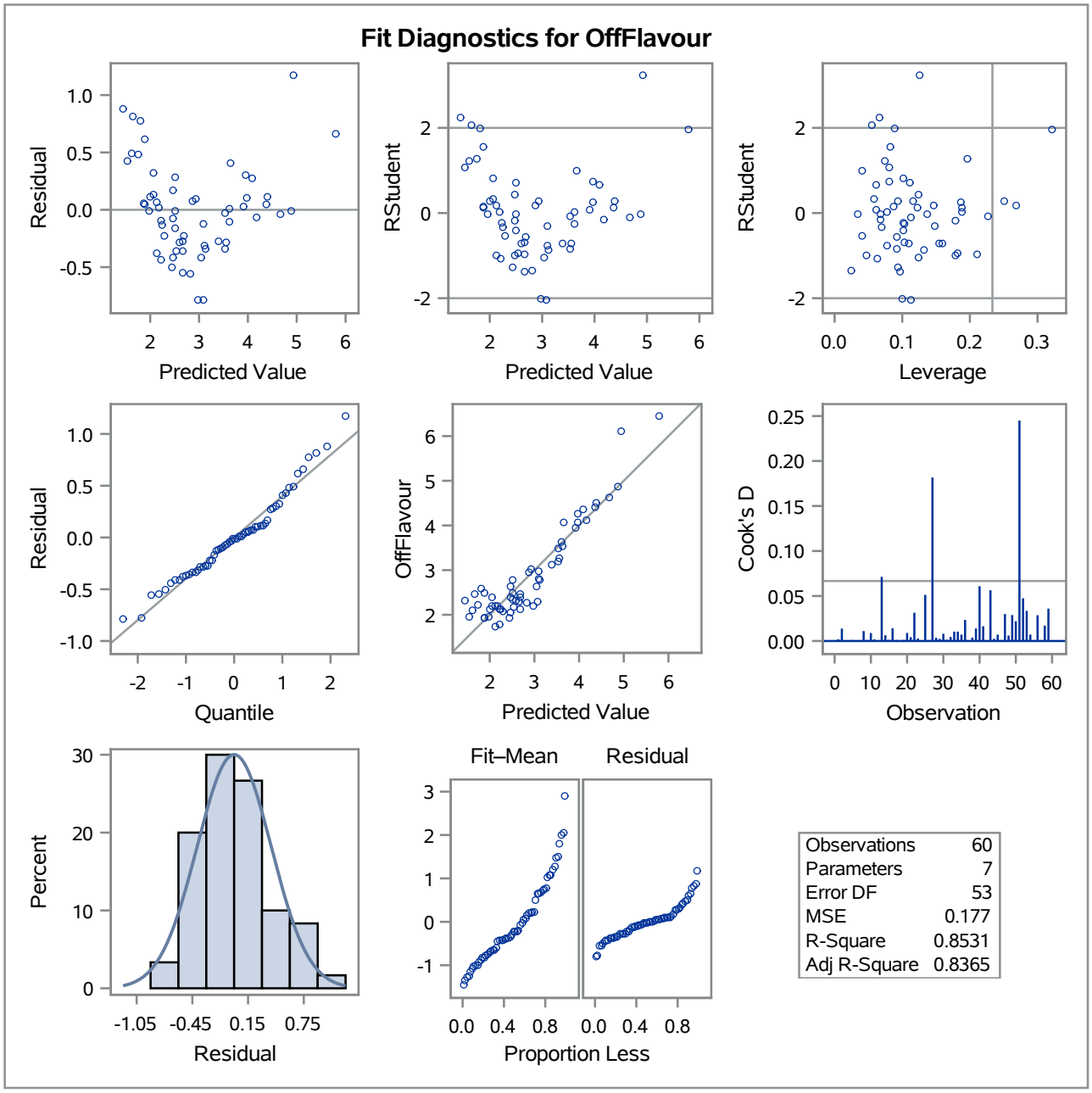
The REG Procedure
Model: MODEL1
Dependent Variable: Fruity



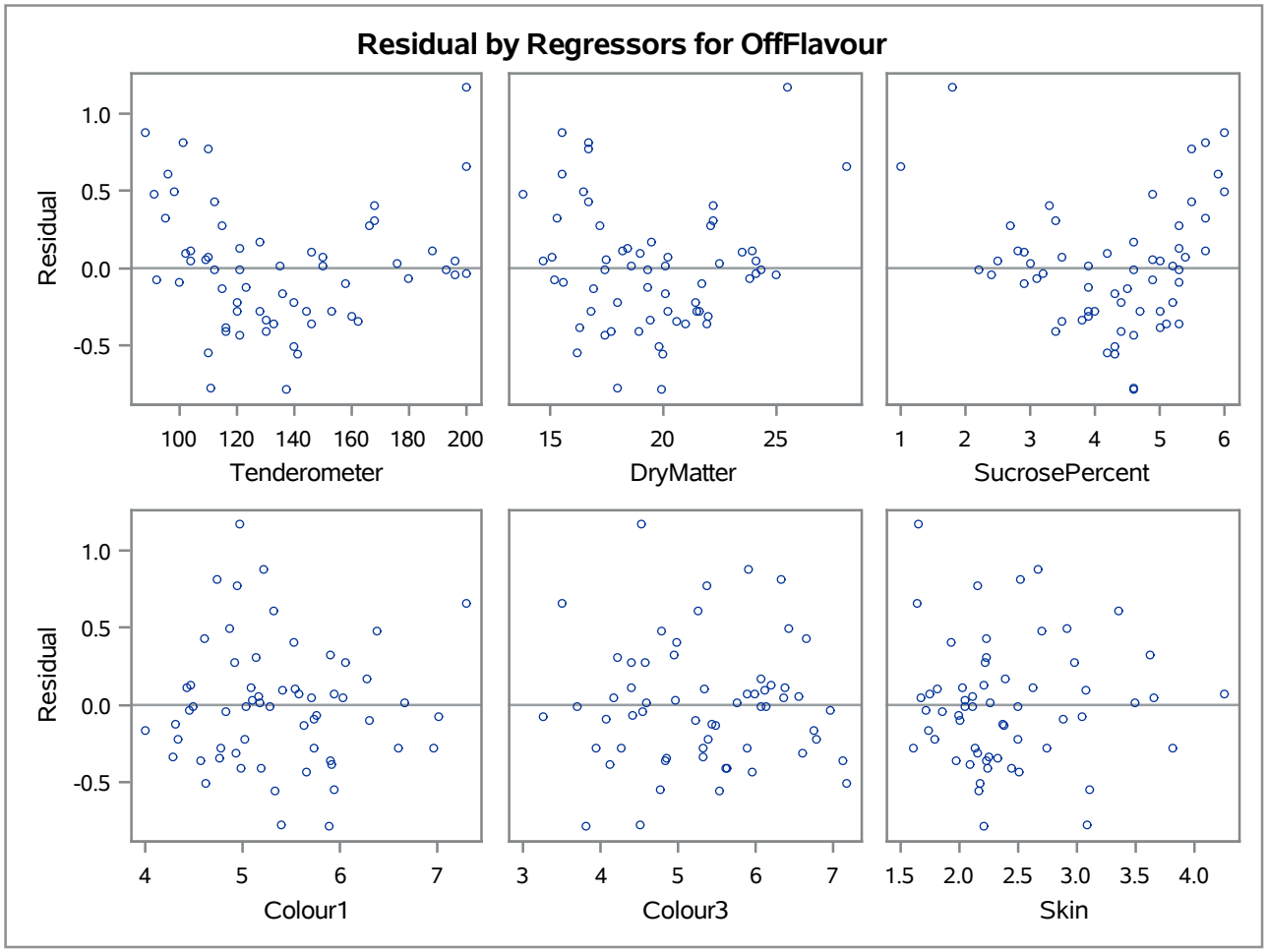
The REG Procedure
Model: MODEL1
Dependent Variable: Fruity



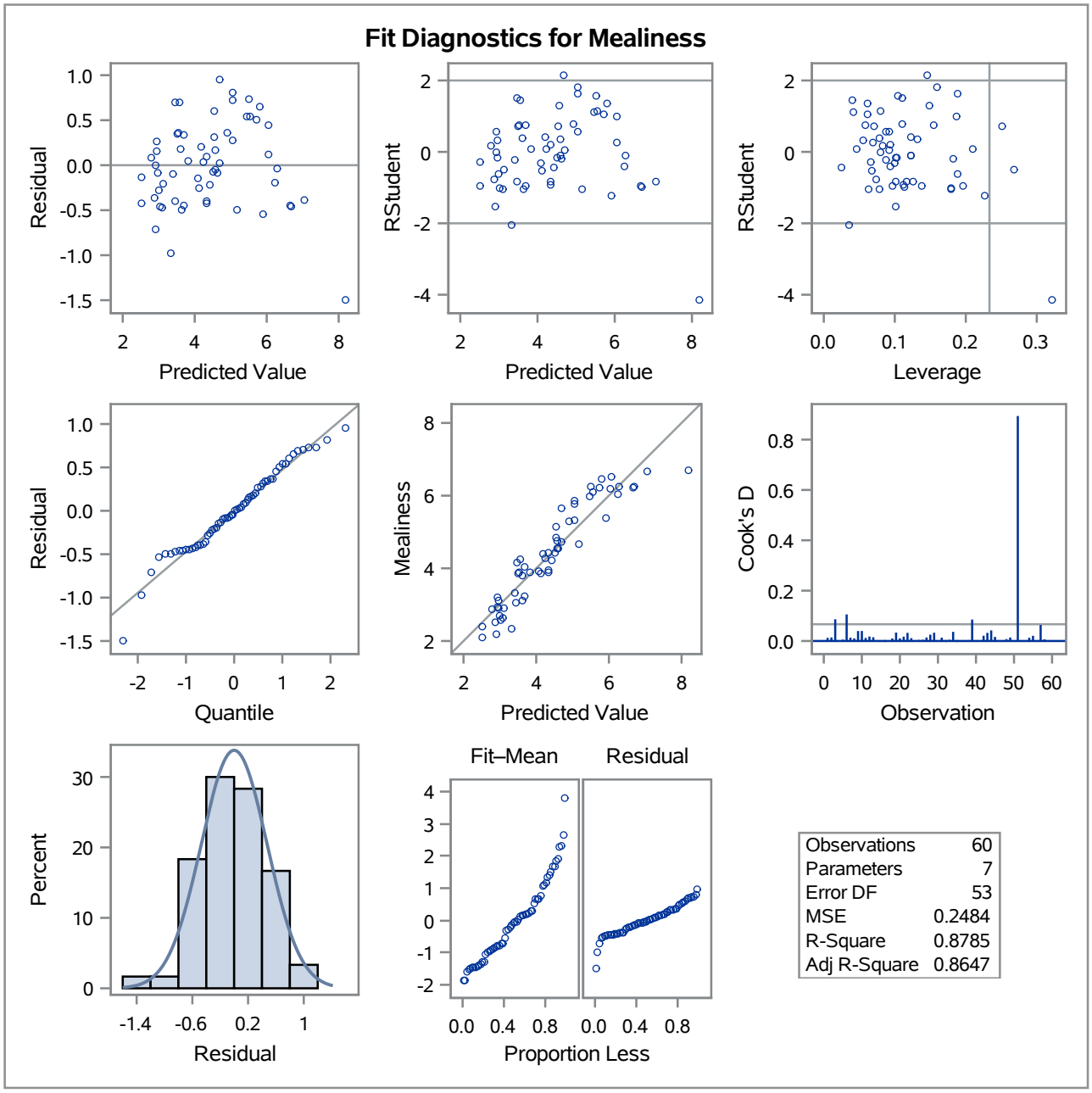
The REG Procedure
Model: MODEL1
Dependent Variable: OffFlavour



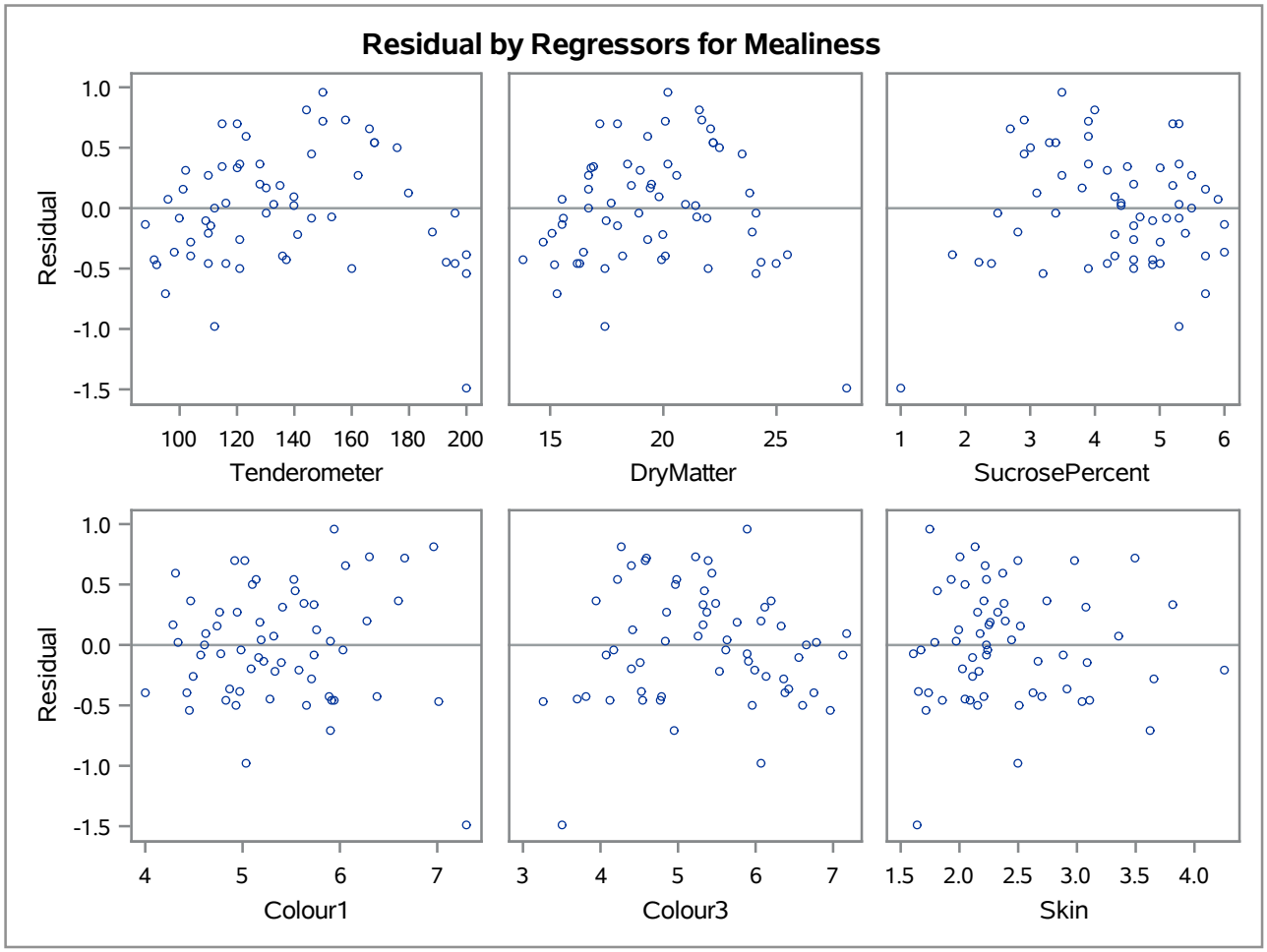
The REG Procedure
Model: MODEL1
Dependent Variable: OffFlavour



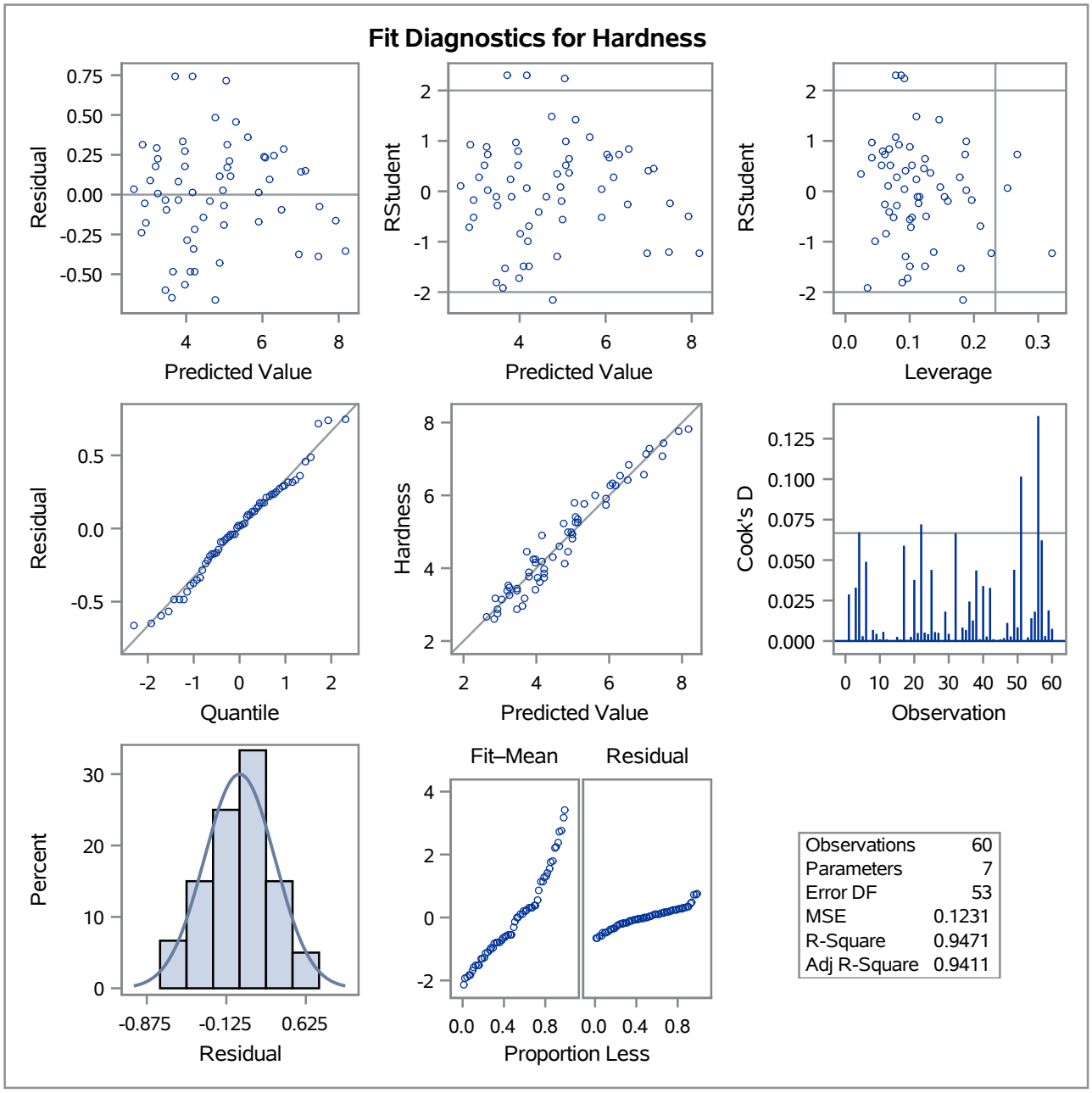
The REG Procedure
Model: MODEL1
Dependent Variable: Mealiness



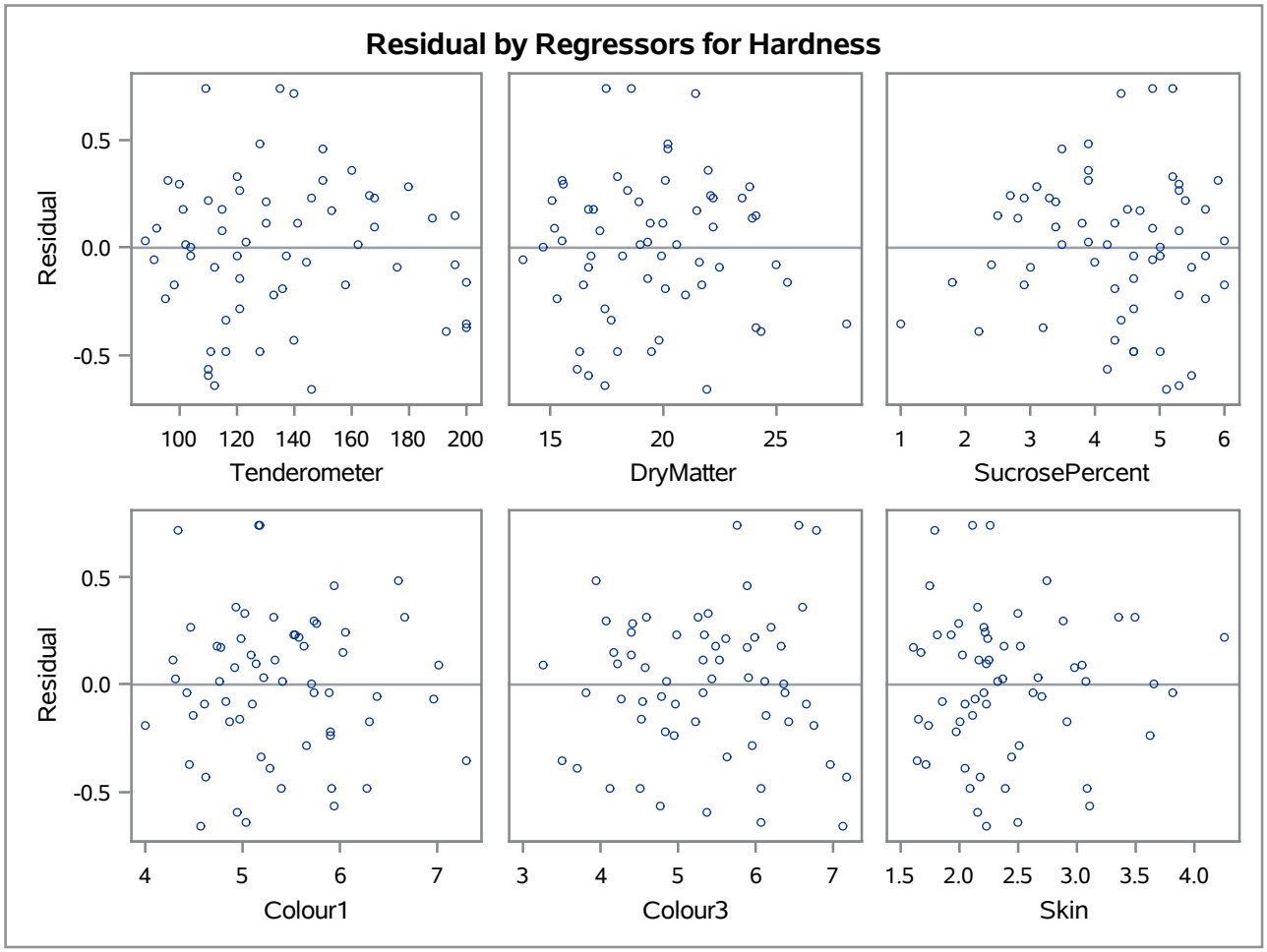
The REG Procedure
Model: MODEL1
Dependent Variable: Mealiness



The REG Procedure
Model: MODEL1
Dependent Variable: Hardness



The REG Procedure
Model: MODEL1
Dependent Variable: Hardness



The REG Procedure
Model: MODEL1
Multivariate Test: OVERALL

Error Matrix (E)					
6.4023729859	2.4917866714	4.3196691166	-5.403876312	-4.408687581	-1.835841029
2.4917866714	4.6509728733	1.7993913873	-2.230602901	-1.959761015	-1.686454707
4.3196691166	1.7993913873	5.3389041768	-2.091311378	-6.50974263	-2.400203624
-5.403876312	-2.230602901	-2.091311378	9.3832699426	-0.288528437	0.5681597914
-4.408687581	-1.959761015	-6.50974263	-0.288528437	13.162870828	3.7891110532
-1.835841029	-1.686454707	-2.400203624	0.5681597914	3.7891110532	6.5241899325

Hypothesis Matrix (H)					
76.317744485	76.788367003	66.739249724	-63.83181175	-83.91038584	-91.51070268
76.788367003	79.320230537	67.89195067	-63.7993805	-85.19642239	-94.49993028
66.739249724	67.89195067	58.860301662	-55.76789968	-74.28844565	-81.58426987
-63.83181175	-63.7993805	-55.76789968	54.511848107	69.859922074	75.281128931
-83.91038584	-85.19642239	-74.28844565	69.859922074	95.168721714	103.33665149
-91.51070268	-94.49993028	-81.58426987	75.281128931	103.33665149	116.80275222

	Canonical Correlation	Adjusted Canonical Correlation	Approximate Standard Error	Squared Canonical Correlation	Eigenvalues of Inv(E)*H = CanRsq/(1-CanRsq)			
					Eigenvalue	Difference	Proportion	Cumulative
1	0.982826	0.980138	0.004433	0.965947	28.3660	27.6662	0.9439	0.9439
2	0.641632	0.530963	0.076591	0.411692	0.6998	0.2243	0.0233	0.9672
3	0.567661	0.495339	0.088237	0.322239	0.4754	0.1446	0.0158	0.9830
4	0.498595	.	0.097824	0.248597	0.3308	0.1583	0.0110	0.9940
5	0.383631	.	0.111029	0.147173	0.1726	0.1662	0.0057	0.9998
6	0.079439	.	0.129367	0.006311	0.0064		0.0002	1.0000

	Test of H0: The canonical correlations in the current row and all that follow are zero				
	Likelihood Ratio	Approximate F Value	Num DF	Den DF	Pr > F
1	0.00864612	11.57	36	213.54	<.0001
2	0.25390172	3.28	25	183.53	<.0001
3	0.43157961	3.04	16	153.39	0.0002
4	0.63677253	2.81	9	124.27	0.0048
5	0.84744527	2.24	4	104	0.0694
6	0.99368939	0.34	1	53	0.5643

The REG Procedure
Model: MODEL1
Multivariate Test: OVERALL

Multivariate Statistics		
S=6 M=-0.5 N=23		
Statistic	**Value**	**P-Value**
Wilks' Lambda	0.00864612	<.0001
Pillai's Trace	2.10195894	<.0001
Hotelling-Lawley Trace	30.05098359	<.0001
Roy's Greatest Root	28.36598143	<.0001

The CANCORR Procedure

VAR Variables	6
WITH Variables	6
Observations	60

Means and Standard Deviations		
Variable	**Mean**	**Standard Deviation**
Tenderometer	135.183333	31.655182
DryMatter	19.510000	3.136645
SucrosePercent	4.273333	1.128351
Colour1	5.368750	0.734245
Colour3	5.337667	0.979105
Skin	2.405417	0.586317
Flavour	5.326417	1.184076
Sweet	5.419417	1.192997
Fruity	3.546917	1.043131
OffFlavour	2.887500	1.040658
Mealiness	4.393167	1.355038
Hardness	4.756250	1.445783

The CANCORR Procedure

Correlations Among the Original Variables

Correlations Among the VAR Variables						
	Tenderometer	DryMatter	SucrosePercent	Colour1	Colour3	Skin
Tenderometer	1.0000	0.9414	-0.8726	0.0165	-0.2684	-0.6392
DryMatter	0.9414	1.0000	-0.8546	0.0046	-0.2246	-0.7044
SucrosePercent	-0.8726	-0.8546	1.0000	-0.2072	0.4187	0.5395
Colour1	0.0165	0.0046	-0.2072	1.0000	-0.6346	0.2263
Colour3	-0.2684	-0.2246	0.4187	-0.6346	1.0000	-0.0165
Skin	-0.6392	-0.7044	0.5395	0.2263	-0.0165	1.0000

Correlations Among the WITH Variables						
	Flavour	Sweet	Fruity	OffFlavour	Mealiness	Hardness
Flavour	1.0000	0.9512	0.9751	-0.9523	-0.9330	-0.9242
Sweet	0.9512	1.0000	0.9492	-0.9015	-0.9138	-0.9452
Fruity	0.9751	0.9492	1.0000	-0.9034	-0.9689	-0.9439
OffFlavour	-0.9523	-0.9015	-0.9034	1.0000	0.8362	0.8545
Mealiness	-0.9330	-0.9138	-0.9689	0.8362	1.0000	0.9268
Hardness	-0.9242	-0.9452	-0.9439	0.8545	0.9268	1.0000

Correlations Between the VAR Variables and the WITH Variables						
	Flavour	Sweet	Fruity	OffFlavour	Mealiness	Hardness
Tenderometer	-0.8982	-0.9077	-0.9004	0.8196	0.8779	0.9465
DryMatter	-0.8863	-0.8909	-0.8974	0.8248	0.9062	0.9285
SucrosePercent	0.9203	0.9593	0.9273	-0.8772	-0.8877	-0.9227
Colour1	-0.2185	-0.1718	-0.1494	0.2267	0.1136	0.0182
Colour3	0.4480	0.3929	0.3980	-0.5066	-0.3269	-0.3028
Skin	0.4784	0.5562	0.5229	-0.4182	-0.5451	-0.6280

The CANCORR Procedure

Canonical Correlation Analysis

	Canonical Correlation	Adjusted Canonical Correlation	Approximate Standard Error	Squared Canonical Correlation	Eigenvalues of Inv(E)*H = CanRsq/(1-CanRsq)			
					Eigenvalue	Difference	Proportion	Cumulative
1	0.982826	0.980138	0.004433	0.965947	28.3660	27.6662	0.9439	0.9439
2	0.641632	0.530963	0.076591	0.411692	0.6998	0.2243	0.0233	0.9672
3	0.567661	0.495339	0.088237	0.322239	0.4754	0.1446	0.0158	0.9830
4	0.498595	.	0.097824	0.248597	0.3308	0.1583	0.0110	0.9940
5	0.383631	.	0.111029	0.147173	0.1726	0.1662	0.0057	0.9998
6	0.079439	.	0.129367	0.006311	0.0064		0.0002	1.0000

	Test of H0: The canonical correlations in the current row and all that follow are zero				
	Likelihood Ratio	Approximate F Value	Num DF	Den DF	Pr > F
1	0.00864612	11.57	36	213.54	<.0001
2	0.25390172	3.28	25	183.53	<.0001
3	0.43157961	3.04	16	153.39	0.0002
4	0.63677253	2.81	9	124.27	0.0048
5	0.84744527	2.24	4	104	0.0694
6	0.99368939	0.34	1	53	0.5643

Multivariate Statistics and F Approximations					
S=6 M=-0.5 N=23					
Statistic	**Value**	**F Value**	**Num DF**	**Den DF**	**Pr > F**
Wilks' Lambda	0.00864612	11.57	36	213.54	<.0001
Pillai's Trace	2.10195894	4.76	36	318	<.0001
Hotelling-Lawley Trace	30.05098359	39.01	36	127.56	<.0001
Roy's Greatest Root	28.36598143	250.57	6	53	<.0001
NOTE: F Statistic for Roy's Greatest Root is an upper bound.					

The CANCORR Procedure

Canonical Correlation Analysis

Raw Canonical Coefficients for the VAR Variables						
	V1	V2	V3	V4	V5	V6
Tenderometer	-0.00775675	-0.059961723	-0.057405106	0.0521204089	-0.031947911	0.0008854078
DryMatter	-0.090556907	0.6675302165	0.739070034	0.2344768868	0.2810766674	-0.058639158
SucrosePercent	0.4723025917	-0.070595902	0.4126136155	1.8144314019	-0.256950493	0.7586493344
Colour1	0.0751378609	0.2854004295	-1.073030333	0.6069758457	1.2860550629	0.5375540226
Colour3	0.0610979426	-0.429421227	-0.365310292	0.109207517	1.1734751344	-0.611008682
Skin	-0.10250715	1.1996049728	0.1217709795	0.8267759351	-0.523855214	-2.023118331

Raw Canonical Coefficients for the WITH Variables						
	W1	W2	W3	W4	W5	W6
Flavour	0.0190969141	0.251430574	3.186061915	-4.877126741	-0.711730914	-0.740656169
Sweet	0.3101435125	-0.009933072	1.4819698898	2.1583634602	-1.75979627	-0.963400009
Fruity	0.0493916319	0.4014505336	0.5908178507	3.2542147621	3.0031675131	4.9817557924
OffFlavour	-0.089605786	1.6197770208	2.2155830898	-1.532594485	-1.301485184	1.173469691
Mealiness	-0.031124827	1.2569304757	1.9252595359	0.4932705446	2.1368688084	0.769146075
Hardness	-0.308578549	-1.728592683	0.9981301476	0.7593513467	-0.937928226	0.6830889341

The CANCORR Procedure

Canonical Correlation Analysis

Standardized Canonical Coefficients for the VAR Variables						
	V1	V2	V3	V4	V5	V6
Tenderometer	-0.2455	-1.8981	-1.8172	1.6499	-1.0113	0.0280
DryMatter	-0.2840	2.0938	2.3182	0.7355	0.8816	-0.1839
SucrosePercent	0.5329	-0.0797	0.4656	2.0473	-0.2899	0.8560
Colour1	0.0552	0.2096	-0.7879	0.4457	0.9443	0.3947
Colour3	0.0598	-0.4204	-0.3577	0.1069	1.1490	-0.5982
Skin	-0.0601	0.7033	0.0714	0.4848	-0.3071	-1.1862

Standardized Canonical Coefficients for the WITH Variables						
	W1	W2	W3	W4	W5	W6
Flavour	0.0226	0.2977	3.7725	-5.7749	-0.8427	-0.8770
Sweet	0.3700	-0.0119	1.7680	2.5749	-2.0994	-1.1493
Fruity	0.0515	0.4188	0.6163	3.3946	3.1327	5.1966
OffFlavour	-0.0932	1.6856	2.3057	-1.5949	-1.3544	1.2212
Mealiness	-0.0422	1.7032	2.6088	0.6684	2.8955	1.0422
Hardness	-0.4461	-2.4992	1.4431	1.0979	-1.3560	0.9876

The CANCORR Procedure

Canonical Structure

Correlations Between the VAR Variables and Their Canonical Variables						
	V1	V2	V3	V4	V5	V6
Tenderometer	-0.9547	-0.1908	-0.0038	0.2245	-0.0249	0.0332
DryMatter	-0.9414	-0.0249	0.2361	0.1757	0.1401	0.0826
SucrosePercent	0.9711	-0.0526	0.1222	0.1931	-0.0411	0.0165
Colour1	-0.1122	0.6304	-0.6604	0.0940	0.1931	0.3282
Colour3	0.3786	-0.5591	0.3032	0.0652	0.5068	-0.4370
Skin	0.5959	0.4531	-0.3212	0.1158	-0.2434	-0.5135

Correlations Between the WITH Variables and Their Canonical Variables						
	W1	W2	W3	W4	W5	W6
Flavour	0.9653	-0.1898	0.0919	-0.1348	0.0565	0.0488
Sweet	0.9847	-0.0449	0.1152	0.0929	-0.0709	-0.0377
Fruity	0.9710	-0.1163	0.0005	-0.0354	0.0163	0.2054
OffFlavour	-0.9113	0.3233	-0.0230	0.0140	-0.2267	0.1133
Mealiness	-0.9428	0.1239	0.1419	0.0982	0.1758	-0.1876
Hardness	-0.9842	-0.1396	0.0917	0.0539	-0.0233	-0.0110

Correlations Between the VAR Variables and the Canonical Variables of the WITH Variables						
	W1	W2	W3	W4	W5	W6
Tenderometer	-0.9383	-0.1224	-0.0021	0.1120	-0.0095	0.0026
DryMatter	-0.9253	-0.0160	0.1340	0.0876	0.0537	0.0066
SucrosePercent	0.9544	-0.0338	0.0694	0.0963	-0.0158	0.0013
Colour1	-0.1102	0.4045	-0.3749	0.0469	0.0741	0.0261
Colour3	0.3721	-0.3587	0.1721	0.0325	0.1944	-0.0347
Skin	0.5857	0.2907	-0.1823	0.0577	-0.0934	-0.0408

Correlations Between the WITH Variables and the Canonical Variables of the VAR Variables						
	V1	V2	V3	V4	V5	V6
Flavour	0.9487	-0.1218	0.0522	-0.0672	0.0217	0.0039
Sweet	0.9678	-0.0288	0.0654	0.0463	-0.0272	-0.0030
Fruity	0.9543	-0.0746	0.0003	-0.0177	0.0063	0.0163
OffFlavour	-0.8957	0.2074	-0.0131	0.0070	-0.0870	0.0090
Mealiness	-0.9266	0.0795	0.0805	0.0490	0.0674	-0.0149
Hardness	-0.9672	-0.0895	0.0520	0.0269	-0.0089	-0.0009

The CANCORR Procedure

Canonical Redundancy Analysis

Raw Variance of the VAR Variables Explained by					
	Their Own Canonical Variables			The Opposite Canonical Variables	
Canonical Variable Number	Proportion	Cumulative Proportion	Canonical R-Square	Proportion	Cumulative Proportion
1	0.9098	0.9098	0.9659	0.8789	0.8789
2	0.0365	0.9464	0.4117	0.0150	0.8939
3	0.0009	0.9473	0.3222	0.0003	0.8942
4	0.0501	0.9974	0.2486	0.0125	0.9067
5	0.0011	0.9985	0.1472	0.0002	0.9068
6	0.0015	1.0000	0.0063	0.0000	0.9068

Raw Variance of the WITH Variables Explained by					
	Their Own Canonical Variables			The Opposite Canonical Variables	
Canonical Variable Number	Proportion	Cumulative Proportion	Canonical R-Square	Proportion	Cumulative Proportion
1	0.9266	0.9266	0.9659	0.8951	0.8951
2	0.0280	0.9547	0.4117	0.0115	0.9066
3	0.0096	0.9643	0.3222	0.0031	0.9097
4	0.0071	0.9714	0.2486	0.0018	0.9115
5	0.0141	0.9854	0.1472	0.0021	0.9136
6	0.0146	1.0000	0.0063	0.0001	0.9136

The CANCORR Procedure

Canonical Redundancy Analysis

Standardized Variance of the VAR Variables Explained by					
	Their Own Canonical Variables			The Opposite Canonical Variables	
Canonical Variable Number	Proportion	Cumulative Proportion	Canonical R-Square	Proportion	Cumulative Proportion
1	0.5420	0.5420	0.9659	0.5235	0.5235
2	0.1592	0.7012	0.4117	0.0655	0.5891
3	0.1170	0.8182	0.3222	0.0377	0.6268
4	0.0242	0.8423	0.2486	0.0060	0.6328
5	0.0626	0.9049	0.1472	0.0092	0.6420
6	0.0951	1.0000	0.0063	0.0006	0.6426

Standardized Variance of the WITH Variables Explained by					
	Their Own Canonical Variables			The Opposite Canonical Variables	
Canonical Variable Number	Proportion	Cumulative Proportion	Canonical R-Square	Proportion	Cumulative Proportion
1	0.9220	0.9220	0.9659	0.8906	0.8906
2	0.0318	0.9538	0.4117	0.0131	0.9037
3	0.0085	0.9623	0.3222	0.0027	0.9064
4	0.0068	0.9691	0.2486	0.0017	0.9081
5	0.0152	0.9843	0.1472	0.0022	0.9104
6	0.0157	1.0000	0.0063	0.0001	0.9105

The CANCORR Procedure

Canonical Redundancy Analysis

Squared Multiple Correlations Between the VAR Variables and the First M Canonical Variables of the WITH Variables						
M	**1**	**2**	**3**	**4**	**5**	**6**
Tenderometer	0.8804	0.8954	0.8954	0.9079	0.9080	0.9080
DryMatter	0.8561	0.8564	0.8744	0.8820	0.8849	0.8850
SucrosePercent	0.9109	0.9121	0.9169	0.9262	0.9264	0.9264
Colour1	0.0122	0.1758	0.3163	0.3185	0.3240	0.3247
Colour3	0.1385	0.2672	0.2968	0.2979	0.3357	0.3369
Skin	0.3431	0.4276	0.4608	0.4642	0.4729	0.4745

Squared Multiple Correlations Between the WITH Variables and the First M Canonical Variables of the VAR Variables						
M	**1**	**2**	**3**	**4**	**5**	**6**
Flavour	0.9000	0.9149	0.9176	0.9221	0.9226	0.9226
Sweet	0.9366	0.9374	0.9417	0.9439	0.9446	0.9446
Fruity	0.9107	0.9162	0.9162	0.9165	0.9166	0.9168
OffFlavour	0.8023	0.8453	0.8455	0.8455	0.8531	0.8531
Mealiness	0.8585	0.8648	0.8713	0.8737	0.8783	0.8785
Hardness	0.9356	0.9436	0.9463	0.9470	0.9471	0.9471

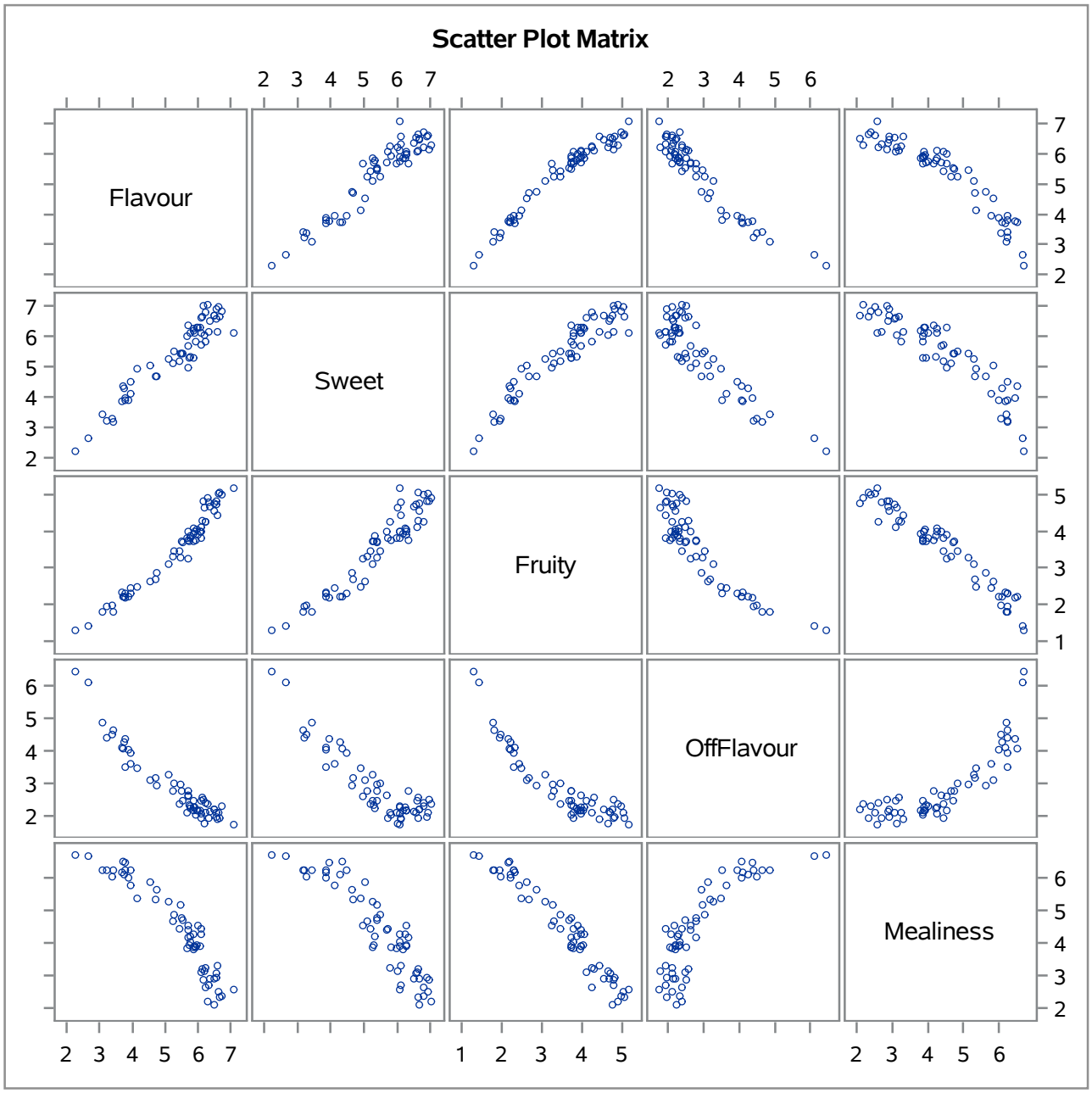
The CORR Procedure

6 Variables:	Flavour Sweet Fruity OffFlavour Mealiness Hardness

Simple Statistics						
Variable	**N**	**Mean**	**Std Dev**	**Sum**	**Minimum**	**Maximum**
Flavour	60	5.32642	1.18408	319.58500	2.28000	7.08500
Sweet	60	5.41942	1.19300	325.16500	2.23000	7.03000
Fruity	60	3.54692	1.04313	212.81500	1.29000	5.17500
OffFlavour	60	2.88750	1.04066	173.25000	1.74500	6.45000
Mealiness	60	4.39317	1.35504	263.59000	2.09500	6.70000
Hardness	60	4.75625	1.44578	285.37500	2.59500	7.82500

Pearson Correlation Coefficients, N = 60 Prob > |r| under H0: Rho=0						
	Flavour	**Sweet**	**Fruity**	**OffFlavour**	**Mealiness**	**Hardness**
Flavour	1.00000	0.95125 <.0001	0.97510 <.0001	-0.95234 <.0001	-0.93298 <.0001	-0.92420 <.0001
Sweet	0.95125 <.0001	1.00000	0.94918 <.0001	-0.90145 <.0001	-0.91381 <.0001	-0.94519 <.0001
Fruity	0.97510 <.0001	0.94918 <.0001	1.00000	-0.90339 <.0001	-0.96886 <.0001	-0.94385 <.0001
OffFlavour	-0.95234 <.0001	-0.90145 <.0001	-0.90339 <.0001	1.00000	0.83622 <.0001	0.85445 <.0001
Mealiness	-0.93298 <.0001	-0.91381 <.0001	-0.96886 <.0001	0.83622 <.0001	1.00000	0.92680 <.0001
Hardness	-0.92420 <.0001	-0.94519 <.0001	-0.94385 <.0001	0.85445 <.0001	0.92680 <.0001	1.00000

The CORR Procedure



The CLUSTER Procedure
Single Linkage Cluster Analysis

Eigenvalues of the Covariance Matrix				
	Eigenvalue	Difference	Proportion	Cumulative
1	1027.38726	1024.94903	0.9936	0.9936
2	2.43823	0.60012	0.0024	0.9959
3	1.83811	1.25479	0.0018	0.9977
4	0.58332	0.03775	0.0006	0.9983
5	0.54557	0.19956	0.0005	0.9988
6	0.34601	0.11357	0.0003	0.9991
7	0.23243	0.02746	0.0002	0.9993
8	0.20498	0.06009	0.0002	0.9995
9	0.14488	0.05810	0.0001	0.9997
10	0.08679	0.01404	0.0001	0.9998
11	0.07275	0.02678	0.0001	0.9998
12	0.04597	0.00445	0.0000	0.9999
13	0.04152	0.00878	0.0000	0.9999
14	0.03274	0.01152	0.0000	1.0000
15	0.02122	0.00816	0.0000	1.0000
16	0.01306	0.00292	0.0000	1.0000
17	0.01013		0.0000	1.0000

Root-Mean-Square Total-Sample Standard Deviation	7.799114

Cluster History					
Number of Clusters	Clusters Joined		Freq	Min Dist	Tie
59	45	48	2	1.7127	
58	34	47	2	1.7151	
57	41	50	2	1.7603	
56	5	35	2	1.8808	
55	CL56	10	3	2.1708	
54	2	11	2	2.1821	
53	26	46	2	2.3096	
52	16	55	2	2.316	
51	32	36	2	2.428	
50	12	24	2	2.4652	
49	CL54	CL53	4	2.4773	
48	1	49	2	2.6245	

The CLUSTER Procedure
Single Linkage Cluster Analysis

Cluster History					
Number of Clusters	Clusters Joined		Freq	Min Dist	Tie
47	21	CL59	3	2.7128	
46	25	40	2	2.7303	
45	19	43	2	2.7534	
44	3	6	2	2.8279	
43	CL52	CL46	4	2.8296	
42	CL48	CL43	6	2.8389	
41	CL49	8	5	2.8896	
40	CL58	58	3	3.0063	
39	14	CL51	3	3.034	
38	CL42	4	7	3.1613	
37	CL41	44	6	3.2348	
36	20	38	2	3.2685	
35	37	53	2	3.2987	
34	17	23	2	3.3244	
33	CL40	CL35	5	3.4108	
32	33	54	2	3.4288	
31	CL50	42	3	3.482	
30	13	CL34	3	3.4992	
29	31	CL33	6	3.6386	
28	CL36	CL57	4	3.6447	
27	CL55	22	4	3.7763	
26	CL30	59	4	3.9943	
25	CL45	CL29	8	4.1381	
24	CL37	CL27	10	4.2411	
23	CL26	CL39	7	4.2936	
22	CL38	CL24	17	4.3181	
21	27	51	2	4.341	
20	CL44	30	3	4.442	
19	7	CL25	9	4.5642	
18	9	CL32	3	4.6076	
17	CL31	CL21	5	4.6562	
16	29	39	2	4.7271	
15	CL19	52	10	4.7505	
14	18	60	2	4.7695	

The CLUSTER Procedure
Single Linkage Cluster Analysis

Cluster History					
Number of Clusters	Clusters Joined		Freq	Min Dist	Tie
13	CL23	CL28	11	4.8555	
12	CL13	CL16	13	4.8703	
11	CL15	28	11	5.0805	
10	CL17	15	6	5.2377	
9	CL18	CL47	6	5.2978	
8	CL12	56	14	5.5625	
7	CL22	CL11	28	5.5944	
6	CL10	57	7	5.717	
5	CL7	CL8	42	6.2866	
4	CL5	CL20	45	6.3048	
3	CL4	CL9	51	7.2367	
2	CL6	CL14	9	8.1661	
1	CL3	CL2	60	8.4148	

The CLUSTER Procedure
Single Linkage Cluster Analysis