

## Salicylic acid and nutrient sprays to improve apple fruit quality

Supplementary files

**Table 7.** Factors and variables, apple fruit finish, cv 'Golden Delicious' at harvest

Eigenvalues	Factors / simple average [mM]						Eigenvectors	
	K <b>50.00<sup>S</sup></b>	Ca <b>70.00</b>	Co <b>0.150</b>	Mo <b>0.300</b>	SA <b>1.000</b>	Mg <b>15.00</b>	Total	Prop. + / -
	Weight <sup>U</sup> $\mu$ 118.85 (77.38 – 174.23 g) R <sup>2</sup> 0.2379 C.V. 14.66							
29.12 <sup>T</sup>		+++				++	5	5 / 0
-19.18		--		++	++	++	8	6 / 2
-31.48	--- <sup>V</sup>	++		++			7	4 / 3
Frec. <sup>W</sup>	3	7	0	4	2	4	20 <sup>Y</sup>	15 / 5
[mM] <sup>X</sup>							Selection $\geq$ 4	
	Diameter $\mu$ 64.8 (58.8 – 71.8 mm) R <sup>2</sup> 0.2742 C.V. 4.60							
11.91		+++				++	5	5 / 0
-8.51		--			++	++	6	4 / 2
-10.45	--			+++	++		7	5 / 2
Frec.	2	5 C; Mg	0	3 L	4	4 C	18	14 / 4
[mM]		70.00				15.00	Selection $\geq$ 4	
	Colour $\mu$ 55.69 (51.81 – 72.36%) R <sup>2</sup> 0.3330 C.V. 4.69							
10.69	+++	++					5	5 / 0
4.46		+++		--	++		7	5 / 2
-739	--		--	+++			7	3 / 4
Frec.	5 C; Mo	5	2	5 C	2	0	19	13 / 6
[mM]	50.00			0.300			Selection $\geq$ 4	
	Firmness $\mu$ 15.35 (12.86 – 18.44 lb in <sup>2</sup> ) R <sup>2</sup> 0.1402 C.V. 8.53							
10.19			+++				3	3 / 0
2.40				++	---		5	2 / 3
-5.49		+++					3	3 / 0
-6.55	++		++	---			7	4 / 3
Frec.	2	3	5	5	3	0	18	12 / 6
[mM]							Selection $\geq$ 4	
	Juice density $\mu$ 1.79 (1.33 – 3.10 g ml <sup>-1</sup> ) R <sup>2</sup> 0.4577 C.V. 11.21							
19.04	+++				++		5	5 / 0
-9.48			+++	+++			6	6 / 0
Frec.	3	0	3	3	2	0	11	11 / 0
[mM]							Selection $\geq$ 2	
	Juice percentage $\mu$ 85.39 (70.00 – 94.12%) R <sup>2</sup> 0.2143 C.V. 7.01							
15.94	--	+++					5	3 / 2
-5.12		++	---				5	2 / 3
-13.01	++			++	+++		7	7 / 0
Frec.	4	5	3	2	3	0	17	12 / 5
[mM]							Selection $\geq$ 3	
	<b>Summary</b>						Total Prop.+/-	
Subtotal	19	25	13	22	16	8	103	
Selection	3 / 6	4 / 6	3 / 6	4 / 6	3 / 6	2 / 6	Variables 5 / 6	

Prop. +/-	10 / 9	21 / 4	8 / 5	17 / 5	13 / 3	8 / 0	77 <sup>z</sup> / 26
[ mM]	50.00	70.00		0.300	1.000		Selec. ≥15 (12)

<sup>S</sup>Simple mean factor levels; <sup>T</sup>Eigenvalues expressed as percentage of the mean of the response variable; <sup>U</sup>Range in parentheses corresponds to the predicted values from the simple mean; <sup>V</sup>Each sign corresponds to multiples of 0.25 rounded to the nearest quarter; <sup>W</sup>Linear regression response type L, quadratic C and factor interaction; <sup>X</sup>Optimal value of the predicted factors and probability: significant \* (0.05 ≤ Pr ≤ 0.01), highly significant \*\* (Pr < 0.01), otherwise not significant; <sup>Y</sup>Total observed frequency for that variable, <sup>Z</sup>Total frequency for the set of variables, those factors with a subtotal equal to or greater than 20% are selected, while the variables greater than or equal to 15%

**Table 8.** Selection of factors and variables for fruit finish of 'Golden Delicious' apples at harvest

Eigenvalues	Factors / simple average [mM]						Eigenvectors	
	K 50.00 <sup>S</sup>	Ca 70.00	Co 0.150	Mo 0.300	SA 1.000	Mg 15.00	Total	Prop. + / -
	Weight <sup>U</sup> μ 118.85 (77.38 – 174.23 g) R <sup>2</sup> 0.2379 C.V. 14.66							
Frec. <sup>W</sup>	3	7	0	4	2	4	20 <sup>Y</sup>	12 / 5
[mM] <sup>X</sup>							Selection ≥ 4	
	Diameter μ 64.8 (58.8 – 71.8 mm) R <sup>2</sup> 0.2742 C.V. 4.60							
Frec.	2	5 C; Mg	0	3 L	4	4 C	18	14 / 4
[mM]		70.00				15.00	Selection ≥ 4	
	Colour μ 55.69 (51.81 – 72.36%) R <sup>2</sup> 0.3330 C.V. 4.69							
Frec.	5 C; Mo	5	2	5 C	2	0	19	13 / 6
[mM]	50.00			0.300			Selection ≥ 4	
	Firmness μ 15.35 (12.86 – 18.44 lb in <sup>2</sup> ) R <sup>2</sup> 0.1402 C.V. 8.53							
Frec.	2	3	5	5	3	0	18	12 / 6
[mM]							Selection ≥ 4	
	Juice density μ 1.79 (1.33 – 3.10 g ml <sup>-1</sup> ) R <sup>2</sup> 0.4577 C.V. 11.21							
Frec.	3	0	3	3	2	0	11	11 / 0
[mM]							Selection ≥ 2	
	Juice percentage μ 85.39 (70.00 – 94.12%) R <sup>2</sup> 0.2143 C.V. 7.01							
Frec.	4	5	3	2	3	0	17	12 / 5
[mM]							Selection ≥ 3	
	<b>Summary</b>						Total Prop.+/-	
Subtotal	19	25	13	22	16	8	103	
Selection	3 / 6	4 / 6	3 / 6	4 / 6	3 / 6	2 / 6	Variables 5 / 6	
Prop. +/-	10 / 9	21 / 4	8 / 5	17 / 5	13 / 3	8 / 0	77 <sup>z</sup> / 26	
[mM]	50.00	70.00		0.300	1.000		Selec. ≥15 (12)	

<sup>S</sup>Simple mean factor levels; <sup>U</sup>Range in brackets corresponds to the predicted values from the simple mean; <sup>W</sup>Linear regression response type L, quadratic C and factor interaction; <sup>X</sup>Optimal value of the predicted factors and probability: significant \* (0.05 ≤ Pr ≤ 0.01), highly significant \*\* (Pr < 0.01), otherwise not significant; <sup>Y</sup>Total observed frequency for that variable, <sup>Z</sup>Total frequency for the set of variables, those factors with a subtotal equal to or greater than 20% are selected, while the variables greater than or equal to 15%

**Table 9.** Factors and variables, apple fruit finish, cv 'Red Chief' at harvest

Eigenvalues	Factors / simple average [mM]						Eigenvectors	
	K 50.00 <sup>S</sup>	Ca 70.00	Co 0.150	Mo 0.300	SA 1.000	Mg 15.00	Total	Prop. + / -
	Weight <sup>U</sup> $\mu$ 130.28 (90.46 – 171.38 g) R <sup>2</sup> 0.2429 C.V. 13.29							
24.60 <sup>T</sup>	++ <sup>V</sup>	++	---				7	4 / 3
17.79	++				+++		5	5 / 0
-14.17		+++	++				5	5 / 0
Frec. <sup>W</sup>	4	5	5	0	3	0	17 <sup>V</sup>	14 / 3
[mM] <sup>X</sup>							Selection $\geq$ 3	
	Diameter $\mu$ 69.0 (61.0 – 76.0 mm) R <sup>2</sup> 0.1826 C.V. 4.81							
9.06	--		++		++		6	4 / 2
5.34		++			+++		5	5 / 0
-5.35		+++	++				5	5 / 0
Frec.	2	5	4	0	5	0	16	14 / 2
[mM]							Selection $\geq$ 3	
	Colour $\mu$ 65.75 (45.00 – 91.94%) R <sup>2</sup> 0.4174 C.V. 12.41							
35.17	++	++			+++		7	7 / 0
19.38		++	---	++			7	4 / 3
-24.14		++	+++	++			7	7 / 0
Frec.	2	6 C; SA	6 C; Mo	4 C	3 C	0	21	18 / 3
[mM]		92.11	0.148	0.299	1.500		Selection $\geq$ 4	
	Firmness $\mu$ 15.98 (14.40 – 17.73 lb in <sup>2</sup> ) R <sup>2</sup> 0.4035 C.V. 4.42							
5.44	++++						4	4 / 0
-2.36		++++					4	4 / 0
-3.82			+++	++			5	5 / 0
Frec.	4	4	3	2	0	0	13	13 / 0
[mM]							Selection $\geq$ 3	
	Juice density $\mu$ 2.48 (1.36 – 4.28 g ml <sup>-1</sup> ) R <sup>2</sup> 0.4965 C.V. 21.76							
100.18		+++				++	5	5 / 0
-115.01	+++				++		5	5 / 0
-121.02	--				+++		5	3 / 2
Frec.	5 L, C; Ca	3 L, C; SA, Mg	0 C; SA	0	5 L, C	2 L, C	15	13 / 2
[mM]	50.00**	70.00**	0.150**		1.000**	15.00**	Selection $\geq$ 3	
	Juice percentage $\mu$ 76.35 (65.00 – 95.00%) R <sup>2</sup> 0.4975 C.V. 7.92							
36.83		++	++	++			6	6 / 0
-29.29	---			++	++		7	4 / 3
-50.50	++				+++		5	5 / 0
Frec.	5 L, C; Co	2 C; Co, SA, Mg	2 C; Mo, SA	4 C	5 L C	0 L, C	18	15 / 3
[mM]	50.00**	70.00*	0.150**	0.300**	1.000**	15.00	Selection $\geq$ 4	
	<b>Summary</b>						Total Prop.+/-	
Subtotal	22	25	20	10	21	2	100	
Selection	4 / 6	5 / 6	4 / 6	2 / 6	4 / 6	0 / 6	Variables 6 / 6	
Prop. +/-	15 / 7	25 / 0	14 / 6	10 / 0	21 / 0	2 / 0	87 <sup>Z</sup> / 13	
[mM]	50.00	92.11	0.148		1.000		Selec. $\geq$ 17 (13)	

<sup>S</sup>Simple mean factor levels; <sup>T</sup>Eigenvalues expressed as percentage of the mean of the response variable; <sup>U</sup>Range in parentheses corresponds to the predicted values from the simple mean; <sup>V</sup>Each sign corresponds to multiples of 0.25 rounded to the nearest quarter; <sup>W</sup>Linear regression response type L, quadratic C and factor interaction; <sup>X</sup>Optimal value of the predicted factors and probability: significant \* (0.05  $\leq$  Pr  $\leq$  0.01), highly significant \*\* (Pr

<0.01), otherwise not significant; <sup>Y</sup>Total observed frequency for that variable, <sup>Z</sup>Total frequency for the set of variables, those factors with a subtotal equal to or greater than 20% are selected, while the variables greater than or equal to 15%

**Table 10.** Selection of factors and variables for fruit finish of 'Red Chief' apples at harvest

Eigenvalues	Factors / simple average [mM]						Eigenvectors	
	K <b>50.00</b> <sup>s</sup>	Ca <b>70.00</b>	Co <b>0.150</b>	Mo <b>0.300</b>	SA <b>1.000</b>	Mg <b>15.00</b>	Total	Prop. + / -
	Weight <sup>U</sup> $\mu$ 130.28 (90.46 – 171.38 g) R <sup>2</sup> 0.2429 C.V. 13.29							
Frec. <sup>w</sup>	4	5	5	0	3	0	17 <sup>y</sup>	14 / 3
[mM] <sup>x</sup>							Selection $\geq$ 3	
	Diameter $\mu$ 69.0 (61.0 – 76.0 mm) R <sup>2</sup> 0.1826 C.V. 4.81							
Frec.	2	5	4	0	5	0	16	14 / 2
[mM]							Selection $\geq$ 3	
	Colour $\mu$ 65.75 (45.00 – 91.94%) R <sup>2</sup> 0.4174 C.V. 12.41							
Frec.	2	6 C; SA	6 C; Mo	4 C	3 C	0	21	18 / 3
[mM]		92.11	0.148	0.299	1.500		Selection $\geq$ 4	
	Firmness $\mu$ 15.98 (14.40 – 17.73 lb in <sup>2</sup> ) R <sup>2</sup> 0.4035 C.V. 4.42							
Frec.	4	4	3	2	0	0	13	13 / 0
[mM]							Selection $\geq$ 3	
	Juice density $\mu$ 2.48 (1.36 – 4.28 g ml <sup>-1</sup> ) R <sup>2</sup> 0.4965 C.V. 21.76							
Frec.	5L,C; Ca	3 L,C; SA, Mg	0 C; SA	0	5 L,C	2 L,C	15	13 / 2
[mM]	50.00	70.00	0.150		1.000	15.00	Selection $\geq$ 3	
	Juice percentage $\mu$ 76.35 (65.00 – 95.00%) R <sup>2</sup> 0.4975 C.V. 7.92							
Frec.	5 L,C; Co	2 C; Co, SA, Mg	2 C; Mo, SA	4 C	5 L,C	0 L,C	18	15 / 3
[mM]	50.00	70.00	0.150	0.300	1.000	15.00	Selection $\geq$ 4	
	<b>Summary</b>						Total Prop.+/-	
Subtotal	22	25	20	10	21	2	100	
Selection	4 / 6	5 / 6	4 / 6	2 / 6	4 / 6	0 / 6	Variables 6 / 6	
Prop. +/-	15 / 7	25 / 0	14 / 6	10 / 0	21 / 0	2 / 0	87 <sup>z</sup> / 13	
[mM]	50.00	92.11	0.148		1.000		Selec. $\geq$ 17 (13)	

<sup>s</sup>Simple mean factor levels; <sup>U</sup>Range in brackets corresponds to the predicted values from the simple mean;

<sup>w</sup>Linear regression response type L, quadratic C and factor interaction; <sup>x</sup>Optimal value of the predicted factors and probability: significant \* (0.05  $\leq$  Pr  $\leq$  0.01), highly significant \*\* (Pr < 0.01), otherwise not significant; <sup>y</sup>Total observed frequency for that variable, <sup>z</sup>Total frequency for the set of variables, those factors with a subtotal equal to or greater than 20% are selected, while the variables greater than or equal to 15%

**Table 11.** Factors and variables, apple fruit quality, cv 'Golden Delicious' at harvest

Eigenvalues	Factors / simple average [mM]						Eigenvectors	
	K 50.00 <sup>S</sup>	Ca 70.00	Co 0.150	Mo 0.300	SA 1.000	Mg 15.00	Total	Prop. +/-
	Total soluble solids <sup>U</sup> $\mu$ 12.3 (10.4 – 15.2 °Brix) R <sup>2</sup> 0.4056 C.V. 7.12							
26.69 <sup>T</sup>	++ <sup>V</sup>	+++					5	5 / 0
11.38	++			++	--		6	4 / 2
-9.29	++		++	--			6	4 / 2
-15.26				+++	+++		6	6 / 0
Frec. <sup>W</sup>	6 C; Ca, Mo	3 C	2 L	7 C	5	0	23 <sup>Y</sup>	19 / 4
[mM] <sup>X</sup>	50.00			0.300	1.000		Selection $\geq$ 5	
	Titratable acidity $\mu$ 0.3704 (0.2747 – 0.5226% málic acid) R <sup>2</sup> 0.2758 C.V. 13.28							
30.18		+++					3	3 / 0
13.47				++	--		4	2 / 2
-18.71	++		++	---			7	4 / 3
-22.81			++		+++		5	5 / 0
Frec.	2	3	4	5	5	0	19	14 / 5
[mM]			0.142	0.381	0.724		Selection $\geq$ 4	
	TSS/acidity ratio $\mu$ 33.75 (22.99 – 44.10) R <sup>2</sup> 0.2450 C.V. 12.67							
9.57	+++			--	++		7	5 / 2
5.08		++			+++		5	5 / 0
-5.40	++	++	--		--		8	4 / 4
-8.85			+++	---			6	3 / 3
Frec.	5	4	5	5	7	0	26	17 / 9
[mM]	58.90		0.248	0.516	0.928		Selection $\geq$ 5	
	Antioxidant capacity $\mu$ 2.959 (1.740 – 4.438 mg trolox g <sup>-1</sup> p.f.) R <sup>2</sup> 0.9598 C.V. 5.78							
69.14				+++	++		5	5 / 0
38.71	++		+++				5	5 / 0
-38.22	+++	++					5	5 / 0
-76.30	--	+++			++		7	5 / 2
Frec.	7C; Co, Mo, SA	5LC; Mo, SA, Mg	3LC; Mo	3LC; SA	4C	0LC	22	20 / 2
[Mm]	50.00**	70.00**			1.000**		Selection $\geq$ 4	
	Total phenols $\mu$ 442.032 (329.516 – 676.290 mg gal acid g <sup>-1</sup> p.f.) R <sup>2</sup> 0.8666 C.V. 7.28							
37.08		++	+++	++			7	7 / 0
-16.83		--	+++				5	3 / 2
-48.24	++	++			+++		7	7 / 0
Frec.	2LC; Ca, Co, SA	6C; Ca, SA	6LC; Mo	2LC	3LC	0	19	17 / 2
[mM]		30.20**	0.067**				Selection $\geq$ 4	
	<b>Summary</b>						<b>Total Prop.+/-</b>	
Subtotal	22	21	20	22	24	0	109	
Selection	3 / 5	2 / 5	3 / 5	3 / 5	4 / 5	0 / 5	Variables 5 / 5	
Prop. +/-	20 / 2	19 / 2	18 / 2	12 / 10	18 / 6	0 / 0	87 <sup>Z</sup> / 22	
[mM]	58.90	70.00	0.248	0.516	1.000		Selec. $\geq$ 17 (13)	

<sup>S</sup>Simple mean factor levels; <sup>T</sup>Eigenvalues expressed as percentage of the mean of the response variable; <sup>U</sup>Range in parentheses corresponds to the predicted values from the simple mean; <sup>V</sup>Each sign corresponds to multiples of 0.25 rounded to the nearest quarter; <sup>W</sup>Linear regression response type L, quadratic C and factor interaction; <sup>X</sup>Optimal value of the predicted factors and probability: significant \* (0.05  $\leq$  Pr  $\leq$  0.01), highly significant \*\* (Pr < 0.01), otherwise not significant; <sup>Y</sup>Total observed frequency for that variable, <sup>Z</sup>Total frequency for the set of variables, those factors with a subtotal equal to or greater than 20% are selected, while the variables greater than or equal to 15%

**Table 12.** Selection of factors and variables for fruit quality of 'Golden Delicious' apples at harvest

Eigenvalues	Factors / simple average [mM]						Eigenvectors Total Prop. +/-	
	K <b>50.00</b> <sup>S</sup>	Ca <b>70.00</b>	Co <b>0.150</b>	Mo <b>0.300</b>	SA <b>1.000</b>	Mg <b>15.00</b>		
	Total soluble solids <sup>U</sup> $\mu$ 12.3 (10.4 – 15.2 °Brix) R <sup>2</sup> 0.4056 C.V. 7.12							
Frec. <sup>W</sup>	6 C; Ca, Mo	3 C	2 L	7 C	5	0	23 <sup>Y</sup>	19 / 4
[mM] <sup>X</sup>	50.00			0.300	1.000		Selection $\geq$ 5	
	Titratable acidity $\mu$ 0.3704 (0.2747 – 0.5226% malic acid) R <sup>2</sup> 0.2758 C.V. 13.28							
Frec.	2	3	4	5	5	0	19	14 / 5
[mM]			0.142	0.381	0.724		Selection $\geq$ 4	
	TSS/acidity ratio $\mu$ 33.75 (22.99 – 44.10) R <sup>2</sup> 0.2450 C.V. 12.67							
Frec	5	4	5	5	7	0	26	17 / 9
[mM]	58.90		0.248	0.516	0.928		Selection $\geq$ 5	
	Antioxidant capacity $\mu$ 2.959 (1.740 – 4.438 mg trolox g <sup>-1</sup> p.f.) R <sup>2</sup> 0.9598 C.V. 5.78							
Frec.	7C; Co, Mo, SA	5LC; Mo, SA, Mg	3LC; Mo	3LC; SA	4C	0LC	22	20 / 2
[mM]	50.00**	70.00**			1.000**		Selection $\geq$ 4	
	Total phenols $\mu$ 442.032 (329.516 – 676.290 $\mu$ g gal acid g <sup>-1</sup> p.f.) R <sup>2</sup> 0.8666 C.V. 7.28							
Frec.	2LC; Ca, Co, SA	6C; Ca, SA	6LC; Mo	2LC	3LC	0	19	17 / 2
[mM]		30.20**	0.067**				Selection $\geq$ 4	
	<b>Summary</b>						Total Prop.+/-	
Subtotal	22	21	20	22	24	0	109	
Selection	3 / 5	2 / 5	3 / 5	3 / 5	4 / 5	0 / 5	Variables 5 / 5	
Prop. +/-	20 / 2	19 / 2	18 / 2	12 / 10	18 / 6	0 / 0	87 <sup>Z</sup> / 22	
[mM]	58.90	70.00	0.248	0.516	1.000		Selec. $\geq$ 17 (13)	

<sup>S</sup>Simple mean factor levels; <sup>U</sup>Range in brackets corresponds to the predicted values from the simple mean;

<sup>W</sup>Linear regression response type L, quadratic C and factor interaction; <sup>X</sup>Optimal value of the predicted factors and probability: significant \* (0.05  $\leq$  Pr  $\leq$  0.01), highly significant \*\* (Pr < 0.01), otherwise not significant; <sup>Y</sup>Total observed frequency for that variable, <sup>Z</sup>Total frequency for the set of variables, those factors with a subtotal equal to or greater than 20% are selected, while the variables greater than or equal to 15%

**Table 13.** Factors and variables, apple fruit quality, cv 'Red Chief' at harvest

Eigenvalues	Factors / simple average [mM]						Eigenvectors	
	K 50.00 <sup>S</sup>	Ca 70.00	Co 0.150	Mo 0.300	SA 1.000	Mg 15.00	Total	Prop. + / -
	Total soluble solids <sup>U</sup> $\mu$ 12.4 (10.4 – 14.4 °Brix) R <sup>2</sup> 0.2442 C.V. 6.67							
26.44 <sup>T</sup>	++ <sup>V</sup>				+++		5	5 / 0
12.01	+++			---			6	3 / 3
-23.15		+++					3	3 / 0
Frec. <sup>W</sup>	5	3	0 C; SA	3 C; SA	3 L C	0	14 <sup>Y</sup>	11 / 3
[mM] <sup>X</sup>	50.00	70.00	0.150	0.300	1.000		Selection $\geq$ 3	
	Titratable acidity $\mu$ 0.3309 (0.2613 – 0.4228% malic acid) R <sup>2</sup> 0.3723 C.V. 9.27							
37.02	++		++		+++		7	7 / 0
22.24	+++	++	--				7	5 / 2
-30.31		+++	++			++	7	7 / 0
Frec.	5 L	5 C; Co, Mg	6 C; SA	0	3 L, C	2 L, C	21	19 / 2
[mM]	58.79	57.97	0.196				Selection $\geq$ 4	
	TSS/acidity ratio $\mu$ 37.88 (26.12 – 42.88 °Brix/ málic acid) R <sup>2</sup> 0.3503 C.V. 10.27							
8.27		+++	++				5	5 / 0
-10.29	++	--	++	++			8	6 / 2
-15.56	+++	++					5	5 / 0
Frec.	5	7	4	2	0	0	18	16 / 2
[mM]	47.77	35.53	0.239				Selection $\geq$ 4	
	Antioxidant capacity $\mu$ 2.397 (0.418 – 4.633 mg trolox g <sup>-1</sup> p.f.) R <sup>2</sup> 0.9829 C.V. 8.80							
312.15			++	++	++		6	6 / 0
-318.26		++++					4	4 / 0
Frec.	0 LC; Ca, Co, Mo, SA	4 LC; Co, Mo, SA, Mg	2 LC; Mo, SA	2 LC; SA	2 LC	0 LC	10	10 / 0
[mM]		70.00**	0.150**	0.300**	1.000**		Selection $\geq$ 2	
	Total phenols $\mu$ 642.849 (482.742 – 816.613 $\mu$ g gal acid g <sup>-1</sup> p.f.) R <sup>2</sup> 0.9271 C.V. 3.076							
26.52	++				+++		5	5 / 0
-11.26				+++	--		5	3 / 2
-38.52	---	+++					6	3 / 3
Frec.	5 LC; Ca, Co, Mo, SA	3 C; Co, Mo	0 LC	3 LC; SA	5 LC	0 L	16	11 / 5
[mM]	50.00**	70.00**		0.300**	1.000		Selection $\geq$ 3	
	<b>Summary</b>						Total Prop.+/-	
Subtotal	20	22	12	10	13	2	79	
Selection	4 / 5	5 / 5	3 / 5	3 / 5	3 / 5	0 / 5	Variables 5 / 5	
Prop. +/-	17 / 3	20 / 2	10 / 2	7 / 3	11 / 2	2 / 0	67 <sup>Z</sup> / 12	
[mM]	58.79	70.00			1.000		Selec. $\geq$ 13 (10)	

<sup>S</sup>Simple mean factor levels; <sup>T</sup>Eigenvalues expressed as percentage of the mean of the response variable; <sup>U</sup>Range in parentheses corresponds to the predicted values from the simple mean; <sup>V</sup>Each sign corresponds to multiples of 0.25 rounded to the nearest quarter; <sup>W</sup>Linear regression response type L, quadratic C and factor interaction; <sup>X</sup>Optimal value of the predicted factors and probability: significant \* (0.05  $\leq$  Pr  $\leq$  0.01), highly significant \*\* (Pr < 0.01), otherwise not significant; <sup>Y</sup>Total observed frequency for that variable, <sup>Z</sup>Total frequency for the set of variables,



those factors with a subtotal equal to or greater than 20% are selected, while the variables greater than or equal to 15%

**Table 14.** Selection of factors and variables for fruit quality of 'Red Chief' apples at harvest

Eigenvalues	Factors / simple average [mM]						Eigenvectors	
	K 50.00 <sup>s</sup>	Ca 70.00	Co 0.150	Mo 0.300	SA 1.000	Mg 15.00	Total	Prop. + / -
	Total soluble solids <sup>U</sup> $\mu$ 12.4 (10.4 – 14.4 °Brix) R <sup>2</sup> 0.2442 C.V. 6.67							
Frec. <sup>w</sup>	5	3	0 C; SA	3 C; SA	3 L C	0	14 <sup>y</sup>	11 / 3
[mM] <sup>x</sup>	50.00	70.00	0.150	0.300	1.000		Selection $\geq$ 3	
	Titratable acidity $\mu$ 0.3309 (0.2613 – 0.4228% malic acid) R <sup>2</sup> 0.3723 C.V. 9.27							
Frec.	5 L	5 C; Co, Mg	6 C; SA	0	3 L, C	2 L, C	21	19 / 2
[mM]	58.79	57.97	0.196				Selection $\geq$ 4	
	TSS/acidity ratio $\mu$ 37.88 (26.12 – 42.88) R <sup>2</sup> 0.3503 C.V. 10.27							
Frec.	5	7	4	2	0	0	18	16 / 2
[mM]	47.77	35.53	0.239				Selection $\geq$ 4	
	Antioxidant capacity $\mu$ 2.397 (0.418 – 4.633 mg trolox g <sup>-1</sup> p.f.) R <sup>2</sup> 0.9829 C.V. 8.80							
Frec.	0 LC; Ca, Co, Mo, SA	4LC; Co, Mo, SA, Mg	2LC; Mo, SA	2LC; SA	2LC	0LC	10	10 / 0
[mM]		70.00**	0.150**	0.300**	1.000**		Selection $\geq$ 2	
	Total phenols $\mu$ 642.849 (482.742 – 816.613 $\mu$ g gal acid g <sup>-1</sup> p.f.) R <sup>2</sup> 0.9271 C.V. 3.076							
Frec.	5LC; Ca, Co, Mo, SA	3C; Co, Mo	0LC	3LC; SA	5LC	0L	16	11 / 5
[mM]	50.00**	70.00**		0.300**	1.000		Selection $\geq$ 3	
	<b>Summary</b>						Total Prop.+/-	
Subtotal	20	22	12	10	13	2	79	
Selection	4 / 5	5 / 5	3 / 5	3 / 5	3 / 5	0 / 5	Variables 5 / 5	
Prop. +/-	17 / 3	20 / 2	10 / 2	7 / 3	11 / 2	2 / 0	67 <sup>z</sup> / 12	
[mM]	58.79	70.00			1.000		Selec. $\geq$ 13 (10)	

<sup>s</sup>Simple mean factor levels; <sup>U</sup>Range in brackets corresponds to the predicted values from the simple mean;

<sup>w</sup>Linear regression response type L, quadratic C and factor interaction; <sup>x</sup>Optimal value of the predicted factors and probability: significant \* (0.05  $\leq$  Pr  $\leq$  0.01), highly significant \*\* (Pr < 0.01), otherwise not significant; <sup>y</sup>Total observed frequency for that variable, <sup>z</sup>Total frequency for the set of variables, those factors with a subtotal equal to or greater than 20% are selected, while the variables greater than or equal to 15%