2016 Hard Red Wheat / Hard White Wheat

Crop Quality Report

California WHEAT COMMISSION

California Wheat

California's wheat growing regions are defined by climate, value of alternative crops, and distinct differences in variety selection.

Five of the six wheat classes grown in the United States are produced in California, with Hard Red wheat accounting for nearly 70% of planted acres this year.

Consistent with prior years, the 2016 crop had high protein, low moisture, high flour extraction, and strong baking performance — all of which make California wheat very good for blending.

Most California hard wheat is planted from October to January and harvested in the months of June and July. With the strong demand for new crop wheat in the domestic marketplace, importers are encouraged to express their interest in purchasing California wheat in early spring. For Hard White wheat, buyers should consider communicating with grain handlers and contracting for acres before planting time.

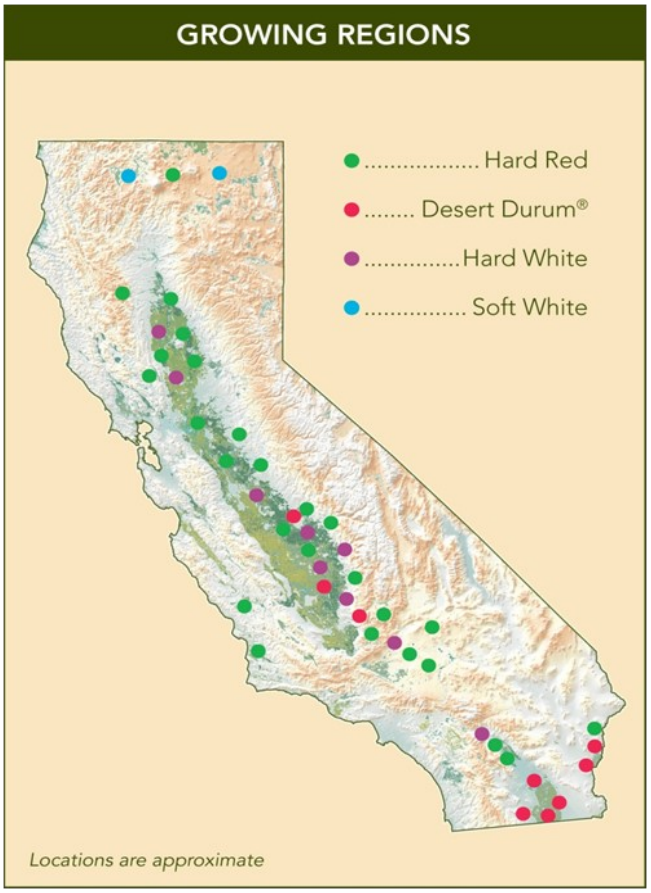
California hard wheat varieties are known for their low moisture and large and uniform kernel size. Because wheat is predominantly grown under irrigation, growers achieve high yields and consistent quality.

2016 Crop Conditions

Precipitation during the 2015-16 season was closer to average in most of the California wheat growing areas than has been the case the recent years of extreme drought. Nevertheless, rainfall was still largely below historical averages and the southern half of the state received a smaller percentage of average rainfall than the northern part of the state. As such, 2015-16 rainfall was insufficient to alleviate the state of "extreme" drought throughout much of the San Joaquin Valley. Disease pressure was relatively low with the continued dry conditions.

Data in this Report

Samples for this year's report were collected from grain handlers and producers around the state. This program collects samples throughout the harvest season, resulting in a crop quality report that is highly representative of the crop.



PRODUCTION HISTORY*

YEAR	METRIC TONS (1,000 MT's)	SHORT TONS (1,000 ST's)
2016	300	330
2015	336	370
2014	392	432
2013	751	828
2012	706	778
2011	1054	1162
2010	762	840

*All common wheat (excluding Durum).

HARD RED WHEAT GRADE HARVEST DATA					
	2016	2015	2014	2013	2012
Test Weight: lb/bu	63.8	63.7	63.4	62.3	62.1
kg/hl	83.8	83.7	83.4	81.9	81.6
Moisture (%)	8.5	8.6	9.1	9.2	9.1
Damaged (%)	0.2	0.2	0	0	0
Foreign Material* (%)	0.5	0.2	0.4	0.2	0.1
Shrunken/Broken* (%)	0.8	0.5	0.7	0.7	0.6
Total Defects (%)	1.2	0.9	1.1	0.9	0.7
Dockage* (%)	1.2	0.9	0.7	1.0	0.8
Total Screenings (%)	2.5	1.6	1.8	1.9	1.5
Net Wheat (%)	89.2	89.9	89.3	89.1	89.5
CTW (%)	106.2	107.1	106.3	106.0	106.6
MWVI (%)	94.2	93.4	94.1	94.3	93.8

Harvest year = Calendar year. *Total Screenings are those factors represented on the grade certificate that are cleaned out in the flour mill. Test weight conversion from lb/bu to kg/hl according to FGIS-PN-97-5, (1.292 x lb/bu) + 1.419. Net Wheat = (100%-(FM+SHBN+Dockage)) x (100%-Moisture)/100%. Clean, Tempered Wheat (CTW%) = (100%- (FM +SHBN+Dockage)) x (100%-Moisture)/(100%-16% (temper moisture)). Millable Wheat Value Index (MWVI) = 100%/CTW.

Varietal Descriptions

Cal Rojo (HRW) is a widely adapted, high yielding variety for both the San Joaquin and Sacramento Valleys. It is mid-early maturing and receives high scores for grain, milling, and baking quality.

Joaquin (HRW) is adapted to the San Joaquin Valley and has high protein and test weight with excellent milling and baking properties.

WB-Joaquin Oro (HRW) is adapted to the San Joaquin Valley and has high protein and test weight with excellent milling and baking properties, similar to the variety Joaquin. In addition, WB-Joaquin Oro carries two genes for stripe rust resistance, one of which is effective against all current races.

Summit 515 (HRW) is a variant of the variety Summit with two effective genes for stripe rust resistance added by marker assisted selection. Summit 515 has very high yield potential in both the San Joaquin and Sacramento Valleys.

WB9112 (HRW) is adapted to the San Joaquin Valley and has high protein and test weight with excellent milling and baking properties. It is very similar to the variety Joaquin and has resistance to stripe rust.

WB9229 (HRW) is adapted to both the San Joaquin and Sacramento Valleys. It has medium to high protein and test weight and has excellent milling and baking properties. It is moderately resistant to Septoria and is resistant to the current races of stripe rust.

Blanca Grande 515 (HW) is a variant of the variety Blanca Grande, with two effective genes for stripe rust resistance added by marker assisted selection. Blanca Grande 515 has excellent end-use quality and high yielding ability in both the San Joaquin and Sacramento Valleys.

Patwin 515 (HW) is a high yielding variety with high protein levels, and adapted to both the Sacramento and San Joaquin Valleys. Patwin 515 is a variant of Patwin with the addition of stripe rust resistance genes *Yr5* and *Yr15*.

WB7618 (HW) is most adapted to the Sacramento Valley. WB7618 has excellent protein and excellent milling and baking properties. It has excellent standability, and is moderately resistant to both Septoria and the current races of stripe rust.

2016 HARD RED WINTER (MIXED VARIETIES)

SACRAMENTO VALLEY

	High Protein (12.5 & Above)		Intermediate Protein (11.0-12.4%)		Low Protein (10.9% & Below)	
WHEAT	**2016**	**2015**	**2016**	**2015**	**2016**	**2015**
Protein (12% MB)	12.9	12.8	11.9	11.7	10.1	10.4
Ash (14% MB)	1.40	1.37	1.39	1.45	1.46	1.43
Moisture (%)	9.5	10.1	8.7	10.2	9.6	9.9
Falling Number (sec)	416	425	381	373	384	339
Test Weight						
lb/bu	64.7	63.9	63.3	63.6	64.3	63.5
kg/hl	85.0	84.0	83.2	83.6	84.5	83.5
SKCS Hardness Score	77	83	64	80	74	73
1000 Kernel Weight (g)	37.9	37.8	40.7	39.0	37.9	42.0
Kernel Size Distribution						
Large	88	84	90	83	88	89
Medium	12	16	10	17	12	11
Small	0	0	0	0	0	0
FLOUR						
Lab Mill Yield (%)	69.8	68.6	70.3	68.3	66.8	69.5
Protein (14% MB)	11.5	11.1	10.8	10.1	8.8	9.5
Ash (14% MB)	0.38	0.39	0.39	0.42	0.36	0.41
Gluten Index	94.0	97.6	92.4	97.9	95.6	98.7
Wet Gluten (14% MB)	32.7	28.8	29.9	27.2	24.0	23.2
SRC*: GPI	0.72	-	0.68	-	0.67	-
Water	77.5	-	72.2	-	72.5	-
Sucrose	120.7	-	115.3	-	109.2	-
Lactic Acid	159.3	-	143.4	-	142.3	-
Sodium Carbonate	101.6	-	95.8	-	104.2	-
ALVEOGRAPH*						
P (mm)	118	114	113	109	116	-
L (mm)	116	89	95	78	43	-
P/L ratio	1.0	1.6	1.2	1.4	2.7	-
W (10^{-4} Joules)	421	369	323	338	195	-
FARINOGRAPH						
Peak Time (min)	15.6	17.8	6.3	19.3	2.3	11.0
Stability (min)	19.7	23.0	12.4	21.6	8.8	14.0
Absorption (%)	67.4	63.4	63.9	62.8	63.5	63.3
BAKING RESULTS						
Baking Absorption (%)	69	64	66	65	65	65
Bread Volume (cc)	980	930	900	898	785	865
Crumb Grain & Texture	9	8	8	7	5	7

Wheat samples were collected by handlers. Wheat and Flour Protein: Leco Combustion Nitrogen Analyzer Model TruSpec, Lab mill yield: Brabender Quadromat Sr. Mill, modified in 1997; Bread Volume: AACCI Method 10-10B; Test weight conversion from lb/bu to kg/hl according to FGIS PN-97-5, {(1.292 x (lb/bu) + 1.419)}. *SRC and Alveograph test were added this year.

2016 HARD RED WINTER (MIXED VARIETIES)

SAN JOAQUIN VALLEY

	High Protein (12.5 & Above)		Intermediate Protein (11.0-12.4%)		Low Protein (10.9% & Below)	
WHEAT	**2016**	**2015**	**2016**	**2015**	**2016**	**2015**
Protein (12% MB)	13.7	13.3	12.0	12.2	9.7	10.1
Ash (14% MB)	1.49	1.46	1.39	1.47	1.50	1.38
Moisture (%)	7.7	6.9	7.5	7.2	8.1	9.6
Falling Number (sec)	423	456	352	453	296	303
Test Weight						
lb/bu	63.5	63.7	63.5	64.4	64.7	63.1
kg/hl	83.5	83.8	83.5	84.6	85.1	83.0
SKCS Hardness Score	64	64	61	69	71	69
1000 Kernel Weight (g)	40.9	40.8	41.2	41.5	42.0	42.3
Kernel Size Distribution						
Large	86	89	88	92	95	93
Medium	14	11	12	8	5	7
Small	0	0	0	0	0	0
FLOUR						
Lab Mill Yield (%)	70.3	69.8	70.9	70.2	69.2	67.2
Protein (14% MB)	12.7	12.0	10.9	11.2	8.2	9.1
Ash (14% MB)	0.37	0.36	0.44	0.37	0.36	0.37
Gluten Index	86.5	88.5	92.3	95.6	91.4	98.0
Wet Gluten (14% MB)	36.2	35.2	30.2	31.3	24.8	24.0
SRC*: GPI	0.75	-	0.70	-	0.63	-
Water	74.2	-	69.7	-	74.8	-
Sucrose	117.4	-	112.9	-	114.4	-
Lactic Acid	158.2	-	145.8	-	136.3	-
Sodium Carbonate	94.5	-	96.4	-	100.4	-
ALVEOGRAPH*						
P (mm)	125	116	100	142	115	-
L (mm)	99	90	90	68	43	-
P/L ratio	1.3	1.3	1.2	2.3	2.7	-
W (10^{-4} Joules)	402	395	291	393	193	-
FARINOGRAPH						
Peak Time (min)	14.7	17.9	8.2	19.6	4.0	3.7
Stability (min)	16.0	21.2	11.9	25.8	6.0	7.6
Absorption (%)	67.5	67.3	62.6	66.2	64.1	63.9
BAKING RESULTS						
Baking Absorption (%)	68	67	63	67	65	65
Bread Volume (cc)	989	959	898	924	775	821
Crumb Grain & Texture	9	9	8	8	5	6

Wheat samples were collected by handlers. Wheat and Flour Protein: Leco Combustion Nitrogen Analyzer Model TruSpec, Lab mill yield: Brabender Quadromat Sr. Mill, modified in 1997; Bread Volume: AACCI Method 10-10B; Test weight conversion from lb/bu to kg/hl according to FGIS PN-97-5, {(1.292 x (lb/bu) + 1.419)}.*SRC and Alveograph test were added this year.

2016 HARD RED VARIETY SPECIFIC INFORMATION
SACRAMENTO VALLEY

	Cal Rojo	Summit 515		WB 9229	
WHEAT	Intermediate Protein	High Protein	Intermediate Protein	High Protein	Intermediate Protein
Protein (12% MB)	11.7	12.8	12.0	13.0	11.9
Ash (14% MB)	1.42	1.37	1.32	1.42	1.42
Moisture (%)	8.3	10.0	9.3	9.0	8.7
Falling Number (sec)	406	396	328	437	410
Test Weight					
lb/bu	60.8	64.6	63.8	64.8	65.4
kg/hl	79.9	84.8	83.8	85.2	85.9
SKCS Hardness Score	50	77	69	78	73
1000 Kernel Weight (g)	40.3	38.8	39.9	36.9	41.9
Kernel Size Distribution					
Large/Medium/Small	87/12/0	90/10/0	91/9/0	85/15/0	91/9/0
FLOUR					
Lab Mill Yield (%)	71.3	69.0	68.5	70.6	71.2
Protein (14% MB)	10.8	11.4	10.7	11.6	10.9
Ash (14% MB)	0.44	0.36	0.34	0.39	0.40
Gluten Index	94.9	93.6	85.8	94.4	96.4
Wet Gluten (14% MB)	28.6	32.6	30.7	32.7	30.4
SRC*: GPI	0.62	0.73	0.72	0.70	0.69
Water	69.0	77.0	74.0	78.3	73.5
Sucrose	111.7	119.0	113.5	122.4	120.6
Lactic Acid	127.9	158.0	150.5	160.1	151.7
Sodium Carbonate	93.4	98.0	95.7	105.3	98.2
ALVEOGRAPH*					
P (mm)	87	115	107	121	146
L (mm)	129	133	76	99	79
P/L ratio	0.7	0.9	1.4	1.2	1.9
W (10^{-4} Joules)	314	435	265	407	391
MIXOGRAPH*					
Peak Time (min)	3.0	2.8	2.5	3.0	3.0
Peak Height (mu)	57.5	58.0	55.0	53.0	53.0
Classification	4	4	4	5	5
FARINOGRAPH					
Peak Time (min)	5.0	7.3	6.5	23.9	7.3
Stability (min)	8.3	13.2	9.9	26.1	19.0
Absorption (%)	60.5	67.4	64.0	67.4	67.1
BAKING RESULTS					
Baking Absorption (%)	62	68	66	69	69
Bread Volume (cc)	865	960	910	1000	925
Crumb Grain & Texture	7	9	8	10	8

Wheat samples were collected by handlers. Wheat and Flour Protein: Leco Combustion Nitrogen Analyzer Model TruSpec, Lab mill yield: Brabender Quadromat Sr. Mill, modified in 1997; Bread Volume: AACCI Method 10-10B; Test weight conversion from lb/bu to kg/hl according to FGIS PN-97-5, {(1.292 x (lb/bu) + 1.419)}. *SRC, Mixograph and Alveograph test were added this year.

2016 HARD RED VARIETY SPECIFIC INFORMATION
SAN JOAQUIN VALLEY

	Cal Rojo		Joaquin	Joaquin Oro	Summit 515		WB 9112
WHEAT	High Protein	Int. Protein	High Protein	High Protein	High Protein	Int. Protein	High Protein
Protein (12% MB)	13.4	12.2	14.5	14.1	13.2	11.8	13.4
Ash (14% MB)	1.50	1.42	1.66	1.49	1.43	1.36	1.38
Moisture (%)	8.4	7.6	7.5	7.4	7.7	7.5	7.8
Falling Number (sec)	447	381	421	460	336	323	451
Test Weight							
lb/bu	62.5	63.2	63.9	63.9	63.4	63.7	63.9
kg/hl	82.2	83.1	83.9	83.9	83.4	83.8	84.0
SKCS Hardness Score	59	57	64	60	67	66	69
1000 Kernel Weight (g)	39.7	40.7	43.7	41.7	41.5	41.6	37.8
Kernel Size Distribution							
Large/Medium/Small	74/25/1	83/16/1	91/9/0	89/10/1	89/10/1	92/8/0	84/15/1
FLOUR							
Lab Mill Yield (%)	68.5	71.4	71.3	71.4	69.4	70.4	71.1
Protein (14% MB)	12.6	11.0	13.4	13.1	11.6	10.8	12.5
Ash (14% MB)	0.42	0.39	0.35	0.34	0.38	0.48	0.34
Gluten Index	90.3	95.3	82.8	85.3	82.4	89.3	91.7
Wet Gluten (14% MB)	33.8	30.3	37.8	38.2	36.3	30.1	34.9
SRC*: GPI	0.70	0.71	0.80	0.75	0.70	0.68	0.78
Water	69.8	65.0	78.3	74.1	75.5	74.4	73.5
Sucrose	121.9	116.2	118.3	113.4	118.2	109.6	115.4
Lactic Acid	152.3	150.0	170.6	157.2	147.1	141.6	163.7
Sodium Carbonate	94.9	95.4	95.8	95.8	91.2	97.3	94.6
ALVEOGRAPH*							
P (mm)	96	88	145	135	113	111	136
L (mm)	114	108	108	97	92	72	82
P/L ratio	0.8	0.8	1.3	1.4	1.2	1.5	1.7
W (10^{-4} Joules)	367	309	496	442	332	272	371
MIXOGRAPH*							
Peak Time (min)	4.0	3.0	3.8	3.8	2.8	3.3	3.3
Peak Height (mu)	47.5	52.5	50.0	52.5	58.0	50.0	67.0
Classification	4	4	5	5	4	4	5
FARINOGRAPH							
Peak Time (min)	7.7	11.0	20.7	15.8	7.0	5.4	22.5
Stability (min)	14.4	13.5	15.5	17.6	15.2	10.2	17.2
Absorption (%)	63.5	61.5	71.0	67.5	67.7	63.6	67.8
BAKING RESULTS							
Baking Absorption (%)	64	63	71	68	69	64	68
Bread Volume (cc)	990	900	993	1020	965	895	975
Crumb Grain & Texture	9	8	9	10	9	7	9

Wheat samples were collected by handlers. Wheat and Flour Protein: Leco Combustion Nitrogen Analyzer Model TruSpec, Lab mill yield: Brabender Quadromat Sr. Mill, modified in 1997; Bread Volume: AACCI Method 10-10B; Test weight conversion from lb/bu to kg/hl according to FGIS PN-97-5, {(1.292 x (lb/bu) + 1.419)}.*SRC , Mixograph and Alveograph test were added this year.

2016 HARD WHITE VARIETY SPECIFIC INFORMATION

SACRAMENTO and SAN JOAQUIN VALLEY

	Blanca Grande 515***	Patwin 515**		WB 7618**
WHEAT	Intermediate Protein	High Protein	Intermediate Protein	High Protein
Protein (12% MB)	12.4	12.6	12.1	12.9
Ash (14% MB)	1.66	1.40	1.48	1.60
Moisture (%)	8.8	8.1	8.8	7.7
Falling Number (sec)	326	439	415	442
Test Weight				
lb/bu	65.9	63.8	63.8	64.2
kg/hl	86.5	83.9	83.8	84.3
SKCS Hardness Score	61	63	72	68
1000 Kernel Weight (g)	44.4	43.4	38.0	42.9
Kernel Size Distribution				
Large/Medium/Small	94/6/0	91/9/0	83/16/1	92/8/0
FLOUR				
Lab Mill Yield (%)	70.5	69.4	67.0	67.6
Protein (14% MB)	11.0	11.3	11.0	12.0
Ash (14% MB)	0.33	0.37	0.41	0.39
Gluten Index	90.8	80.0	88.5	90.5
Wet Gluten (14% MB)	32.3	33.2	30.3	35.5
SRC*: GPI	0.64	0.60	0.55	0.69
Water	70.7	73.3	74.7	76.0
Sucrose	113.3	110.7	115.0	113.9
Lactic Acid	140.8	123.9	115.7	143.6
Sodium Carbonate	105.5	97.0	96.8	95.7
ALVEOGRAPH*				
P (mm)	130	127	112	158
L (mm)	77	75	75	58
P/L ratio	1.7	1.7	1.5	2.7
W (10^{-4} Joules)	342	281	256	343
MIXOGRAPH*				
Peak Time (min)	2.5	1.75	2.5	2.75
Peak Height (mu)	55	62.5	55	60.75
Classification	3	1	2	5
FARINOGRAPH				
Peak Time (min)	5.2	5.8	5.9	19.7
Stability (min)	8.5	15.7	13.4	20.1
Absorption (%)	64.9	67.0	65.0	69.4
BAKING RESULTS				
Baking Absorption (%)	66	68	65	70
Bread Volume (cc)	885	920	850	970
Crumb Grain & Texture	7	8	7	9

Wheat samples were collected by handlers. Wheat and Flour Protein: Leco Combustion Nitrogen Analyzer Model TruSpec, Lab mill yield: Brabender Quadromat Sr. Mill, modified in 1997; Bread Volume: AACCI Method 10-10B; Test weight conversion from lb/bu to kg/hl according to FGIS PN-97-5, {(1.292 x (lb/bu) + 1.419)}. *SRC, Mixograph and Alveograph test were added this year. **Patwin 515 and WB 7618 samples are collected in Sacramentno Valley. ***Blance Grande 515 is collected in San Joaquin Valley.

2016 HARD WHITE—TORTILLA QUALITY
SACRAMENTO and SAN JOAQUIN VALLEY

WHEAT	Blanca Grande 515 Intermediate Protein	Patwin 515 High Protein	Patwin 515 Intermediate Protein	WB 7618 High Protein
DOUGH EVALUATION				
Absorption (%)	55.0	57.0	55.0	59.4
Mix Time (min)	8.0	7.0	8.0	7.0
Smoothness (1-5)	2	2	2	2
Softness (1-5)	2	2	2	2
Extensibility (1-5)	2	2	3	2
Force to Extend (1-5)	3	3	2	4
Press Rating (1-5)	2	1	2	1
TORTILLA EVALUATION				
Moisture (%)	32.3	32.2	29.8	32.9
Weight (g)	38.4	37.0	37.5	36.1
Diameter (mm)	161.0	187.5	169.5	180.5
Thickness (mm)	2.5	1.6	2.1	1.8
Sp. Volume (cm^3)	1.3	1.2	1.3	1.3
Lightness (L-value)	84.2	86.0	87.8	86.3
TEXTURE PROFILE				
DAY 1				
Force (N)	6.9	8.5	8.5	8.2
Distance (mm)	20.2	26.0	26.0	25.7
Work (N.mm)	59.5	61.0	61.0	81.4
Day 16				
Force (N)	6.3	5.9	5.9	6.6
Distance (mm)	10.0	14.5	14.5	14.9
Work (N.mm)	27.6	27.5	27.5	44.5
ROLLABILITY SCORES				
Day 1	5	5	5	5
Day 16	5	5	3	4
Diameter (mm)	161.0	187.5	169.5	180.5
Rating	Fair	Good	Good	Good

INTERPRETATION OF RESULTS

Smoothness (1-5): 1 = Smooth, 5 = very rough; Softness (1-5): 1 = very soft, 5 = very hard; Force to extend (1-5): 1 = less force, 5 = extreme force; Extensibility (1-5): 1 = breaks immediately, 5 = extends readily; Press Rating (1-5): 1 = less force, 5 = extreme force

Force, distance, and work is related to tortilla rollability. Tortilla that has good rollability is less prone to break when rolled. Tortilla with high force (N), distance, and work correlates well with good tortilla quality.

Diameter ≥ 165 mm is preferred, L-value is positively correlated with opacity.

Rollability Scores: 1 = easily break when rolled, 5 = no breaking when rolled

Good = rollability score > 3 on day 16, ≥165 mm; Fair = rollability score > 3 on day 16, 157-164 mm; Poor = rollability score < 3 on day 16, any diameter

2016 HARD RED—TORTILLA QUALITY
SACRAMENTO VALLEY

	Cal Rojo	Summit 515		WB 9229	
WHEAT	Intermediate Protein	High Protein	Intermediate Protein	High Protein	Intermediate Protein
DOUGH EVALUATION					
Absorption (%)	50.5	57.4	54.0	57.4	57.1
Mix Time (min)	8.0	7.0	7.5	7.0	7.0
Smoothness (1-5)	2	1	2	2	1
Softness (1-5)	2	2	2	3	2
Extensibility (1-5)	2	2	3	2	2
Force to Extend (1-5)	3	4	3	3	4
Press Rating (1-5)	2	2	1	1	1
TORTILLA EVALUATION					
Moisture (%)	30.6	30.6	33.1	28.3	28.8
Weight (g)	38.1	37.3	37.9	37.3	36.5
Diameter (mm)	170.0	178.0	178.0	181.0	180.5
Thickness (mm)	2.4	2.2	2.2	1.8	1.8
Sp. Volume (cm^3)	1.4	1.4	1.4	1.2	1.3
Lightness (L-value)	84.5	86.8	87.2	86.1	85.2
TEXTURE PROFILE					
DAY 1					
Force (N)	8.5	7.6	7.1	10.3	8.6
Distance (mm)	17.6	23.5	21.0	25.8	23.0
Work (N.mm)	58.6	79.2	60.6	93.5	74.4
Day 16					
Force (N)	7.2	7.3	7.0	9.2	7.0
Distance (mm)	11.6	15.4	11.9	15.3	13.1
Work (N.mm)	30.9	46.6	31.8	76.2	49.7
ROLLABILITY SCORES					
Day 1	5	5	5	5	5
Day 16	4	5	4	5	5
Diameter (mm)	170.0	178.0	178.0	181.0	180.5
Rating	Good	Good	Good	Good	Good

INTERPRETATION OF RESULTS

Smoothness (1-5): 1 = Smooth, 5 = very rough; Softness (1-5): 1 = very soft, 5 = very hard; Force to extend (1-5): 1 = less force, 5 = extreme force; Extensibility (1-5): 1 = breaks immediately, 5 = extends readily; Press Rating (1-5): 1 = less force, 5 = extreme force

Force, distance, and work is related to tortilla rollability. Tortilla that has good rollability is less prone to break when rolled. Tortilla with high force (N), distance, and work correlates well with good tortilla quality.

Diameter ≥ 165 mm is preferred, L-value is positively correlated with opacity.

Rollability Scores: 1 = easily break when rolled, 5 = no breaking when rolled

Good = rollability score > 3 on day 16, ≥165 mm; Fair = rollability score > 3 on day 16, 157-164 mm; Poor = rollability score < 3 on day 16, any diameter

2016 HARD RED—TORTILLA QUALITY
SAN JOAQUIN VALLEY

	Cal Rojo		Joaquin	Joaquin Oro	Summit 515		WB 9112
WHEAT	High Protein	Int. Protein	High Protein	High Protein	High Protein	Int. Protein	High Protein
DOUGH EVALUATION							
Absorption (%)	53.5	51.5	61.0	57.5	57.7	53.6	57.8
Mix Time (min)	8.0	7.0	8.0	8.0	8.0	7.5	7.5
Smoothness (1-5)	2	2	2	3	3	2	2
Softness (1-5)	2	3	1	3	3	2	2
Extensibility (1-5)	2	3	2	3	3	2	2
Force to Extend (1-5)	3	2	3	3	2	2	4
Press Rating (1-5)	2	2	1	1	2	1	2
TORTILLA EVALUATION							
Moisture (%)	33.7	31.4	31.3	34.0	30.9	32.3	30.6
Weight (g)	38.7	39.0	37.0	37.4	39.3	37.5	36.6
Diameter (mm)	166.5	165.5	188.0	174.5	162.5	169.5	180.0
Thickness (mm)	2.0	2.7	1.5	1.7	2.2	2.0	1.8
Sp. Volume (cm^3)	1.1	1.5	1.2	1.1	1.2	1.2	1.3
Lightness (L-value)	88.0	86.0	82.5	85.7	85.9	85.6	85.9
TEXTURE PROFILE							
DAY 1							
Force (N)	11.0	8.2	12.3	14.8	7.6	8.5	10.2
Distance (mm)	24.3	19.0	32.3	31.8	23.5	20.3	28.2
Work (N.mm)	87.7	57.8	155.4	212.6	79.2	67.4	115.5
Day 16							
Force (N)	7.3	6.5	7.4	10.0	7.3	6.3	6.8
Distance (mm)	13.6	10.4	17.6	19.3	15.4	11.8	14.4
Work (N.mm)	39.6	27.1	55.9	93.8	46.6	21.2	38.4
ROLLABILITY SCORES							
Day 1	5	5	5	5	5	5	5
Day 16	5	4	5	5	4	4	5
Diameter (mm)	166.5	165.5	188.0	174.5	162.5	169.5	180.0
Rating	Good	Good	Good	Good	Fair	Good	Good

INTERPRETATION OF RESULTS

Smoothness (1-5): 1 = Smooth, 5 = very rough; Softness (1-5): 1 = very soft, 5 = very hard; Force to extend (1-5): 1 = less force, 5 = extreme force; Extensibility (1-5): 1 = breaks immediately, 5 = extends readily; Press Rating (1-5): 1 = less force, 5 = extreme force

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Technical and Laboratory Services

CWC Executive Director Claudia Carter and Laboratory Manager Teng Vang
Photo credit: Matt Salvo, California Farm Bureau Federation

The California Wheat Commission laboratory has the equipment necessary for evaluation of common and durum wheat milling quality, flour chemical analysis, physical dough testing, semolina analysis, bake and noodle production tests, and pasta analysis.

The Commission's staff is available to work with customers in the area of quality assurance, product development, problem solving, quality control training, and research. The lab order test form is available on the California Wheat Commission website, please use when requesting services.

Customer Assistance and Support

The Commission is available to answer technical questions about California's wheat quality, including recommendations for blending and appropriate end-use. The Commission conducts specialized training programs in milling, baking, semolina, pasta, and quality control. These specific programs may be customized to meet the customers' needs.

Crop and Export Survey

California produces five of the six classes of U.S. wheat: Hard Red Winter (HRW), Desert Durum®, Hard White, Soft White and Hard Red Spring. While HRW, Hard White, and Durum are the predominately produced and exported classes, information and contacts for all the above classes of wheat are available by contacting the Commission office. Every effort is made to provide an accurate assessment of quality to buyers. With greater amounts of wheat being sold by variety, varietal specific information is emphasized in Commission surveys.

Varietal Development

Private and public breeding programs play an important role in the development of new varieties available to California wheat producers. The Commission analyzes hundreds of samples each year to support these programs and encourages the release of new varieties that will meet the customers' needs. New varieties are evaluated by commercial mills through the California Wheat Collaborator program.

Research

The Commission laboratory is available for flour, semolina, milling, end-product, and new-product research. Technical expertise is available in hearth breads, pasta, Asian food products, standard loaf bread, steamed bread, Asian noodles, cookies, tortillas and Middle Eastern flat breads.

CWC Laboratory Manager Teng Vang
Photo credit: Matt Salvo, California Farm Bureau Federation

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