Canadian Grain Commission
Commission canadienne des grains

Quality of western Canadian wheat 2001

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Canada

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Summary

The western prairie region experienced very dry conditions throughout seeding, growth and harvesting. In contrast, wet conditions persisted in most parts of the eastern prairies until the end of July followed by dry conditions during later growth and harvest. Dry conditions and high temperatures in July and August in much of Saskatchewan and southern Alberta caused severe stress to the crop resulting in reduced yields. Most of the crop is very sound and of high grade due to ideal harvesting conditions. The predominant grading factors in red spring wheat include fusarium damage, midge and immaturity due to heat stress in the south and frost damage in the north. In durum wheat, predominant grading factors include smudge and midge damage. Spring and durum wheat production is estimated at 15.9 and 2.9 million tonnes, respectively. High grade Canada Western Red Spring wheat shows higher protein content, higher test weight, comparable milling and baking quality, somewhat reduced dough strength and increased water absorption potential compared to last year. Canada Western Amber Durum wheat shows very sound kernel characteristics and higher protein content relative to 2000.

Figure 1 • Map of Canada showing major wheat producing areas in the prairies

Seven classes of Canadian wheat

This report presents final information on the quality of the 2001 crop for the seven classes of western Canadian wheat listed below.

Canada Western Red Spring (CWRS) wheat is a hard wheat with superior milling and baking quality. It is offered at various guaranteed protein levels. There are three milling grades in the CWRS class.

Canada Western Amber Durum (CWAD) wheat is a durum wheat producing a high yield of semolina with excellent pasta-making quality. There are four milling grades in the CWAD class.

Canada Western Extra Strong (CWES) wheat is a hard red spring wheat with extra-strong gluten suitable for blending purposes and for special breads. There are two milling grades in the CWES class.

Canada Prairie Spring Red (CPSR) wheat is a medium-strength wheat suitable for the production of certain types of hearth breads, flat breads, steamed breads, noodles and related products. There are two milling grades in the CPSR class.

Canada Western Red Winter (CWRW) wheat is a hard wheat of excellent milling quality suitable for the production of a wide variety of products including French breads, flat breads, steamed breads, noodles and related products. There are two milling grades in the CWRW class.

Canada Prairie Spring White (CPSW) wheat is a medium-strength wheat suitable for the production of various types of flat breads, noodles, chapatis and related products. There are two milling grades in the CPSW class.

Canada Western Soft White Spring (CWSWS) wheat is a soft wheat of low protein content for production of cookies, cakes and pastry as well as various types of flat breads, noodles, steamed breads and chapatis. There are three milling grades in the CWSWS class.

Introduction

About the 2001 harvest survey data

Data presented in this report were generated from quality tests carried out on composites representing over 6000 individual samples submitted by producers and primary elevator managers from the three prairie provinces. Figure 1 highlights the wheat producing regions which are in the provinces of, from east to west, Manitoba, Saskatchewan and Alberta. These data are not quality specifications for Canadian wheat. Rather, they represent our best estimate of quality. How closely they represent the exact quality characteristics of wheat of any given grade exported during the coming year depends on

- The amounts and relative quality of carryover stocks of each grade
- The degree to which the harvest survey composites are representative of 2001 production

Background for the 2001 crop

The Weather and Crop Surveillance department of the Canadian Wheat Board provided background information for the 2001 crop.

Seeding conditions

Dry conditions in Alberta and a large portion of Saskatchewan during the fall and winter of 2000 resulted in very poor soil moisture levels going into the 2001 planting season. Manitoba and southeastern Saskatchewan were at the opposite extreme with above normal precipitation from October to December 2000, providing ample soil moisture reserves. Dry, warm conditions during late April and May resulted in rapid seeding of cereal crops in the western prairies. In the driest areas, germination was quite uneven. Planting in the western prairies was more than 50 per cent complete by the middle of May and finished by the end of the month. The excess soil moisture and persistent precipitation slowed planting until late May and into June in parts of southeastern Saskatchewan and in Manitoba.

Growing conditions

Cooler temperatures throughout most of the month of June kept crop stress to a minimum, despite the very dry conditions. June rains were isolated to the eastern prairies, with only scattered rainfall reported in western areas. June precipitation ranged from significantly above normal in the eastern Prairies to well below normal in southern Alberta. Central and northern Alberta (including the Peace River region) received moderate amounts of precipitation during the last half of the month providing much needed moisture for crops. Saskatchewan remained extremely dry (except in the southeast) and crop conditions began to deteriorate rapidly by the end of June.

Above normal temperatures during the first two weeks of July caused severe stress to all crops, and yield potential declined in the western areas of the prairies. Most locations in Saskatchewan and southern Alberta received less than 50 per cent of normal precipitation for the month. However, northern Alberta received frequent moderate amounts of precipitation during the month, helping improve the condition of the crop in that region. Moderate to heavy rainfall covered parts of Manitoba and eastern Saskatchewan during July, resulting in increased disease pressure and some crop losses due to flooding.

Harvest conditions

The warm temperatures and drought conditions in the western growing areas accelerated crop development. The harvest began in many regions during the first two weeks in August, although activity was not general across the prairies until the third week in August. Harvest weather was ideal, with most locations receiving less than half of normal precipitation and warmer than normal temperatures. The harvest was over one-third completed by the end of August, and almost finished by the third week of September. The uneven growth in central and northern Alberta slowed harvest activity in those regions, with harvesting completed by the first week of October.

Production and grade information*

Statistics Canada production estimates for Western Canada are significantly below last year's levels due to the drought conditions in Alberta and much of Saskatchewan. Spring wheat yields are expected to reach only 1.9 tonnes per hectare, the lowest yields since 1989. Durum yields are also forecast to be very low at 1.4 tonnes per hectare. Total wheat production for Western Canada is estimated at 19.3 million tonnes (24.1 million tonnes in 2000). Spring wheat production is estimated at 15.9 million tonnes, despite an increase in sown area. Durum wheat production, at 2.9 million tonnes, marks the lowest production figure since 1988.

Despite reduced yields caused by dry conditions, most red spring and durum wheat from the 2001 crop is segregating into the top two grades due to the nearly ideal harvest weather during August and September. There was some frost damage to crops in northern Alberta due to the variable maturity found in some areas. The wet growing season in the eastern prairies promoted the development of diseases (fusarium), causing some downgrading. Some smudge and midge damage is apparent in durum wheat. However, these degrading factors affect only a small portion of the total crop. Tight grading tolerances for these factors ensure that the high inherent quality of the top milling grades of Canada Western Red Spring and Canada Western Amber Durum wheat are protected.

Harvest survey samples

Samples for the Canadian Grain Commission harvest surveys are collected from randomly selected western Canadian grain producers. Producers are invited to participate by sending in samples of their newly harvested crop. The CGC supplements producer samples with samples from grain elevator companies to obtain a representative regional distribution for each wheat class. The CGC uses a bar-coded documentation system for all samples allowing producers to call a toll-free number at the CGC to obtain a protein content and the unofficial grade assigned to their sample.

For 2001 harvest survey data, the first cutoff date for No. 1 Canada Western Red Spring (CWRS) wheat composite preparation was Oct. 1.

* Source: Statistics Canada *Field Crop Reporting Series No. 7*, October 5, 2001

Protein

Table 1 compares mean protein values for each of the seven classes of western Canadian wheat surveyed in 2001 to corresponding values obtained in the 1999 and 2000 harvest survey. Both of the major wheat classes, Canada Western Red Spring (CWRS) and Canada Western Amber Durum (CWAD), show large increases in protein content compared to 2000. Large increases are also evident in the other wheat classes. These increases can be primarily associated with the drought conditions that occurred over much of the western prairie region.

Table 1 • Mean protein content of milling grades of western Canadian wheat classes, 2001, 2000, 1999

	Protein content (%)[1]		
Class	2001	2000	1999
CWRS	14.7	13.6	13.3
CWAD	14.1	12.5	11.9
CWES	13.4	12.3	12.2
CPSR	13.1	11.2	11.2
CWRW	11.1	10.3	10.0
CPSW	13.0	11.4	10.9
CWSWS	11.0	10.9	10.7

[1] Mean value, N x 5.7; 13.5% moisture basis

Canada Western Red Spring wheat

Protein and variety survey

Table 2 lists mean protein values for CWRS wheat by grade and province for 2001. Comparative values for western Canada by grade are shown for 2000 and for the previous 10 years (1991-2000). Figure 2 shows the fluctuations in annual mean protein content since 1927.

The average protein content of the 2001 CWRS wheat crop is 14.7%—up 1.1% from 2000 and 1.4% higher than the ten year mean. An increase in protein content is evident with decreasing grade, ranging from 14.4% for the No. 1 grade to 15.2% for the No. 3 grade. Manitoba continues to show the highest protein content with an average of 15.4% while Saskatchewan shows an average of 14.5% and Alberta, 14.3%.

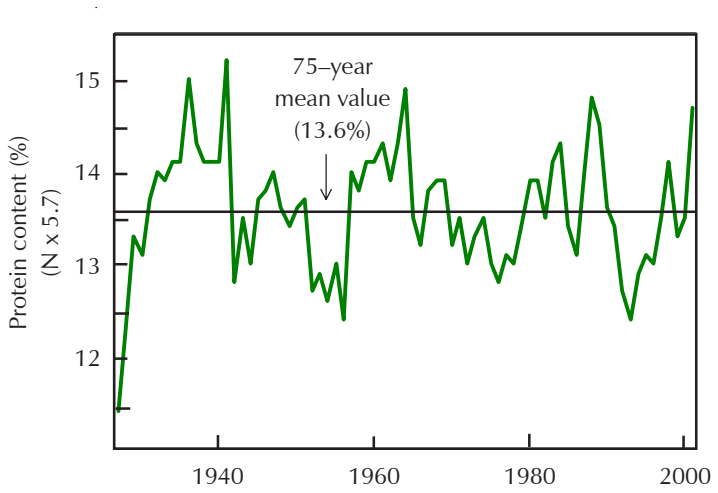
The Canadian Wheat Board Variety Survey shows that AC Barrie is the predominant variety in the CWRS class with 39% of the seeded acreage, down from 44% in 2000. CDC Teal is the second most widely grown variety at 10% while the newer varieties, AC Splendor and AC Intrepid, represent 5% of the acreage.

Table 2 • Mean protein content of 2001 Canada Western Red Spring wheat, by grade, year and province

	Protein content (%)[1]					
	Western Canada			2001		
Grade	2001	2000	1991–00	Manitoba	Saskatchewan	Alberta
No. 1 CWRS	14.4	13.6	13.2	15.1	14.4	14.3
No. 2 CWRS	14.9	13.6	13.3	15.4	14.7	14.0
No. 3 CWRS	15.2	13.5	12.9	15.7	14.8	14.1
All milling grades	**14.7**	**13.6**	**13.3**	**15.4**	**14.5**	**14.3**

[1] N x 5.7; 13.5% moisture basis

Figure 2 • Mean protein content of harvest survey Canada Western Red Spring wheat–1927 to 2001



Milling and baking quality Allis-Chalmers laboratory mill

To assess the quality of the 2001 CWRS wheat crop, composites were prepared from harvest survey samples representing the top two milling grades. The No. 1 and No. 2 CWRS samples were segregated into composites having minimum protein levels of 14.5% and 13.5%. Results for the 12.5% composite are not reported due to the small amount of wheat segregating into this protein level. Data for noodle quality are given in a later section.

No. 1 Canada Western Red Spring wheat

Table 3 summarizes quality data for the No. 1 CWRS composites. Corresponding data are provided at the 13.5% minimum protein level for both last year's composite and the ten-year average, 1991-2000.

Test weight and seed size of the 2001 No. 1 grade protein segregates are higher than last year and the long term averages. Wheat ash is similar to last year and to the long term average. The high degree of soundness expected of No. 1 CWRS is evident from the high wheat falling number and flour amylograph peak viscosity values.

Wheat particle size index and flour starch damage values indicate that kernel texture is harder relative to last year. Flour yield and the degree of flour refinement (flour ash and grade colour) are similar to 2000 values although AGTRON flour colour is lower. Compared to long term averages, this year's No. 1 grade composites show similar flour yield and flour ash content and superior flour grade colour.

Farinograph absorption is about 3% higher than last year and over 1% higher than the long term average. The higher starch damage this year is probably the major contributor to this increased absorption. Farinograph and extensograph results indicate somewhat weaker dough properties relative to last year. The lower Length and higher P values, indicating tighter dough properties, are probably related to higher flour absorption which can strongly influence alveogram shape. Canadian short process baking absorption is higher than last year and the long term average, consistent with farinograph absorption results. Loaf volumes are comparable to 2000 values. During processing, dough shows somewhat shorter mixing requirements while maintaining the superior handling properties characteristic of last year's crop.

No. 2 Canada Western Red Spring wheat

Table 4 shows quality data for the 2001 No. 2 CWRS composites and comparative data for the 13.5% minimum protein level for last year's composite and the ten-year average, 1991-2000.

Test weight and kernel weight are higher than last year and the long term average. The No. 2 grade composites show a high degree of soundness, evident from the high wheat falling number and flour amylograph peak viscosity values. Wheat particle size index and flour starch damage values indicate that kernel texture is harder relative to last year. Milling yield is similar while flour ash content is higher and flour grade colour is superior compared to 2000 results.

Rheological tests demonstrate dough strength properties similar to last year. Farinograph absorption is higher than last year and the long term average. Good baking quality is evident with the Canadian short process baking procedure. Baking absorption is higher than last year while mixing time is shorter.

Table 3 • No. 1 Canada Western Red Spring wheat
Quality data for 2001 harvest survey grade composite samples

	Minimum protein content		No. 1 CWRS 13.5	
Quality parameter[1]	14.5	13.5	2000	1991–00 mean
Wheat				
Test weight, kg/hl	82.8	83.1	81.3	81.2
Weight per 1000 kernels, g	33.1	33.0	30.7	31.9
Protein content, %	14.8	13.8	13.8	13.7
Protein content, % (dry matter basis)	17.1	15.9	16.0	15.9
Ash content, %	1.59	1.57	1.56	1.57
α-amylase activity, units/g	4.5	2.0	4.5	4.7
Falling number, s	405	425	375	390
PSI, %	54	53	54	53
Milling				
Flour yield				
Clean wheat basis, %	75.8	75.8	75.4	75.6
0.50% ash basis, %	77.3	76.3	76.4	76.6
Flour				
Protein content, %	14.1	13.2	13.3	13.1
Wet gluten content, %	39.9	36.1	35.1	35.7[2]
Ash content, %	0.47	0.49	0.48	0.48
Grade colour	-1.8	-2.0	-1.9	-1.5
AGTRON colour, %	73	73	79	72[3]
Starch damage, %	7.6	8.1	6.4	6.9
α-amylase activity, units/g	0.5	0.5	1.0	1.3
Amylograph peak viscosity, BU	765	670	730	695
Maltose value, g/100 g	2.6	2.6	2.2	2.2
Farinogram				
Absorption, %	66.9	66.7	63.5	65.4
Development time, min	5.5	5.0	5.75	5.0
Mixing tolerance index, BU	30	30	35	26
Stability, min	8.5	8.5	8.5	10.0
Extensogram				
Length, cm	22	21	22	22
Height at 5 cm, BU	300	310	345	295
Maximum height, BU	560	550	645	520
Area, cm^2	165	150	190	150
Alveogram				
Length, mm	133	105	137	121
P (height x 1.1), mm	115	120	93	107
W, x 10^{-4} joules	510	458	438	423
Baking (Canadian short process baking test)				
Absorption, %	72	71	67	69
Mixing energy, W–h/kg	13.2	12.0	13.1	8.2
Mixing time, min	9.3	9.0	10.1	7.5
Loaf volume, cm^3/100 g flour	1070	1110	1080	1100

[1] Unless otherwise specified, data are reported on a 13.5% moisture basis for wheat and a 14.0% moisture basis for flour.
[2] Mean of data generated starting in 1996
[3] Mean of data generated starting in 1993

Table 4 • No. 2 Canada Western Red Spring wheat
Quality data for 2001 harvest survey grade composite samples

	Minimum protein content		No. 2 CWRS 13.5	
Quality parameter[1]	14.5	13.5	2000	1991–00 mean
Wheat				
Test weight, kg/hl	80.8	81.5	80.1	79.7
Weight per 1000 kernels, g	32.0	32.3	31.9	31.9
Protein content, %	14.7	13.7	13.7	13.7
Protein content, % (dry matter basis)	17.0	15.9	15.8	15.8
Ash content, %	1.74	1.70	1.63	1.63
α-amylase activity, units/g	3.0	4.0	7.0	5.5
Falling number, s	385	385	375	376
PSI, %	54	53	55	54
Milling				
Flour yield				
Clean wheat basis, %	75.6	75.6	75.2	75.4
0.50% ash basis, %	74.1	75.1	75.7	76.4
Flour				
Protein content, %	14.3	13.1	13.3	13.1
Wet gluten content, %	39.3	35.2	35.8	36.3[2]
Ash content, %	0.53	0.51	0.49	0.49
Grade colour	-1.5	-1.8	-1.4	-1.2
AGTRON colour, %	69	73	75	70[3]
Starch damage, %	7.6	8.0	6.5	6.5
α-amylase activity, units/g	0.5	0.5	3.5	2.0
Amylograph peak viscosity, BU	710	675	465	550
Maltose value, g/100 g	2.5	2.6	2.3	2.2
Farinogram				
Absorption, %	66.1	66.1	64.8	65.1
Development time, min	5.5	5.00	5.25	5.0
Mixing tolerance index, BU	35	30	35	30
Stability, min	7.5	7.5	8.0	9.0
Extensogram				
Length, cm	22	21	22	23
Height at 5 cm, BU	300	300	295	282
Maximum height, BU	560	545	565	448
Area, cm^2	170	155	165	150
Alveogram				
Length, mm	123	114	129	126
P (height x 1.1), mm	109	119	99	100
W, x 10^{-4} joules	461	461	425	409
Baking (Canadian short process baking test)				
Absorption, %	70	71	69	69
Mixing energy, W–h/kg	14.6	13.8	13.5	9.8
Mixing time, min	9.5	9.4	10.4	8.2
Loaf volume, cm^3/100 g flour	1105	1085	1090	1085

[1] Unless otherwise specified, data are reported on a 13.5% moisture basis for wheat and a 14.0% moisture basis for flour.
[2] Mean of data generated starting in 1996
[3] Mean of data generated starting in 1993

Comparative Buhler laboratory mill flour data

Samples of 2001 and stored 2000 harvest survey No. 1 CWRS-13.5 wheat composites were milled consecutively on the same day on the tandem Buhler laboratory mill into straight grade and 45% extraction patent flour. Data are shown in Table 5.

The 2001 composite shows improved milling properties relative to last year's composite. The straight grade flour from the 2001 composite shows an identical yield to the 2000 composite while both the straight grade and patent flour from 2001 show lower ash and superior grade colour relative to last year's composite. All flours have high amylograph peak viscosity values. Starch damage values for the straight grade and patent flour show a higher value than last year.

Farinograph data show higher absorption in both straight grade and patent flour while dough strength is comparable to last year. Good baking quality using both sponge and dough and Canadian short process procedures are evident for both straight grade and patent flour. Baking absorption is similar or slightly higher than last year while dough mixing time with both processes is somewhat shorter this year.

Table 5 • No. 1 Canada Western Red Spring wheat • 13.5% protein segregate
Comparative Buhler mill flour data • 2001 and 2000 harvest survey composites[1]

Quality parameter[2]	Straight grade		Patent	
	2001	2000	2001	2000
Flour				
Yield, %	75.2	75.2	45.0	45.0
Protein content, %	13.1	13.3	12.2	12.3
Wet gluten content, %	35.6	35.0	33.8	33.1
Ash content, %	0.41	0.43	0.34	0.36
Grade colour	-2.9	-2.3	-4.5	-4.2
AGTRON colour, %	80	78	94	92
Amylograph peak viscosity, BU	670	700	750	785
Starch damage, %	6.7	6.0	7.0	6.4
Farinogram				
Absorption, %	62.7	61.5	62.5	60.6
Development time, min	5.25	5.50	5.50	6.75
Mixing tolerance index, BU	30	30	5	20
Stability, min	8.5	9.0	22.0	17.0
Sponge-and-dough baking test	**(40 ppm ascorbic acid)**		**(20 ppm ascorbic acid)**	
Absorption, %	65	64	63	63
Mixing: energy dough stage, W–h/kg	8.1	10.1	10.2	13.3
Mixing: time dough stage, min	7.6	9.4	10.5	12.4
Loaf volume, cm^3/100 g flour	1125	1130	1025	1045
Appearance	8.3	8.4	7.5	7.8
Crumb structure	5.9	6.0	6.0	6.0
Crumb colour	7.5	7.7	7.7	7.7
Canadian short process baking test	**(150 ppm ascorbic acid)**		**(150 ppm ascorbic acid)**	
Absorption, %	67	66	65	65
Mixing energy dough stage W–h/kg	16.9	17.4	14.4	15.2
Mixing time dough stage, min	11.1	12.3	10.3	11.3
Loaf volume, cm^3/100 g flour	1075	1095	1085	1045
Appearance	8.1	7.4	7.7	7.2
Crumb structure	5.9	6.3	6.3	6.3
Crumb colour	7.7	7.7	7.8	7.7

[1] The 2000 composite was stored and milled the same day as the 2001
[2] Data reported on 14.0% moisture basis

Canada Western Amber Durum wheat

Table 6 lists the mean protein content values for Canada Western Amber Durum (CWAD) wheat by grade. Comparative values by grade are shown for 2000 and for the previous 10 years (1991-2000). Figure 3 shows the variation in annual mean protein content since 1963.

The average protein content of the 2001 durum crop is 14.1%, up 1.6% from 2000 and 1.9% from the 10 year mean. Protein content for No. 1 and No. 2 CWAD shows a significant improvement of 0.8 and 1.7%, respectively, compared to 2000 values. Annual mean protein content values since 1963 show that this quality factor is highly variable, mostly in response to environmental conditions.

Data describing the quality characteristics for composite samples of the top two grades of the 2001 CWAD wheat crop are shown in Table 7. Corresponding data for 2000 composites and mean values for the previous ten years (1991-2000) are provided for comparison.

Physical characteristics of the 2001 crop show an increase in kernel weight and vitreous kernel counts, with similar test weight to last year. Falling numbers are higher than 2000 values, indicating that sprout damage is not a factor in this year's crop. The major grading factors in the 2001 crop year are smudge and midge damage.

As expected from the increased protein content, wet gluten values are higher than 2000. SDS sedimentation volumes suggest that both grades have gluten strength similar to last year but higher alveograph P and W values indicate stronger gluten strength properties. In contrast, gluten index values are lower than last year. This may indicate that environmental conditions influence gluten index values differently than other gluten strength indicators, and highlights the need to use more than one method to evaluate gluten strength.

Milling quality, as shown by semolina milling yield, is similar for the No. 1 CWAD and slightly better for the No. 2 CWAD, compared to last year. Wheat ash values are similar to 2000.

Semolina colour is similar when compared to the 2000 crop, with a slight improvement for the No. 2 CWAD. The lower Agtron colour values are a response to higher protein content.

Cooking quality for the two top grades is superior to last year, as indicated by higher firmness (peak force) values, and reflects the increase in protein content for the No. 1 and No. 2 CWAD grades.

Although Kyle remains the most popular variety grown on the prairies, its proportion shows a decrease in acreage and represents 60% of the crop compared with 70% in 2000. AC Avonlea, a newly released variety with improved colour and higher protein content, increased to 20% of the crop. AC Morse, a variety with increased gluten strength rose to 12% of the crop.

Table 6 • Mean protein content of Canada Western Amber Durum wheat, by grade and year

Grade	Protein content (%)[1]		
	2001	2000	1991–00
No. 1 CWAD	14.0	13.2	12.6
No. 2 CWAD	14.0	12.3	12.0
No. 3 CWAD	14.4	12.4	11.9
All milling grades	**14.1**	**12.5**	**12.2**

[1] N x 5.7; 13.5% moisture basis

Figure 3 • Mean protein content of harvest survey Canada Western Amber Durum wheat–1963 to 2001

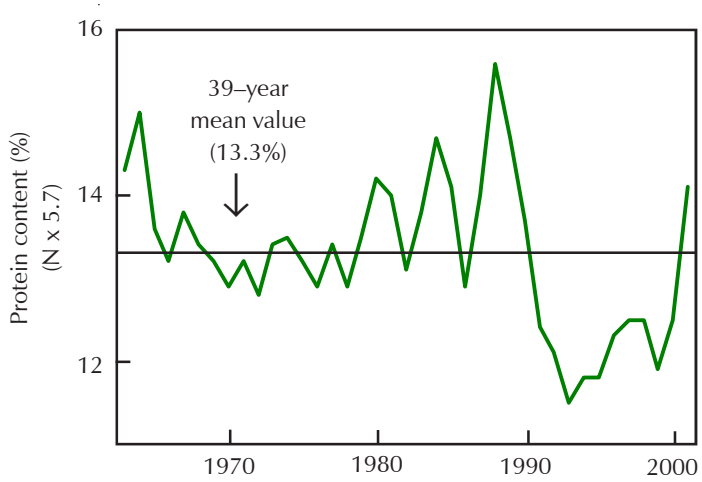


Table 7 • No. 1 and No. 2 Canada Western Amber Durum wheat
Quality data for 2001 and 2000 harvest survey grade composite samples

Quality parameter[1]	No. 1 CWAD 2001	No. 1 CWAD 2000	No. 1 CWAD 1991-00 Mean	No. 2 CWAD 2001	No. 2 CWAD 2000	No. 2 CWAD 1991-00 Mean
Wheat						
Test weight, kg/hl	82.8	82.9	82.0	83.1	83.0	81.7
Weight per 1000 kernels, g	42.7	41.2	42.5	43.6	41.3	42.5
Hard vitreous kernels, %	95	93	87.9	94	78	77.8
Protein content, %	14.1	13.1	12.5	14.0	12.1	12.1
Protein content, % (dry matter basis)	16.3	15.1	14.3	16.2	14.0	14.0
SDS sedimentation, ml	40	41	36	38	36	33
Ash content, %	1.52	1.52	1.56	1.64	1.67	1.59
Yellow pigment content, ppm	8.3	8.6	8.4[2]	8.5	8.4	8.4[2]
Falling number, s	430	400	410	405	390	385
Milling yield, %	74.5	74.8	74.2	75.9	75.2	74.0
Semolina yield, %	66.9	66.2	65.7	67.9	66.0	64.8
PSI, %	37	38	38[3]	39	39	38[3]
Semolina						
Protein content, %	12.9	12.2	11.6	12.9	11.2	11.2
Wet gluten content, %[4]	34.0	31.1	31.6[3]	32.6	28.9	30.3[3]
Dry gluten content, %[4]	11.9	10.6	11.6[3]	11.5	10.7	11.7[3]
Gluten index, %[4]	14	27	-		16	24
Ash content, %	0.65	0.64	0.65	0.69	0.65	0.66
Yellow pigment content, ppm	8.1	8.0	7.8[2]	8.2	7.6	7.5[2]
AGTRON colour, %	78	85	80	74	86	80
Minolta colour:						
L*	87.5	87.6	-	87.5	87.3	-
a*	-2.8	-2.9	-	-2.8	-3.0	-
b*	32.9	32.6	-	32.6	31.7	-
Speck count per 50 cm^2	27	24	27	29	27	32
Falling number, s	505	480	480[2]	510	455	450[2]
Alveogram						
Length, mm	94	80	-	87	85	-
P (height x 1.1), mm	53	43	-	52	39	-
P/L	0.6	0.6	-	0.6	0.5	-
W x 10^{-4} joules	121	98	-	111	86	-
Spaghetti						
Dried at 70°C						
Minolta colour:						
L*	76.9	77.7	-	76.0	77.7	-
a*	3.6	3.7	-	4.1	3.5	-
b*	67.3	66.8	-	65.9	65.0	-
Cooking quality, CQP	34	33	35	37	29	33
Firmness, g/cm	996	905	-	974	832	-

[1] Unless otherwise specified, data are reported on a 13.5% moisture basis for wheat and a 14.0% moisture basis for semolina.
[2] Mean of data generated starting in 1992
[3] Mean of data generated starting in 1995
[4] As of 1998, AACC Method 38-12A has been used to determine Wet gluten content and Gluten index

Canada Western Extra Strong wheat

Table 1 shows the mean protein content for CWES wheat for 2001 and the previous two years. The mean protein content of this year's crop is estimated at 13.4%, 1.1% higher than the 2000 and 1999 crop.

Table 8 summarizes quality data for the 2001 No. 1 CWES grade composite. Data for 2000 are included for comparison. Test weight and kernel weight are higher compared to last year. A high degree of soundness is evident from the high wheat falling number and flour amylograph peak viscosity values. Wheat PSI is the same as the 2000 value, indicating very similar kernel texture for both years. Flour starch damage is higher than last year.

Flour yield and flour colour are similar while flour ash is lower than last year. Physical dough tests indicate stronger dough strength properties than last year. Farinograph water absorption shows an increase over the 2000 value. Remix-to-peak mixing time is longer while baking properties show increased bake absorption and decreased loaf volume compared to last year.

The Canadian Wheat Board Variety Survey shows that 47% of the CWES acreage was planted to Glenlea, with Bluesky (25%) and Laser (23%) accounting for most of the remainder.

Table 8 • No. 1 Canada Western Extra Strong wheat
Quality data for 2001 and 2000 harvest survey grade composite samples

Quality parameter[1]	2001	2000
Wheat		
Test weight, kg/hl	80.9	78.5
Weight per 1000 kernels, g	42.2	36.6
Protein content, %	13.4	12.3
Protein content, % (dry matter basis)	15.4	14.2
Ash content, %	1.54	1.50
α-amylase activity, units/g	10.5	15.5
Falling number, s	355	305
Flour yield, %	75.6	75.3
PSI, %	48	48
Flour		
Protein content, %	12.9	11.7
Wet gluten content, %	30.3	27.4
Ash content, %	0.52	0.55
Grade colour	-1.0	-0.8
AGTRON colour, %	68	69
Starch damage, %	9.2	7.9
α-amylase activity, units/g	3.0	7.5
Amylograph peak viscosity, BU	420	270
Maltose value, g/100 g	3.3	3.1
Farinogram (90 rpm)		
Absorption, %	64.7	61.9
Development time, min[2]	5.75	6.5
Extensogram		
Length, cm	24	25
Height at 5 cm, BU	365	340
Maximum height, BU	715	635
Area, cm^2	230	215
Alveogram		
Length, mm	100	108
P (height x 1.1), mm	129	109
W, x 10^{-4} joules	525	461
Baking (remix-to-peak baking test)		
Absorption, %	68	64
Remix time, min	5.1	4.3
Loaf volume, cm^3/100 g flour	810	905

[1] Unless otherwise specified, data are reported on a 13.5% moisture basis for wheat and a 14.0% moisture basis for flour.
[2] At the normal farinograph speed of 63 rpm, CWES flour does not develop and appears weak. Farinograph speed has been increased from 63 rpm to 90 rpm in order to achieve full development.

Canada Prairie Spring Red wheat

The mean protein content for CPSR wheat for 2001 and the previous two years is shown in Table 1. The 2001 crop shows a very high value at 13.1% compared to values of 11.2% for 2000 and 1999.

Table 9 summarizes quality data for the No. 1 CPSR new crop composite. Data from 2000 are included for comparison. Test weight and kernel weight are higher compared to last year. A high degree of soundness is evident from the high wheat falling number and flour amylograph peak viscosity values. Kernel texture is harder than last year as shown by lower wheat PSI, while flour starch damage is higher compared to the 2000 value.

Milling yield and flour colour are similar to last year while flour ash content is lower. Physical dough tests indicate much stronger dough strength properties compared to 2000. Farinograph absorption is also much higher than last year. Remix-to-peak baking properties are clearly superior compared to last year. The increased dough strength and water absorption as well as the superior baking quality of the 2001 crop can be mainly attributed to the large increase in protein content.

Canadian Wheat Board Variety Survey results show that the acreage of AC Crystal has increased to 63% from 40% last year. AC Taber and AC Foremost have decreased from 27% to 21% and from 20% to 11%, respectively.

Table 9 • No. 1 Canada Prairie Spring Red wheat
Quality data for 2001 and 2000 harvest survey grade composite samples

Quality parameter[1]	2001	2000
Wheat		
Test weight, kg/hl	82.7	80.1
Weight per 1000 kernels, g	42.7	39.8
Protein content, %	13.2	11.2
Protein content, % (dry matter basis)	15.3	12.9
Ash content, %	1.48	1.47
α-amylase activity, units/g	2.0	7.5
Falling number, s	390	345
Flour yield, %	75.5	75.3
PSI, %	55	57
Flour		
Protein content, %	12.6	10.3
Wet gluten content, %	32.2	27.1
Ash content, %	0.44	0.47
Grade colour	-1.8	-1.7
AGTRON colour, %	71	74
Starch damage, %	6.8	5.8
α-amylase activity, units/g	0.5	4.5
Amylograph peak viscosity, BU	720	400
Maltose value, g/100 g	2.0	2.0
Farinogram		
Absorption, %	63.1	59.7
Development time, min	7.0	5.0
Mixing tolerance index, BU	30	55
Stability, min	10.0	6.5
Extensogram		
Length, cm	20	21
Height at 5 cm, BU	395	295
Maximum height, BU	795	560
Area, cm^2	205	155
Alveogram		
Length, mm	124	139
P (height x 1.1), mm	102	69
W, x 10^{-4} joules	448	291
Baking (remix-to-peak baking test)		
Absorption, %	65	59
Remix time, min	3.4	2.2
Loaf volume, cm^3/100 g flour	870	750

[1] Unless otherwise specified, data are reported on a 13.5% moisture basis for wheat and a 14.0% moisture basis for flour.

Canada Western Red Winter wheat

Table 1 shows the mean protein content for CWRW wheat for 2001 and the previous two years. The mean protein content of the 2001 crop is estimated at 11.1%, 0.8% higher than last year.

Table 10 summarizes quality data for the No. 1 CWRW new crop composite. Data from last year are shown for comparison. Test weight is lower while kernel weight is higher than last year. A high degree of soundness is evident from the high wheat falling number and flour amylograph peak viscosity values. The CWRW composite shows similar kernel texture to 2000 based on the PSI value while flour starch damage is higher this year.

Milling yield and flour colour are similar while flour ash is somewhat higher compared to last year. Physical dough tests indicate an increase in dough strength and water absorption properties compared to 2000. Good loaf volume for the protein content is evident with the remix-to-peak baking procedure.

The Canadian Wheat Board Variety Survey indicates that CDC Clair, at 54% of the acreage, is the predominant variety while CDC Harrier and CDC Kestrel represent 19% and 18% of the acreage respectively.

Table 10 • No. 1 Canada Western Red Winter wheat
Quality data for 2001 and 2000 harvest survey grade composite samples

Quality parameter[1]	2001	2000
Wheat		
Test weight, kg/hl	81.4	82.3
Weight per 1000 kernels, g	31.5	30.8
Protein content, %	11.9	11.4
Protein content, % (dry matter basis)	13.8	13.2
Ash content, %	1.45	1.40
α-amylase activity, units/g	4.5	4.5
Falling number, s	415	375
Flour yield, %	75.3	75.4
PSI, %	58	58
Flour		
Protein content, %	11.0	10.6
Wet gluten content, %	28.0	26.6
Ash content, %	0.45	0.43
Grade colour	-1.7	-1.6
AGTRON colour, %	71	73
Starch damage, %	6.3	5.4
α-amylase activity, units/g	1.0	2.0
Amylograph peak viscosity, BU	630	615
Maltose value, g/100 g	2.0	1.8
Farinogram		
Absorption, %	59.4	58.4
Development time, min	4.75	4.5
Mixing tolerance index, BU	40	50
Stability, min	7.0	6.0
Extensogram		
Length, cm	20	22
Height at 5 cm, BU	320	285
Maximum height, BU	520	450
Area, cm^2	145	125
Alveogram		
Length, mm	136	119
P (height x 1.1), mm	78	69
W, x 10^{-4} joules	340	258
Baking (remix-to-peak baking test)		
Absorption, %	59	57
Remix time, min	2.4	2.4
Loaf volume, cm^3/100 g flour	800	765

[1] Unless otherwise specified, data are reported on a 13.5% moisture basis for wheat and a 14.0% moisture basis for flour.

Canada Prairie Spring White wheat

Table 1 shows the mean protein content for CPSW wheat for 2001 and the previous two years. The 2001 crop shows a very high protein content at 13.0%, 1.6% higher than last year and 2.1% higher than 1999 year.

Table 11 summarizes quality data for the No. 1 CPSW new crop composite. Data from the 2000 harvest are included for comparison. Data for noodle quality are given in a later section. Test weight and kernel weight are higher than last year. A high degree of soundness is evident from the high wheat falling number and flour amylograph peak viscosity values. Kernel texture is considerably harder compared to last year as shown by wheat PSI. Flour starch damage is also higher than in 2000.

Milling yield is somewhat lower than last year while flour colour is slightly duller and flour ash is slightly higher. Physical dough tests indicate stronger dough properties and much higher water absorption compared to last year. Remix-to-peak baking properties show increased mixing requirements and improved loaf volume over 2000.

The Canadian Wheat Board Variety Survey identifies AC Vista as the predominant CPSW variety this year with 58% of the acreage. AC Karma (26%) and Genesis (16%) account for the remainder.

Table 11 • No. 1 Canada Prairie Spring White wheat
Quality data for 2001 and 2000 harvest survey grade composite samples

Quality parameter[1]	2001	2000
Wheat		
Test weight, kg/hl	81.9	80.5
Weight per 1000 kernels, g	40.4	37.8
Protein content, %	12.9	11.3
Protein content, % (dry matter basis)	14.9	13.0
Ash content, %	1.51	1.48
α-amylase activity, units/g	2.5	7.5
Falling number, s	410	380
Flour yield, %	75.6	76.2
PSI, %	52	57
Flour		
Protein content, %	12.0	10.3
Wet gluten content, %	32.8	28.4
Ash content, %	0.51	0.50
Grade colour	-1.6	-1.9
AGTRON colour, %	74	78
Starch damage, %	7.8	6.1
α-amylase activity, units/g	0.5	2.5
Amylograph peak viscosity, BU	780	625
Maltose value, g/100 g	2.6	2.0
Farinogram		
Absorption, %	66.6	61.6
Development time, min	4.00	3.25
Mixing tolerance index, BU	50	70
Stability, min	4.5	4.0
Extensogram		
Length, cm	24	22
Height at 5 cm, BU	240	200
Maximum height, BU	380	270
Area, cm^2	125	85
Alveogram		
Length, mm	115	123
P (height x 1.1), mm	103	69
W, x 10^{-4} joules	340	211
Baking (remix-to-peak baking test)		
Absorption, %	59	58
Remix time, min	2.0	1.4
Loaf volume, cm^3/100 g flour	760	680

[1] Unless otherwise specified, data are reported on a 13.5% moisture basis for wheat and a 14.0% moisture basis for flour.

Canada Western Soft White Spring wheat

Table 1 shows the mean protein content for CWSWS wheat for 2001 and the previous two years. The mean protein content of the 2001 crop is estimated at 11.0%, 0.1% higher than last year.

Table 12 summarizes quality data for the No. 1 CWSWS new crop composite. Data from the 2000 harvest are included for comparison. Test weight and kernel weight are higher than last year. A high degree of soundness is evident from the high wheat falling number and flour amylograph peak viscosity values. Kernel texture is somewhat harder compared to last year as shown by wheat PSI. Flour starch damage is slightly higher than last year.

Milling yield is similar to last year while flour ash and colour values are superior. Physical dough tests indicate that dough properties are somewhat stronger than 2000. Farinograph absorption is slightly higher compared to 2000.

The Canadian Wheat Board Variety Survey identifies AC Nanda (37%) and AC Reed (35%) as the predominant CWSWS varieties this year with AC Phil (25%) accounting for most of the remainder.

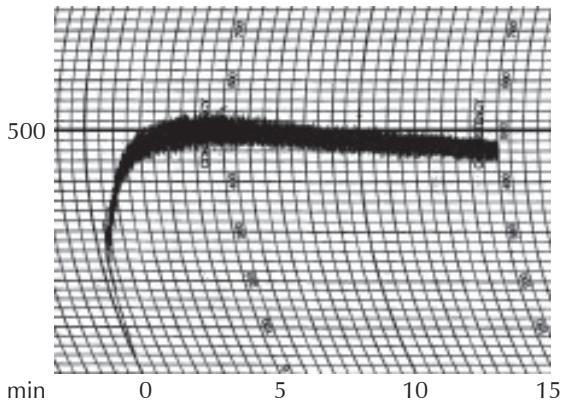
Table 12 • No. 1 Canada Western Soft White Spring wheat
Quality data for 2001 and 2000 harvest survey grade composite samples

Quality parameter[1]	2001	2000
Wheat		
Test weight, kg/hl	83.5	82.5
Weight per 1000 kernels, g	38.0	35.8
Protein content, %	11.1	10.6
Protein content, % (dry matter basis)	12.8	12.3
Ash content, %	1.44	1.46
α-amylase activity, units/g	3.0	7.0
Falling number, s	345	340
Flour yield, %	77.0	76.8
PSI, %	67	69
Flour		
Protein content, %	9.9	9.6
Wet gluten content, %	26.6	24.8
Ash content, %	0.50	0.54
Grade colour	-1.1	-0.6
AGTRON colour, %	73	71
Starch damage, %	3.4	3.0
α-amylase activity, units/g	0.5	3.0
Amylograph peak viscosity, BU	625	400
Maltose value, g/100 g	1.1	1.2
AWRC, %	59	62
Farinogram		
Absorption, %	54.5	53.9
Development time, min	1.50	1.25
Mixing tolerance index, BU	190	180
Stability, min	1.0	1.0
Alveogram		
Length, mm	96	96
P (height x 1.1), mm	23	21
W, x 10^{-4} joules	48	38
Cookie test		
Spread, mm	83.0	83.5
Ratio (spread/thickness)	8.9	9.5

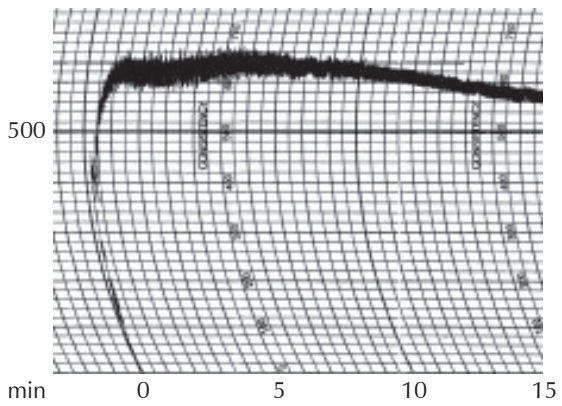
[1] Unless otherwise specified, data are reported on a 13.5% moisture basis for wheat and a 14.0% moisture basis for flour.

Farinograms
2001 crop composite samples

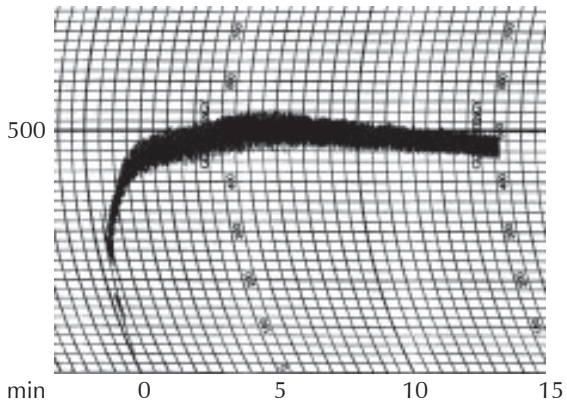
No. 1 Canada Western Red Spring wheat • 13.5



No. 1 Canada Western Extra Strong wheat • 90 rpm



No. 1 Canada Prairie Spring Red wheat



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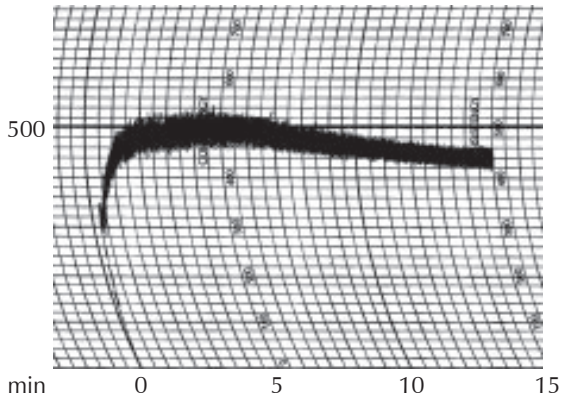

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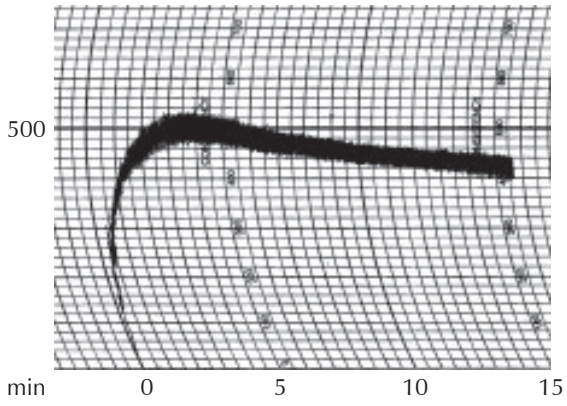
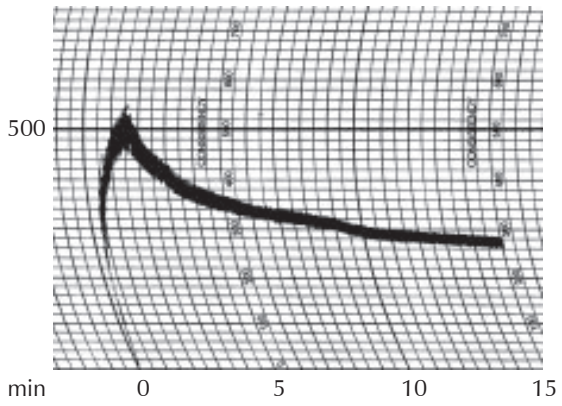


No. 1 Canada Western Soft White Spring wheat



Noodle evaluation 2001

Canada Western Red Spring

No. 1 CWRS from the 2001 and 2000 crop composites, at both 13.5 and 12.5 % protein content, were milled on the GRL tandem Buhler mill to produce a patent flour (60% yield on a clean wheat basis) and a straight grade flour. No. 2 CWRS from the 2001 and 2000 crop composites at 13.5% protein were milled in a similar manner. There was insufficient sample of No. 2 CWRS to prepare a 12.5% protein composite. Noodles were prepared for the first time in a temperature and humidity controlled room,maintained at 23° C +/-2.0°C with a relative humidity at 50% +/-2.0%. Data are shown in Tables 13, 14 and 15.

The colour of both raw and cooked yellow alkaline noodles prepared from the No.1 CWRS (13.5%), for either patent or straight grade flours (Tables 13 and 14), was comparable at both 2 hours and 24 hours to that of 2000. Similar values for the textural attributes of the cooked noodles were also found for both years. The higher humidity (50%) during production caused noodles to be slightly thicker than reported previously, resulting in lower resistance to compression values (RTC, %) than reported in previous years. Direct comparison of 2001 and 2000 samples prepared during this evaluation indicated no difference in this texture characteristic relative to last year. The observed change was due solely to our new ability to control temperature and humidity during production.

Fresh yellow alkaline noodles prepared from patent flour of No. 2 CWRS (Table 15) were comparable to the corresponding 2000 sample. Noodles prepared from the 2001 straight grade flour displayed a slight improvement in noodle brightness, L*, and yellowness, b* over their 2000 counterparts. No appreciable difference was detected in cooked alkaline noodle colour. Cooked noodle texture was similar for both years for those prepared from patent flour with a slight improvement in the 2001 noodle texture from straight grade flour as compared to last year.

The colour of both fresh raw and cooked white salted noodles prepared from No. 1 CWRS (13.5%) using either flour (Tables 13 and 14) was similar to that of 2000. Texture characteristics of 2001 cooked noodles were consistent with those of the previous year.

Fresh white salted noodles prepared from patent and straight grade flours of No. 2 CWRS (Table 15) displayed similar colour characteristics to those prepared in 2000. No differences were observed in cooked noodle colour characteristics or textural attributes between the two years.

Table 13 • No. 1 Canada Western Red Spring wheat - 13.5% protein segregate
Comparative noodle quality data for the 2001 and 2000 harvest survey composite samples[1]

Quality parameter[2]	60% patent		Straight grade	
	2001	2000	2001	2000
Flour				
Flour yield (clean basis), %	60.0	60.0	75.2	75.2
Protein content, %	12.6	12.7	13.1	13.3
Wet gluten content, %	34.5	34.1	35.6	35.0
Ash content, %	0.36	0.36	0.41	0.43
Grade colour, K-J units	-4.1	-3.6	-2.9	-2.3
AGTRON colour, %	92	88	80	78
Starch damage, Megazyme %	6.9	6.3	6.7	6.0
Amylograph peak viscosity, BU	750	740	670	700
Farinogram				
Absorption, %	62.3	60.8	62.7	61.5
Development time, min	5.25	7.25	5.25	5.50
Mixing tolerance index, BU	15	25	30	30
Stability, min	20.0	15.5	8.5	9.0
Fresh alkaline noodles				
Raw colour at 2 h (24 h)				
Brightness, L*	81.6 (76.8)	81.4 (76.5)	79.0 (72.6)	78.3 (71.9)
Redness, a*	0.3 (0.4)	0.1 (0.4)	0.2 (0.7)	0.3 (0.9)
Yellowness, b*	28.7 (29.2)	27.9 (27.9)	29.7 (28.6)	29.2 (28.8)
Cooked colour				
Brightness, L*	66.1	65.9	64.2	64.8
Redness, a*	-1.7	-1.9	-1.4	-1.6
Yellowness, b*	28.2	27.9	28.2	27.5
Texture				
Thickness, mm	2.30	2.23	2.33	2.26
RTC, %	22.5	22.2	22.5	23
Recovery, %	31.7	31.1	30.6	31.2
MCS, g/mm^2	27.5	26.0	26.5	27.0
Fresh white salted noodles				
Raw colour at 2 h (24 h)				
Brightness, L*	83.3 (78.1)	83.0 (77.5)	81.6 (75.0)	80.3 (73.9)
Redness, a*	2.4 (2.8)	2.4 (2.7)	2.8 (3.5)	2.9 (3.6)
Yellowness, b*	24.5 (26.1)	24.1 (25.1)	24.7 (24.5)	25.3 (24.7)
Cooked colour				
Brightness, L*	76.3	76.4	75.6	75.7
Redness, a*	-0.2	-0.2	0.2	0.4
Yellowness, b*	18.5	18.0	18.1	18.0
Texture				
Thickness, mm	2.60	2.60	2.68	2.65
RTC, %	20.6	21.2	21.3	23.2
Recovery, %	26.4	27.6	25.7	27.1
MCS, g/mm^2	24.5	25.1	23.2	25.1

[1] The 2000 composites were stored and milled the same day as the respective 2001 composite and replicated the following day in reverse order.

[2] Unless otherwise specified, data are reported on a 13.5% moisture basis for wheat and a 14.0% moisture basis for flour.

Table 14 • No. 1 Canada Western Red Spring wheat - 12.5% protein segregate
Comparative noodle quality data for the 2001 and 2000 harvest survey composite samples[1]

Quality parameter[2]	60% patent		Straight grade	
	2001	2000	2001	2000
Flour				
Flour yield (clean basis), %	60.0	60.0	74.7	74.5
Protein content, %	11.8	11.8	12.2	12.2
Wet gluten content, %	32.0	31.4	32.4	31.7
Ash content, %	0.37	0.37	0.44	0.44
Grade colour, K-J units	-4.3	-4.1	-2.9	-2.8
AGTRON colour, %	93	93	82	81
Starch damage, Megazyme %	7.2	6.7	6.9	6.5
Amylograph peak viscosity, BU	715	740	670	675
Farinogram				
Absorption, %	62.0	60.2	62.4	60.6
Development time, min	4.25	4.00	4.75	4.25
Mixing tolerance index, BU	15	20	30	25
Stability, min	17.0	12.0	8.5	9.0
Fresh alkaline noodles				
Raw colour at 2 h (24 h)				
Brightness, L*	82.1 (77.3)	82.0 (77.5)	79.4 (73.1)	78.6 (72.4)
Redness, a*	0 (0.2)	0.1 (0.2)	0.2 (0.7)	0.2 (0.8)
Yellowness, b*	28.8 (29.0)	28.3 (28.6)	29.8 (29.1)	29.5 (28.8)
Cooked colour				
Brightness, L*	64.4	65.9	65.0	65.3
Redness, a*	-1.5	-1.9	-1.4	-1.8
Yellowness, b*	28.6	28.4	28.7	28
Texture				
Thickness, mm	2.29	2.21	2.33	2.19
RTC, %	22.5	21.3	21.7	22
Recovery, %	30.9	31.1	30.3	31.2
MCS, g/mm^2	25.1	23.8	25.3	24.4
Fresh white salted noodles				
Raw colour at 2 h (24 h)				
Brightness, L*	84.5 (79.4)	84.3 (78.9)	82.1 (75.5)	82.2 (74.9)
Redness, a*	2.2 (2.5)	2.2 (2.5)	2.7 (3.2)	2.6 (3.1)
Yellowness, b*	24.0 (25.7)	23.9 (25.5)	25.2 (24.7)	23.8 (23.9)
Cooked colour				
Brightness, L*	75.9	76.3	75.3	75.4
Redness, a*	-0.3	-0.3	0.3	0.2
Yellowness, b*	18.7	18.2	18.7	18.3
Texture				
Thickness, mm	2.54	2.53	2.54	2.61
RTC, %	18.5	18.7	20.1	20.6
Recovery, %	25.9	27.4	27.1	27.2
MCS, g/mm^2	23.0	23.6	22.9	23.8

[1] The 2000 composites were stored and milled the same day as the respective 2001 composite and replicated the following day in reverse order.

[2] Unless otherwise specified, data are reported on a 13.5% moisture basis for wheat and a 14.0% moisture basis for flour.

Table 15 • No. 2 Canada Western Red Spring wheat - 13.5% protein segregate
Comparative noodle quality data for the 2001 and 2000 harvest survey composite samples[1]

Quality parameter[2]	60% patent		Straight grade	
	2001	2000	2001	2000
Flour				
Flour yield (clean basis), %	60.0	60.0	74.5	74.5
Protein content, %	12.5	12.7	13.1	13.2
Wet gluten content, %	34.8	34.2	35.6	35.3
Ash content, %	0.39	0.38	0.43	0.45
Grade colour, K-J units	-3.3	-3.1	-1.9	-1.7
AGTRON colour, %	92	91	78	77
Starch damage, Megazyme %	6.5	6.1	6.2	5.9
Amylograph peak viscosity, BU	805	565	730	490
Farinogram				
Absorption, %	61.9	61.0	62.3	61.6
Development time, min	4.75	4.75	4.75	5.50
Mixing tolerance index, BU	25	20	40	30
Stability, min	9.0	11.5	7.0	9.0
Fresh alkaline noodles				
Raw colour at 2 h (24 h)				
Brightness, L*	80.9 (76.1)	80.4 (76.1)	77.4 (70.8)	76.4 (70.7)
Redness, a*	0.3 (0.6)	0.3 (0.5)	0.4 (1.1)	0.5 (1.0)
Yellowness, b*	27.8 (28.4)	27.5 (27.9)	29.3 (28.3)	28.9 (27.8)
Cooked colour				
Brightness, L*	65.8	65.6	64.6	63.9
Redness, a*	-1.9	-2.2	-1.6	-1.7
Yellowness, b*	28.3	27.8	27.9	27.3
Texture				
Thickness, mm	2.35	2.32	2.36	2.30
RTC, %	25.0	24.3	25.6	23.7
Recovery, %	31.3	31.0	31.3	30.3
MCS, g/mm^2	27.7	27.2	27.1	25.5
Fresh white salted noodles				
Raw colour at 2 h (24 h)				
Brightness, L*	82.5 (77.5)	82.5 (76.7)	80.3 (73.3)	80.4 (72.9)
Redness, a*	2.5 (2.8)	2.5 (2.7)	3.1 (3.7)	2.9 (3.6)
Yellowness, b*	24.8 (25.7)	24.1 (25.0)	25.1 (25.1)	24.3 (23.8)
Cooked colour				
Brightness, L*	76.1	76.0	75.3	74.8
Redness, a*	0	-0.1	0.5	0.4
Yellowness, b*	18.6	17.9	18.5	18.0
Texture				
Thickness, mm	2.58	2.60	2.63	2.69
RTC, %	20.9	20.7	22.3	22.3
Recovery, %	26.7	26.8	27.2	27.4
MCS, g/mm^2	24.3	24.6	25.1	26.3

[1] The 2000 composites were stored and milled the same day as the respective 2001 composite and replicated the following day in reverse order.

[2] Unless otherwise specified, data are reported on a 13.5% moisture basis for wheat and a 14.0% moisture basis for flour.

Canada Prairie Spring White

The drier growing conditions throughout much of Western Canada resulted in above average protein content for this class, which influenced a number of quality characteristics listed in Table 16. The new variety, AC Vista, became the dominant variety grown across Western Canada. It is important to note that while a significant increase in protein content was found in both the 60% patent and straight grade flours for the 2001 crop, fresh alkaline noodle brightness remained comparable to the lower protein 2000 samples, particularly in the noodles prepared from 60% patent flour. No appreciable difference was detected in 2001 alkaline noodle redness, a*, or yellowness, b* as compared to the 2000 samples.

Cooked alkaline noodles prepared from 2001 flours retained noodle brightness comparable to last year's crop at both extraction levels. A slight shift in cooked a* values for the 2001 noodles is consistent with the higher flour protein content. No differences were detected in the yellowness, b*, of the cooked alkaline noodles.

The increased protein content in CPSW flours resulted in a significant increase in all cooked alkaline noodle textural parameters reflecting greater bite (MCS) and chewiness (RTC, % and REC, %).

Although the 2001 flours had a higher protein content than 2000, fresh white salted noodle brightness was comparable to last year's noodles. A moderate increase in fresh noodle redness was observed,consistent with the increase in protein content for the 2001 crop.

Cooked white salted noodles prepared from the 2001 crop were comparable in noodle brightness, L*, and redness, a*, to those of the 2000 crop for both patent and straight grade extraction flour noodles. A slight shift in noodle a* values for 2001 was observed in accordance with the higher protein content.

The cooked 2001 crop white salted noodles displayed textural attributes consistent with the 2000 crop year noodles for both patent and straight grade flours.

Table 16 • No. 1 Canada Prairie Spring White wheat
Comparative noodle quality data for 2001 and 2000 harvest survey composite samples[1]

Quality parameter[2]	60% patent		Straight grade	
	2001	2000	2001	2000
Flour				
Flour yield (clean basis), %	60	60	75.3	74.6
Protein content, %	11.3	9.4	11.9	10.3
Wet gluten content, %	31.9	26.7	32.7	28.1
Ash content, %	0.39	0.38	0.47	0.47
Grade colour, K-J units	-3.5	-3.9	-2.1	-2.3
AGTRON colour, %	88	91	75	79
Starch damage, Megazyme %	6.9	5.6	6.7	5.5
Amylograph peak viscosity, BU	900	700	840	600
Farinogram				
Absorption, %	63.5	59.1	63.5	59.1
Development time, min	3.50	3.25	3.50	3.00
Mixing tolerance index, BU	50	60	60	80
Stability, min	5.0	5.0	4.0	4.5
Fresh alkaline noodles				
Raw colour at 2 h (24 h)				
Brightness, L*	82.5 (77.3)	82.7 (77.7)	78.7 (71.9)	79.2 (73.1)
Redness, a*	-0.7 (-0.4)	-0.9 (-0.5)	-0.5 (0.3)	0.8 (0.2)
Yellowness, b*	28.0 (28.3)	27.6 (27.7)	30.3 (29.1)	29.5 (28.6)
Cooked colour				
Brightness, L*	66.1	66.4	65.2	65.2
Redness, a*	-2.3	-3.1	-2.1	-2.6
Yellowness, b*	29.9	30.2	30.1	30.2
Texture				
Thickness, mm	2.24	2.12	2.21	2.11
RTC, %	24.1	20.9	23.9	21.2
Recovery, %	30.4	27.7	30.3	27.8
MCS, g/mm^2	24.8	21.1	24.2	20.5
Fresh white salted noodles				
Raw colour at 2 h (24 h)				
Brightness, L*	84.4 (78.7)	85.0 (79.5)	82.0 (75.1)	81.7 (74.9)
Redness, a*	1.8 (2.0)	1.5 (1.7)	2.3 (2.9)	2.2 (2.7)
Yellowness, b*	23.4 (23.9)	21.9 (22.9)	24.7 (24.2)	23.8 (23.1)
Cooked colour				
Brightness, L*	76.2	76.4	75.6	75.0
Redness, a*	-0.6	-0.9	-0.1	-0.3
Yellowness, b*	17.8	17.3	18.2	17.6
Texture				
Thickness, mm	2.43	2.39	2.46	2.44
RTC, %	19.4	17.7	20.6	19.2
Recovery, %	24.4	24.9	25.5	25.1
MCS, g/mm^2	18.7	17.5	20.2	18.1

[1] The 2000 composites were stored and milled the same day as the respective 2001 composite and replicated the following day in reverse order.

[2] Unless otherwise specified, data are reported on a 13.5% moisture basis for wheat and a 14.0% moisture basis for flour.